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WESTERN PROVINCE BIODIVERSITY PROFILE AND CONSERVATION ACTION PLAN



MINISTRY OF ENVIRONMENT AND NATURAL RESOURCES
BIODIVERSITY SECRETARIAT

WESTERN PROVINCE BIODIVERSITY PROFILE AND CONSERVATION ACTION PLAN:

Channa Bambaradeniya



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Message from the Hon. Minister

Sri Lanka is a small island with rich biological diversity and high level of endemism. Biodiversity of the country is unique and hence it has universal value. Nevertheless, it is currently under threat from ever increasing human interferences. Due to this extraordinary endemism and also high level of threat the country is considered as one of the global biodiversity hotspots.

Biodiversity Conservation is not a new phenomenon to Sri Lanka. From ancient times Sri Lankans have had close relations with flora and fauna and they were very much concerned about their conservation and protection for the benefit of future generation. As we all know the world's first recorded sanctuary, 'Mihintale' is located in Sri Lanka.

Sri Lanka has adopted a positive approach in formulating new policies and strategies towards conserving its biological wealth. We have signed and ratified the Convention on Biological Diversity (CBD) and are already in the process of implementing relevant provisions. I am proud to say that Sri Lanka is one of the very first countries that prepared Biodiversity Conservation Strategy and Action Plan.

Nevertheless, we are facing severe problems in conserving our biological diversity. As outlined in the 2007 Red List of Threatened Fauna and Flora of Sri Lanka, the rate of biodiversity loss in Sri Lanka is increasing rapidly as can be seen in other countries in the world.

Therefore, we need to act now to reduce the biodiversity loss or hold the extinction of endangered species. I believe these Provincial Biodiversity Conservation Profiles and Action Plans are a key strategy to achieve this objective. Biodiversity issues are not concentrated to a particular locality of the country but are distributed in various provinces of the country in different scales.

I strongly believe that this document would be an excellent guide with immense value to all stakeholders who are working on conservation and sustainable use of biodiversity.

Patali Champika Ranawaka

Minister of Environment & Natural Resources

Message from the Secretary

Sri Lanka has signed and ratified the ‘Convention on Biological Diversity’ and is obliged to implement the relevant provisions of the Convention. This Ministry has developed the “Strategy for the Conservation and Sustainable use of Biological Diversity” as early as in 1994 by way of implementing Article 6 of the Convention. This was followed by the development of the ‘Biodiversity Framework Action Plan’ in 1998. In 1997, Sri Lanka finalized the preparation of complete Biodiversity Conservation Action Plan (BCAP) with the development of the “Addendum to the Biodiversity Conservation Framework Action Plan”.

A consultative approach was followed in the preparation of this addendum. During the addendum preparatory process a series of workshops were held by the Ministry with relevant Provincial Administrations and all other relevant stakeholders of the province to discuss draft recommendations and they were revised when and where necessary. At these workshops it was highlighted that the addendum recommendations were focused on national level and adequate attention was not paid to provincial issues. As a solution to this issue, it was decided to develop Biodiversity Conservation Profiles and Action Plans (BDCPAP) at provincial level. The Component C of the Protected Area Management and Wildlife Conservation Project of the Ministry provided necessary financial assistance.

The Ministry considers that the preparation of BDCPAP at provincial level is a unique exercise as it is one of the first such activities done in the world. This Ministry has ensured that all stakeholders of the relevant province were involved in the preparatory process. Thus we can be happy that this unique exercise produced a document through the collective efforts of all stakeholders for the conservation of biodiversity at provincial level. I strongly believe that the final product is very comprehensive and meets the needs of the Western Province.

M A R D Jayatilake

Secretary

Ministry of Environment & Natural Resources

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Dr. Channa Bambaradeniya

The Consultant

Western Province Biodiversity Profile and Conservation Action Plan.

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Abbreviations

BDS	–	Biodiversity Secretariat of Ministry of Environment
CEA	–	Central Environmental Authority
PA	–	Provincial Administration
UDA	–	Urban Development Authority
DWC	–	Department of Wildlife Conservation
FD	–	Forest Department
DBG	–	Department of Botanic Gardens
DZG	–	Department of Zoological Gardens
DAM	–	Department of Ayurvedic Medicine
EFL	–	Environmental Foundation Limited
SLRC	–	Sri Lanka Rupavahini Corporation
NIE	–	National Institute of Education
DA	–	District Administration
SLTB	–	Sri Lanka Tourist Board
DC	–	Department of Customs
(E)	–	English Name
(S)	–	Sinhala Name

1 INTRODUCTION

The Western Province of Sri Lanka, covering an extent of 3,684 km², includes the administrative districts of Colombo (699 km²), Gampaha (1387 km²) and Kalutara (1598 km²), covering 31 AGA divisions. The Western Province is bordered by the coast in the West, the North-Western Province in the North, the Southern Province in the South and the Sabaragamuwa Province in the East (Figure 1).

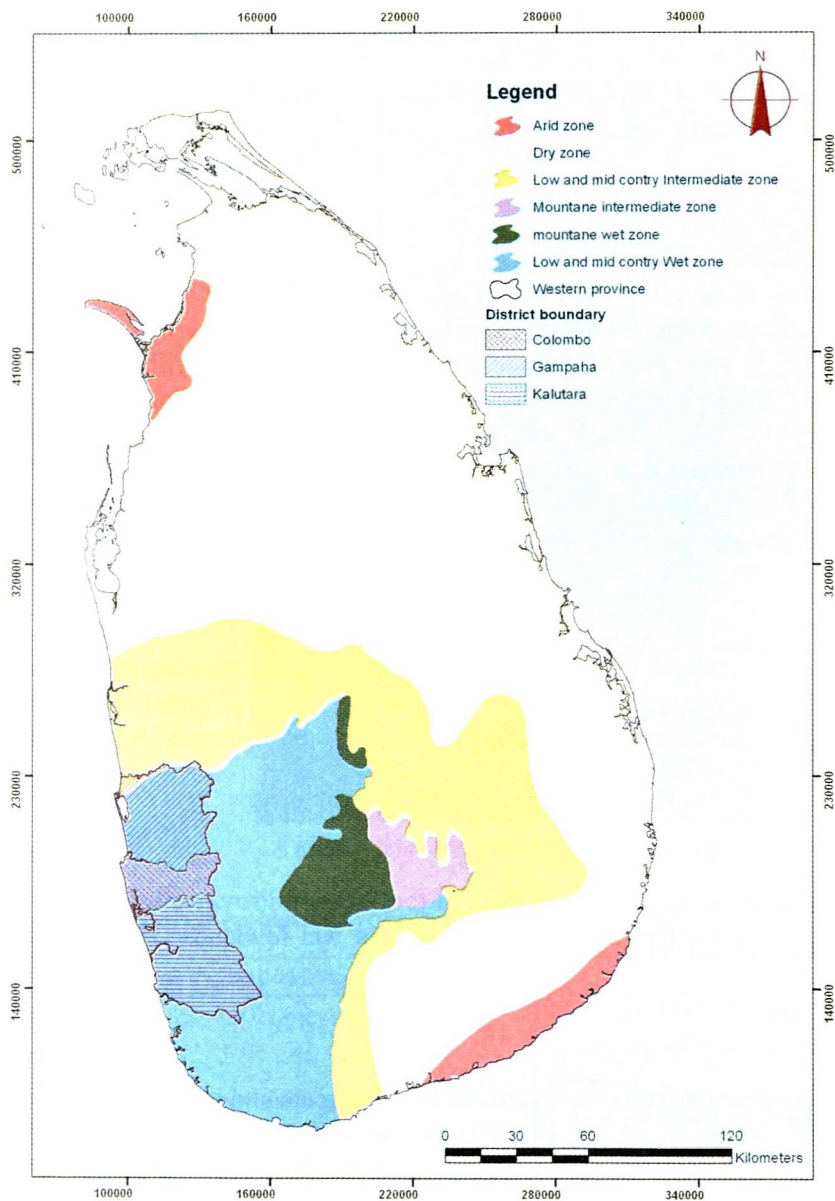


Figure 1: Location of the Western Province and its three Districts (map prepared by Prasanna Samarawickrama)

A process was initiated by the Biodiversity Secretariat of the Ministry of Environment, to prepare a ‘Provincial Biodiversity Profile and Action Plan’ in year 2006, in collaboration with the Western Provincial Council. The information in the profile was extracted from secondary sources such as published papers and articles as well as unpublished reports. This document was prepared in a consultative manner, where total of three workshops were held for provincial administrators and other officers representing different provincial departments, who contributed with information for upgrading the draft Profile and Action Plan. The Profile and the Action Plan are intended to guide and promote the conservation and sustainable use of biodiversity in the Western Province.

2 BIO-GEOGRAPHICAL, PHYSICAL AND EDAPHIC ASPECTS

General geography and climate

Of the total extent in the Western Province, 91 km² (2.5%) is occupied by inland water bodies. The floodplains of three main rivers – Kalu, Kelani and Attanagalu-Oya are located within the Western Province. The province spans across the south-western lowland wet zone of Sri Lanka. The topography of the landscape is generally flat in the coastal areas, with a rolling and undulating terrain towards the eastern part of the province, where the altitude increases up to about 100m. According to data gathered by the Colombo Weather Station, the mean annual temperature for this area ranges from 27 – 28 °C, while the mean annual rainfall ranges from 1900-2400 mm (Source: Department of Census and Statistics, 2005).

Geology and soils

The geology of the province is dominated by Precambrian rocks of the Southwestern Group, consisting of schists, gneisses, and granulites of metasedimentary origin, as well as migmatite and granitic gneisses. As in other parts of the wet zone, red-yellow podzolic soils are the main soil type in the Western Province, with sub-groups. The soil in the Colombo and Gampaha districts include the sub-group with soft or hard laterite concretions, which also occurs to a lesser extent in the Kalutara district. The ‘ill-drained’ lands in the lower coastal plain of the province include Bog and Half-bog soils (ie., in Muthurajawela and Attidiya marshes). The beach areas from Negambo (Gampaha district) to Mount Lavinia (Colombo district) consist of a narrow stretch of Latesols and Regosols on old red and yellow sands. Narrow strips of alluvial soils occur along the floodplains of Kelani river, Dandugam Oya and Kalu river.

Agro-ecological zones

According to the classification of agro-ecological zones, the Western Province consists of three main zones (WL 1, WL 3 and WL 4) under the low-country wet zone. The Colombo District spans across WL 4, WL 3 and WL 1 zones; the Gampaha District falling mainly under WL 3 and the Kalutara District spread across WL 4 and WL 1.

Floristic zones

Of the 15 floristic regions identified in Sri Lanka, the flora of the Western Province belongs to three main floristic regions; the coastal and marine belt (zone 1), the northern wet lowlands (zone 5) and southern lowland hills (zone 7).

Bioregions

A total of 15 bioregions have been recognised in Sri Lanka, based on climate and geophysical classifications, the fauna and flora distribution patterns, and the biodiversity richness of different parts of the country. The inland area of the Western Province belongs to the 4th bioregion, while its coastal zone belongs to the 12th bioregion.

Faunal zones

Of the three main ichthyological zones of freshwater fish in Sri Lanka, the Western Province falls under the south-western ichthyological zone, where 12 species of rare endemic fish are confined to. Of the mammalian zones in Sri Lanka, the wild mammals of the Western Province belong to the wet zone lowlands mammal zone.

3 ECOSYSTEM PROFILE

The Western Province harbour an array of natural and human-influenced forest and wetland ecosystem types. Details and statistics related to these ecosystem types are elaborated in this section.

Forest ecosystems

Remnant patches of tropical lowland rainforests are scattered mainly in the Kalutara district (Table 1a). Near primary and secondary forest cover in the Western Province occupies approximately 16% of the land area (Table 1b).



A tropical rainforest (Photo: Channa Bambaradeniya)

Table 1a: Natural terrestrial vegetation types in the Western Province

Terrestrial Vegetation Types	Sites
Tropical wet evergreen forests/Tropical lowland rainforests	Haycock, Indikada Mukalana, Labugama-Kalatuwana, Morapitiya-Runakanda, Neluketiya Mukalana, Ingiriya forest
Riverine gallery forests	Kelani and Kalu river banks (mid-stream)
Coastal scrubland and sea-shore vegetation	Uswetakeiyyawa, Galkissa, Kalutara

Table 1b: Forest cover in the Western Province

District	Forest types	Area (ha)	% Forest Cover
COLOMBO	Natural forest	1868.042	2.8
	Plantation	178.166	0.26
	Total forest cover (ha)	2046.208	3.06
GAMPAHA	Natural forest	428.184	0.31
	Plantation	345.982	0.25
	Total forest cover (ha)	774.167	0.56
KALUTARA	Natural forest	21575.799	13.2
	Plantation	1069.429	0.65
	Total forest cover (ha)	22645.228	13.92

Several patches of primary and secondary lowland evergreen forests (also known as tropical rainforests) are scattered in the province, and these range from about 20 ha to 7000ha (ie., Morapitiya-Runakanda forest in Kalutara district). The patches of relatively intact tropical rainforests in the province consist of vegetation arranged in at least four strata; a canopy layer (*Mesua* spp. and *Shorea* spp., growing to 30-45m), a sub-canopy layer (*Cullenia* spp. and *Myristica* spp., which range between 15-25m), an understory layer (*Syzygium* spp. up to 10m) and a ground herbaceous vegetation cover.

Riverine gallery forests occur in the banks of certain stretches of streams and rivers in the Western Province. The distribution of this vegetation type can be as narrow as a few meters on the steeper terrain or over 10m wide in the flat areas in the lower reaches. Vegetation height is about 25m-35m with a closed canopy belt of forests. Sub-canopy (15m) and shrubs/herbs (0.5m-3m) layers can also be distinguished. General luxuriance compared to other forests makes it more akin to rain forests. Lianas are important constituents of the forest framework. This vegetation type also has a very high floristic richness, dominated by evergreen species such as *Terminalia arjuna*, *Madhuca longifolia*, *Mangifera zelanica*, and *Diospyros malabarica*.

The coastal scrubland consist of salinity tolerant vegetation that borders the sea shore, and includes species such as *Thespesia populnea*, *Hibiscus tiliaceus*, *Scaevola takkada* and *Pandanus* spp. The gentle sea-shore vegetation is dominated by runners and creepers such as *Ipomoea pescapre*.

Wetland ecosystems

Several types of inland freshwater, brackishwater and marine wetlands occur in the Western Province (Table 2a). The natural freshwater wetlands include swamps, marshes, floodplains and rivers, while man-made freshwater wetlands include more than 60 irrigation tanks, ponds and reservoirs (Table 2c). The coastal brackishwater wetlands include a few patches of mangrove, lagoons, estuaries, salt marshes and saline peat bogs. The shallow marine wetlands type is dominated by rock and sand-stone reefs, with patches of isolated corals.



Muthurajawela marsh (Photo: Channa Bambaradeniya)

Table 2a: Wetland ecosystems in the Western Province

Wetland Types	Sites
Inland wetlands	
Freshwater Swamps	Walauwatte-Wathurana
Freshwater Marshes	Bellanwila-Attidiya
	Kolonnawa and Bloomendal marsh
	Sri J'pura-Kotte marsh
	Heen marsh
	Muthurajawela marsh
Floodplains	Diyawanna-oya
Rivers and Streams	Kelani River
	Bolgoda river
	Kalu River
	Attanagalu oya (including Dandugam oya)
Tanks and Ponds	Beira lake
	Thalangama tank
	Boralesgamuwa tank
	Kesbewa tank
	Gammanpila tank (Bandaragama)
Reservoirs	Labugama and Kalatuwawa
Coastal wetlands	
Mangrove	Negombo (lagoon fringing mangrove)
	Benthota (riverine fringing mangrove)
	Kaduru Duwa (lagoon fringing mangrove)
	Benthota-Ittapana (riverine fringing mangrove)
Lagoons (including sea grass beds)	Lunawa lagoon
	Negambo lagoon
Estuaries	Panadura estuary
	Benthota estuary
	Kelani estuary
Salt marshes	Muthurajawela
Saline peat bogs	Muthurajawela
Marine Wetlands	
Rock and sand-stone reefs (with patches of coral)	Near-shore coastal stretch from Colombo port to Mount Lavinia
	Benthota area

Table 2(b): District-wise total extent of coastal habitats in Western Province (in ha)

District	Mangroves	Salt Marshes	Dunes	Beaches, Barrier beaches, Spits	Lagoons	Estuaries	Other Water Bodies	Fresh Water Marsh
Colombo	5	-	-	44	23	624	68	38
Kalutara	45	-	-	64	6	930	-	1895
Gampaha	85	647	53	49	-	3289	10	1348
Total Extent	135	647	53	157	29	4843	78	3281

(Source: CZMP, 2004)

Table 2(c): List of irrigation tanks in the Western Province

Tanks	District	DS Division
Kopiyawatha wewa; Chamali Pura Wewa;	Kaluthara	Kaluthara
Aluthgama Wewa(Pansal Wewa); Madagama Kuda Wewa; Wawita Wewa; Widagama Wewa (Walgama Wewa); Gammanpila Wewa	Kaluthara	Bandaragama
Remuna wewa	Gampaha	Madurawala
Pitadeniya tank; Kudumberiya tank; Ethiliyagala tank; Bogala Agara tank; Siri Ambepura tank; Damwelkatuwa tank; Kalumada tank; Dagonna Dachchagara tank; Hal Ullagara tank; Thota tank; Katukenda tank	Gampaha	Diulapitiya
Mabodale tank	Gampaha	Minuwangoda
Hapittigama Dalugalgala tank; Heediyawala tank; Detagama Halwatta tank; Thennagama tank; Meegahamadiththa tank; Kuruduwattha tank	Gampaha	Mirigama
Dadagamuwa tank; Horakale tank; Alubogahadeniya tank; Thalgahadeniya tank; Marathagahadeniya tank; Dalupothadeniya tank	Gampaha	Aththanagalla
Lokurudeniya tank	Gampaha	Gampaha
Puwakgahadeniya Yaya tank	Gampaha	Gampaha
Ihalagama tank; Kapuwa tank; Kadurgaha tank (Walpolu tank); Peralanda tank	Gampaha	Ja Ela
Nugahenawatta tank; Rajapaksha tank; Dalukanda tank; Sohonabumiya tank; Maharagama tank; Madalanda tank; Horokgaha tank; Thethipanladieniya Tank; Nelamahara tank; Rajamahawihara tank; Deniya tank; Gadumuna tank; Saranawatta tank	Gampaha	Mahara
Peenchathudeniya tank; Ariddagahadeniya tank; Panigahawila tank; Herukuburayaya tank; Kibulwila tank; Alubogahadeniya tank; Mawathahena tank; Peerawila Jalsaya tank	Gampaha	Dompe
Yabaraluwa tank; Heladeniya tank	Gampaha	Biyagama
Thalangama tank	Colombo	Homagama
Kesbewa tank	Colombo	Kesbewa

Three main rivers fall into the sea through the Western Province; Kelani, Attanagalu-oya and Kalu rivers. A fourth one – the Benthara river, forms the boundary between the Western and Southern provinces. These main rivers and their tributaries are connected with several types of inland and coastal wetlands in the province. Several fresh water marshes occur in the low-lying areas of the province. These are shallow inland depressions which are either connected to a river or receiving water through surface run-off and ground water seepage. Partially decomposed organic material in such marshes form peat, characterized by water logged sticky soil. A typical example is the Muthurajawela Marsh, which is the largest peat bog in Sri Lanka. These marshes harbour aquatic and semi-aquatic vegetation, dominated by grasses, sedges and other herbaceous plants. The fresh water swamp forest is a late successional stage of a freshwater marsh ecosystem, comprising of trees such as *Stemonoporus moonii* and *Mesua stylosa* that are adapted to grow in shallow stagnant water. Swamp forests are seasonally inundated with river water. It is the most rare wetland type in Sri Lanka and a good example is the Walauwatte-Wathurana Swamp Forest (12 ha) located in the Kalu river basin.

The main coastal wetlands in the Western Province include estuaries, lagoons and associated mangrove swamps. Estuaries are formed in places where rivers enter the sea.

The estuaries form the largest extent of coastal wetland habitats in the Western Province (see Table 2b). The estuaries of the Kelani, Kalu and Benthara rivers harbour stands of riverine fringing mangrove. The lagoons are salt or brackish water coastal wetlands separated from the sea by a low sand bank with one or more relatively narrow permanent or seasonal outlets to the sea. Lagoons such as Lunawa and Kaduruduwa in the Kalutara district harbour patches of lagoon fringing mangrove.

Agro-ecosystems

The agro-ecosystems in the Western Province are dominated by paddy cultivations and plantation crops such as coconut, rubber and tea (Table 3). Paddy fields are characterized by the presence of a standing water body, which is temporary and seasonal. Hence, flooded paddy fields can be considered as agronomically managed marshes. They are temporary and seasonal aquatic habitats, that sustain wetland associated fauna. Another agro-ecosystem type is the home gardens with multi-species vegetation. The extremely high demand for land in this province for commercial industries and human settlements has resulted in the transformation of agro-ecosystems into built areas over the last two to three decades. Of the available paddy land in the province, only about 65% is asweddumized annually.



A paddyfield ecosystem (Photo: Channa Bambaradeniya)

Table 3: Extents (ha) of agro-ecosystems in the Western Province

Agro-ecosystem types	Colombo	Gampaha	Kalutara
Paddy fields	4137	8981	15066
Tea cultivations	194	--	7067
Coconut cultivations	7292	43130	11276
Rubber cultivations	7064	3055	29922
Home gardens	unknown	unknown	unknown
Plantation forests	178	346	1070

(Source: Department of Census ad Statistics (2002 data))

Urban biodiversity refuges

Apart from the above managed landscapes, several types of human-influenced urban biodiversity refuges occur in the Colombo district. These include small home gardens (ie., in Colombo 07 area), urban parks (ie., Viharamahadevi park), temple gardens, cemeteries (ie., Borella cemetery), play grounds (ie., Colombo golf course) and roadside avenue plantations (ie., Colombo 7 area).



The Borella Cemetery (Photo: Channa Bambaradeniya)



Viharamahadevi Park (en.wikipedia.org)

4 SPECIES PROFILE

Species richness, endemic species, threatened species

About 35% of the inland indigenous vertebrate species in Sri Lanka occur in the Western Province, which includes about 20% of the endemic vertebrate species in the island (Table 4). Approximately 25% of the total indigenous vertebrate species in the Western Province are nationally threatened (see Annex 9 for details).

Table 4: Statistics of inland fauna and flora in the Western Province, in relation to Sri Lanka

Location	Number of Species						
	Butterflies	FW Fish	Amphibians	Reptiles	Birds	Mammals	Flora
Sri Lanka	243	82	106 +	171	227	91	3771 *
	20 E	44 E	90 +E	101 T	33 E	16 E	926 E
	66 T	28 T	52 T	56 T	46 T	41 T	675 T
Western Province ¹	69	76 @	18	47	135	36	1000
	4 E	19 E	5 E	8 E	17 E	6 E	300 E
	17 T	18 T	2 T	17 T	17 T	17 T	139 T
Colombo ¹							500
	3 T	10 T	2 T	3 T	5 T	10	75 E 22 T
Gampaha ¹							700
	1 T	9 T	2 T	4 T	3 T	8 T	125 E 10 T
Kalutara ¹							900
	14 T	16 T	2 T	10 T	16 T	15 T	175 E 126 T

(Source: IUCN and MOENR, 2007)

Notes: E – Endemic Species, T – Nationally Threatened Species; ¹ Based on published sources up to now; @includes fresh and brackish water species; + Several new amphibian species currently being described; *Total angiosperm flora including exotic naturalized species; Plant numbers (total and endemics) for the province and districts is based on estimates.

More than 25% of the flowering plant species in Sri Lanka occur in the Western Province. At least 30% of them are endemic to Sri Lanka, while more than 10% of them are nationally threatened (see Annex 10 for details). A recent publication by the Ministry of Environment has compiled 73 species of endemic flowering plants occurring in the Colombo and Gampaha districts, and 174 species in the Kaluthara district. The lower plants in the Western Province have not been adequately documented. The Pteridophytes recorded from a forest in the Kalutara district includes 32 species (see Annex 8).

Published information indicates the occurrence of 76 species of fish in the wetland habitats of the Western Province, which includes fresh and brackish water forms (Annex 1). Most of the amphibians in the Western Province (Annex 2) include species that are adapted to exist in modified landscapes. Of the total reptile species recorded from the Western Province (Annex 3), about 40% are nationally threatened. Nearly half of the native vertebrate species in the Western Province consist of birds (Annex 4). These include several migratory species as well. Of the mammals recorded from the Western Province (Annex 5), a few isolated populations of five endemic arboreal species (3 primates, 1 rodent and 1 viverid) are scattered in the three districts. Among the invertebrate fauna in the Western Province, the butterflies are relatively well documented (Annex 6), with about 30% of the total species in Sri Lanka occurring in the three districts.

Relict Species

Among the endemic vertebrate fauna in the Western Province, the Ornate Paradise Fish (*Malpulutta kretseri*), the Sri Lanka Rock Frog (*Nannophrys ceylonensis*), the Corrugated Water Frog (*Lankanectus corrugatus*), the Common Lanka Skink (*Lankascincus fallax*), Gan's Lanka Skink (*Lankascincus gansi*), and Spot-winged Thrush (*Zoothera spiloptera*), Blue Magpie (*Urocissa ornata*) are geographical relicts, which are of evolutionary significance. Similarly, among the endemic flowering plants, *Walidda antidysenterica*, *Stemonoporus mooni*, *Stemonoporus canaliculatus* and *Sunaptea scabriuscula* are geographic relicts.



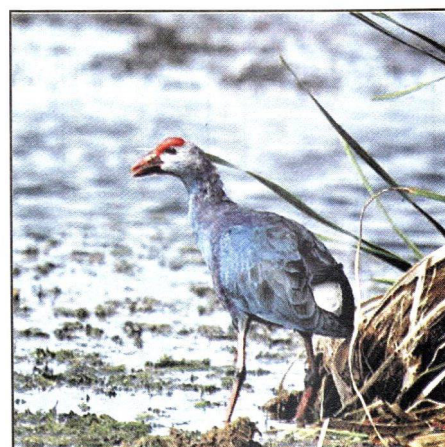
Ornate paradise fish: *Malpulutta kretseri*
(iglnl.netfirms.com)



Indian Jackal
(Photo: Mendis Wickramasinghe)



Sri Lanka Rock frog
(Photo: Channa Bambaradeniya)



Purple Coot
(Photo: Mendis Wickramasinghe)

5 GENETIC PROFILE

Agricultural crop varieties

The genetic profile of agricultural crops could be elaborated under crop wild relatives, and crop varieties, especially with a focus on traditional varieties.

Among the grain crops grown in the Western Province, several species of traditional rice cultivars are still grown by small scale farmers in Gampaha and Kalutara districts. A species of wild rice has been documented from the Muthurajawela marsh in the Gampaha district, which used to be an area widely used for rice cultivation during the Kotte kingdom.

About 4-5 decades ago, the commonly cultivated traditional rice varieties in the Western Province included 'four month' varieties such as Murungakayam, Wella illangaliya, Hondarawara, Gangala and Beruwee, which were grown during the Maha season. The 'three month' varieties such as Heenati, Dahanala, Kokkali, Kanni Murunga, Pachha Perumal, Kuruwee and Suvandel were grown during the Yala season, while Mawee, a 'six to eight' month variety was also cultivated. However, these traditional rice varieties have now been replaced by high yielding varieties.

Among the horticultural crops, several varieties of banana are grown in small scale farms in the province, while two species of wild banana (*Musa acuminata* and *Musa balbisiana*) have also been recorded in isolated localities. The endemic wild mango (*Mangifera zeylanica*) is present in the isolated patches of rainforests, mainly in the Kalutara district.

Among the spices, wild species of Cinnamon (*Cinnamomum* spp.), Cloves (*Syzygium* spp.), Nutmeg (*Myristica* spp.) and Pepper (*Piper* spp.) have been recorded from the Kalutara district.

Among the plantation crops, several hybrids of coconut occur mainly in the Gampaha and Colombo districts.

Livestock varieties

Among the livestock, several breeds of cattle, buffalo, pigs and goats occur in small-scale farms in the Western Province.

Among the buffaloes (*Bubalus* spp.), the 'Murrah' breed (with a distinctive white patch in forehead) has been introduced to Sri Lanka from the Indian sub-continent, and small herds of this breed are owned by a few farmers in the Western Province, to produce milk. The other type includes the traditional 'swamp' type, which is commonly used to plough paddy fields. There is considerable variety of genotype of cattle including 'zebu' (ie., Sahiwal breeds), crossbreeds, and local indigenous types. Under intensive management systems, European breeds such as Jersey and Holstein Friesian are also used in the area.



Etikehel - *Musa balbisiana*
(cgi.ebay.de)
(www.photomazza.com)

6 IN SITU CONSERVATION

The current protected areas in the Western Province under the Department of Wildlife Conservation and Forest Department indicates that approximately 7% of the area is protected for conservation of biodiversity (Table 5).

Protected areas under the Forest Department

A majority (39) of the protected areas are under the jurisdiction of the Forest Department, where several of them are Proposed Reserves (PR's). The largest is the Morapitiya-Runakanda forest (ca. 7000ha), located in the Kalutara district, followed by Kalugala forest, Neluketiya forest, Yagirala forest and the Delmella-Yatigampitiya forest. The others are below 1000ha in extent.

Protected areas under the Department of Wildlife Conservation (DWC)

There are four protected areas under the jurisdiction of the DWC in the Western Province, including the smallest national park in Sri Lanka (Horagolla NP – 13ha).

Protected areas declared by the Central Environmental Authority (CEA)

The Central Environmental Authority has declared three wetlands in the Western Province as Environmentally Sensitive Regions (ESR's), under the National Environmental Act.

Important Bird Areas

Of the 70 'Important Bird Areas' in Sri Lanka identified by the Field Ornithology Group and the Birdlife International, nine are located in the Western Province. These include the Bellanwila-Attidiya marsh, Muthurajawela marsh, Indikada Mukalana, Morapitiya-Runakanda forest, Haycock forest, Labugama forest, Bodhinagala forest, Delmella-Yatagampitiya forest, and the Kalugala forest.

Table 5: Protected areas in the Western Province

Site	District and Extent (ha)
Protected Areas under Department of Wildlife Conservation	
Horagolla National Park	Gampaha; 13
Bellanwila-Attidiya Sanctuary	Colombo; 385
Muthurajawela Sanctuary	Gampaha; 1300
Sri J'pura-Kotte Sanctuary	Colombo; 250ha
Protected Areas under Forest Department	
Alawala-Ataudakanda PR	Gampaha; 352
Bajjangoda PR	Gampaha; 175
Badagama PR	Kaluthara; 40
Dambukanda PR	Gampaha; 41
Getamarawa-Dunkolahena PR	Colombo; 129
Delmella-Yatagampitiya PR	Kaluthara; 1413
Halpankanda PR	Gampaha; 158
Haycock FR	Kaluthara; 380
Indikada Mukalana PR	Colombo; 176
Ingiriya FR	Kaluthara; 450

(Cont.)

Site	District and Extent (ha)
Kaharagala PR	Kaluthara; 32
Kalugala PR	Kaluthara; 4288
Kananpella FR	Colombo; 298
Karagahatenna PR	Gampaha; 55
Kebalawita PR	Gampaha; 115
Kirigala Mukalana PR	Kaluthara; 35
Kotakanda PR	Gampaha; 242
Kudaganga FR	Kaluthara; 137
Labugama-Kalatuwana FR	Colombo-Kalutara-Ratnapura; 2150
Latpandura PR	Kaluthara; 42
Mahagama FR	Kaluthara; 227
Mahakanda PR	Gampaha; 103
Meegahatenna PR	Kaluthara; 277
Mirigamkanda PR	Gampaha; 139
Miriyagalla FR	Colombo; 123
Mithirigala FR	Gampaha; 500
Morapitiya-Runakanda PR	Kaluthara; 7108
Nahalla PR	Kaluthara; 35
Neluketiya Mukalana PR	Kaluthara; 2384
Pelawatte FR	Kaluthara; 110
Plenda West PR	Kaluthara; 145
Polawattekanda FR	Kaluthara; 29
Ranwaragalakanda PR	Kaluthara; 192
Vellihallure OSF	Kaluthara; 425
Wagawatte PR	Kaluthara; 113
Walbotalekanda PR	Gampaha; 42
Wilikulakanda PR	Gampaha; 310
Yagirala FR	Kaluthara; 3000
Yagirala PR	Kaluthara; 34
Protected Areas under Department of Fisheries and Aquatic Resources (Fisheries Management Areas)	
Bolgoda Reservoir	Kalutara; 1200
Negombo Lagoon	Gampaha; 3,350
Protected Areas under Sri Lanka Land Reclamataion and Development Corporation	
Parliamentary Water Retention Area	Colombo; 42
Greater Colombo Flood Retention Area (Heen-ela, Kolonnawa and Kotte marshes)	Colombo; 365
Other Protected Areas (Gazetted under National Environmental Act of CEA)	
Wathurana ESR/EPA	Kaluthara
Thalangama ESR/EPA	Colombo
Bolgoda Wetland ESR/EPA (Panadura ganga, Werasganga, Bolgoda South Lake, Bolgoda North Lake)	Colombo and Kaluthara
Muthurajawela Buffer Zone	Gampaha; 285

7 EX SITU CONSERVATION

The ex-situ conservation facilities in the Western Province could be considered under locations with live plants and animals maintained under human care, fauna and flora repositories, plant genetic resource centers, and biodiversity information systems (see Table 6 for details).

Table 6: Sites related to Ex-situ Conservation in the western province

Ex -situ Facility	Location
Locations with live plants and animals (under managed conditions)	
Zoological Gardens	Dehiwala (Colombo district)
Water World (Private Aquarium)	Kelaniya (Colombo district)
Henarathgoda Botanical Gardens	Henarathgoda (Gampaha district)
Ayurvedic plant gardens	Meegoda (Colombo district), Navinna (Colombo district), Gampaha Wickramarachchi Ayurveda Institute
Fauna and Flora Repositories	
National Museum (Fauna repository in the Natural History Section)	Colombo – 07 (Colombo district)
University repositories (Colombo, Kelaniya, J'pura, OU)	Colombo 03, Kelaniya, Sri Jayewardenapura and Nawala
Medicinal plants herbarium at Institute of Indigenous Medicine and Bandaranaike Memorial Ayurveda Research Institute	Rajagiriya and Navinna
Plant Nurseries	
Fruit plant nurseries (registered under the Department of Agriculture)	Colombo (6); Gampaha (17); Kalutara (10)
Biodiversity Information Systems (Digital Data Bases)	
Wetland Database (Central Environmental Authority and International Water Management Institute)	Battaramulla (Colombo district)
National Conservation Review Database (Forest Department)	Battaramulla (Colombo district)
Species Database (Biodiversity Secretariat of MOENR and IUCN)	Battaramulla (Colombo district)
Wildlife in Protected Areas Database (Department of Wildlife Conservation)	Malabe (Colombo district)

Botanical gardens and arboreta

The Botanic gardens at Henerathgoda harbours about 500 plant species. The Ayurvedic garden in Nawinna harbours around 200 species of medicinal plants, with more than 1500 individual plants. The Viharamahadevi park in Colombo harbours more than 200 species of trees, including native and exotic forms.

Zoological gardens

The National Zoological Garden has a collection of native and exotic vertebrate species, including about 53 fish species, 32 reptiles, 130 birds and 98 mammals. About 1.4 million people had visited the National Zoo, in year 2000. Ex situ conservation centers could thus be financially viable and perform a valuable service through awareness-building, in addition to contributing to conservation outcomes. A private aquarium in Kelaniya (Water World) holds more than 100 native and exotic fish species.

Biorepositories

The National museum holds a biorepository on vertebrates (mammals - 2885, birds - 3243, reptiles - 7128, amphibians -1059, fish -15064), and invertebrates (molluscs - 4671, polychaetes - 2001, arthropods - > 100,000).

Digital databases

The National Database on Species prepared by IUCN includes distribution records and ecological information related to 1100 flowering plants, about 650 vertebrates, 243 butterflies, and 50 land snails. This data base would facilitate the periodic revision of the national list of threatened species, using IUCN global redlist criteria.

The database on wetlands, developed by the International Water Management Institute (IWMI) has information on nearly 80 wetlands in Sri Lanka, which could be used as an important tool to manage these wetland ecosystems.



Dehiwala Zoological Garden

8 PROFILES OF FOOD-RELATED BIODIVERSITY

Agricultural Biodiversity

As mentioned earlier, the main food related plantation crop in the Western Province is coconut, followed by tea. Paddy is cultivated extensively in the Gampaha district. The main fruit crops in the province grown at commercial scale include Banana, Rambutan, Papaya, Mangustin. Passion-fruit and Pine-apple. All these fruits are cultivated in a commercial scale in the Kaluthara district (Table 7), where Passion-fruit and Mangustin cultivations in the province are found. The Gampaha district is popular for Pine-apple and Rambutan fruit crops in Sri Lanka.

Table 7: Extent (ha) and production (MT) of major fruit crops in the Western Province

District	Pineapple		Banana		Rambutan		Papaya		Passion Fruit		Mangustin	
	Land Area	Ann. Prod.	Land Area	Ann. Prod.	Land Area	Ann. Prod.	Land Area	Ann. Prod.	Land Area	Ann. Prod.	Land Area	Ann. Prod.
Colombo	62	756	386	2410	179	1145	65	312				
Kaluthara	211	1598	1709	12698	189.5	1035	250	1312	259	2141	71	237
Gampaha	1062	10000	1418	10210	797	6376	98	588				
Western Province	1335	12354	3513	25318	1166	8556	413	2212	259	2141	71	237

The major commercial vegetable cultivations in the Western Province include beans, brinjal, raddish, bittergaurd, ochra, cucumber, green chillies and others. More tha 50% of the vegetable cultivations in the province occur in the Kaluthara district (Table 8). Leafy vegetables such as *Centella asiatica* ('Gotukola'), *Ipomoea aquatica* ('Kan-Kun'), *Lasia spinosa* ('Kohila'), *Sesbania grandiflora* ('Kathurumurunga'), and *Alternanthera sessilis* ('Mukunuwenna') are grown in commercial scale, mainly in abandoned paddy lands in the province.

Table 8: Extent (ha) of vegetable cultivations in the Western Province

Area	Maha Season	Yala Season
Colombo district	480	364
Kaluthara district	1088	909
Gampaha district	521.3	361
Western Province	2089	1634

The tubers and yams grown in commercial scale in the Western Province include five main species, dominated by Manihoc (Table 10). Apart from these, about 160 ha of ginger also occur in the Western Province, yealding about 1100MT annually.

Apart from the commercial fruit crop plantations, the multi-species home gardens mainly in the Gampaha and Kalutara districts harbour many fruit plants (see Table 9 below).

Table 9: Fruit plants in home gardens of the Western Province

FAMILY	BOTANICAL NAME	LOCAL NAME
Annonaceae	<i>Annona muricata</i>	Anoda
Moraceae	<i>Artocarpus altilis</i>	Del
Moraceae	<i>Artocarpus heterophyllous</i>	Kos
Oxalidaceae	<i>Averroha bilimbi</i>	Bilinchā
Palmae	<i>Cocos nucifera</i>	Coconut
Rubiaceae	<i>Coffea Arabica</i>	Kopi
Anacardiaceae	<i>Mangifera indica</i>	Amba
Moringaceae	<i>Moringa olifera</i>	Murunga
Musaceae	<i>Musa paradisica</i>	Kesel
Sapindaceae	<i>Nephelium lappaceum</i>	Rambutan
Lauraceae	<i>Persea Americana</i>	Alipera
Myrtaceae	<i>Psidium guajava</i>	Pera
Myrtaceae	<i>Syzygium jambos</i>	Jambu
Fabaceae	<i>Tamarindus indica</i>	Siyambala
Combretaceae	<i>Terminalia catappa</i>	Kottamba
Caricaceae	<i>Carica papaya</i>	Papol
Elaeocarpaceae	<i>Elaeocarpus serratus</i>	Weralu
Rutaceae	<i>Citrus reticulate</i>	Naran
Anacardiaceae	<i>Anacardium occidentale</i>	Kaju
Musaceae	<i>Musa acuminata</i>	Kesel
Tiliaceae	<i>Muntingia calabura</i>	Jam
Anacardiaceae	<i>Spondias dulcis</i>	Emberella
Clusiaceae	<i>Garcinia quaesita</i> ^E	Goraka
Euphorbiaceae	<i>Phyllanthus emblica</i>	Nelli

Table 10: Extent (ha) and annual production (MT) of tubers and yams in the Western Province

Area	Manihoc		Sweet potato		Dioscorea		Kiri ala		Inn ala	
	Land Area	Ann. Prod.	Land Area	Ann. Prod.	Land Area	Ann. Prod.	Land Area	Ann. Prod.	Land Area	Ann. Prod.
Maha Season										
Colombo	102	1020	7	56	10	200	10	200	0	0
Kaluthara	240	4800	100	1400	0	0	30	300	0	0
Gampaha	505	6060	17	335	0.5	5	12	120	0	0
Western Province	847	11880	124	1791	10.5	205	52	620	0	0
Yala Season										
Colombo	74	740	6	48	19	380	11	220	4	80
Kaluthara	170	3400	85	1190	69.5	695	118	1180	30	300
Gampaha	343	4116	12	240	21.5	215	48	480	0	0
Western Province	587	8256	103	1478	110	1290	177	1880	0	0

The export agricultural produce in the western province include Cinnamon (3387 ha), Coffee (157 ha), Cocoa (2 ha), Pepper (1716 ha), Vanilla (3.6 ha) and Ariconut plants.

The main ornamental plant cultivations in the Western Province include anthurium and orchid, while an equal area of other ornamental plants also occur in the province (Table 11). These are mainly produced for the export trade.

Table 11: Extent (ha) and annual production (MT) of ornamental plant cultivations in the Western Province

Area	Anthurium		Orchid		Other ornamentals	
	Land Area	Annual Prod.	Land Area	Annual Prod.	Land Area	Annual Prod.
Colombo district	62.5	10	13.87	1.35	48.7	12
Kaluthara district	50.5	2.5	19.1	1.7	35	3
Gampaha district	48.51	5.58	9.36	2.721	57.74	10.33
Western Province	161.51	18.08	42.33	5.771	141.44	25.33

Fisheries Biodiversity

The commonly caught food fish in coastal wetlands in the Western Province are listed in Table 12. The commonly captured crustaceans in saline water wetlands in Western Province include the Giant Freshwater Prawn (*Macrobrachium rosenbergii*), the Mud Lobster (*Thalassina anomala*) the White Prawn (*Penaeus indicus*, *P. monodon*) and the Mud Crab (*Scylla serrata*).

Table 12: Common fish species captured for commercial and/or subsistence fishery from coastal lagoons and estuaries in the Western Province

Family	Species
Anguillidae	Short-finned Eel - <i>Anguilla bicolor</i>
Carangidae	Big-eye Trevally - <i>Caranx sexfasciatus</i>
	Black-tipped Trevally - <i>Caranx heberi</i>
Cichlidae	Orange Chromide - <i>Eetroplus maculatus</i>
	Pearl Spot - <i>Eetroplus suratensis</i>
	Tilapia - <i>Oreochromis mossambicus</i>
Channidae	Murrel - <i>Channa striata</i>
Lutjanidae	Red Snapper - <i>Lutjanus argentimaculatus</i>
Chanidae	Milkfish - <i>Chanos chanos</i>
Mullidae	Largescale Mullet - <i>Liza micolepis</i>
Centropomidae	Common Glass fish - <i>Ambassis commersoni</i>



Murrel – *Channa striata* (Photo: Channa Bambaradeniya)

The coastal areas of Colombo, Negombo and Kalutara in the Western Province include several fishing villages, where local communities dependant on marine and coastal fishery are living. In year 2000, the Western Province ranked 2nd in marine fisheries production (excluding Northern Province) in Sri Lanka, with nearly 59,000 MT of marine fish captured, under five major fish categories (see Table 14). The marine fish caught in fish catches include at least 30 species of bony fish, about 12 species of cartilaginous fish (sharks, skates and rays), about 10 species of crustaceans (prawns, crabs, lobsters), about 5 species of molluscs (cuttlefish, squid, octopus) and several species of holothurians (sea cucumbers). Among the three districts in the province, Gampaha accounts for the highest annual average marine and inland fish production, at nearly 30,000 MT and 2,175 MT, respectively (Table 13).

Table 13: Marine and inland fish production in the three districts of Western Province

District	Marine Fish Production (1996 – 2002 average annual in MT)	Inland and Aquaculture Fish Production (1999 – 2002 average annual in MT)
Colombo	2884	84
Gampaha	29727 (Negombo)	2175
Kalutara	29080	477

(Source: Ministry of Fisheries and Ocean Resources)

Table 14: Marine fish production in Western Province (2002 data)

Major Fish Category	Species (with local name)	Production (MT)
Tuna (Skipjack and Yellowfin)	<i>Thunnus albacares</i> (Kelawalla) <i>Katsowonus pelamis</i> (Balaya)	31,900
Other Large Pelagic (Spanish Mackerel, Sail fish, Marlins, Swordfish, Shark, Skate and Rays)	<i>Scomberomorus commersoni</i> (Thora) <i>Istiophorus platypterus</i> (Thalapath) <i>Makaira</i> spp. (Koppara) <i>Auxis</i> spp. (Alagoduwa, Ragoduwa) <i>Euthynnus affinis</i> (Atawalla) <i>Isurus</i> spp. (Mee mora) <i>Alopias</i> spp. (Kasa mora) <i>Carcharhinus</i> spp. (Bala mora) <i>Dasyatis</i> spp. (Welli maduwa) <i>Aetobatus narinari</i> (Vavoul maduwa)	13,950
Demersal (Rockfish, Paraw)	<i>Carangoides</i> spp. (Parawa) <i>Caranx</i> spp. (Paraw) <i>Lethrinus</i> spp. (Atissa) <i>Lutjanus</i> spp. (Ranna, Thambalaya) <i>Epinephelus</i> spp. (Gal kossa) <i>Liza</i> spp. (Godaya) <i>Sphyraena</i> spp. (Jeelawa)	3,250
Shore Seine/Small Pelagic Varieties (Sardines, Anchovy, Halfbeaks, Flying fishes, Silverbiddies, Shad)	<i>Amblygaster clupeioides</i> (Keeramin) <i>Dussumiera acuta</i> (Thondaya) <i>Sardinella</i> spp. (Sudaya, Kalawenna) <i>Stolephorus</i> spp. (Halmessa) <i>Leiognathus</i> spp. (Karalla) <i>Gerres</i> spp. (Thirali) <i>Hemiramphus</i> spp. (Moralla) <i>Cheilopogon</i> spp. (Piyamessa)	7,720
<u>Other Marine (shrimps, prawns, lobsters, cuttlefish, squid, crabs, other)</u>	<i>Macrobrachium rosenbergii</i> (Kara issa) <i>Panaeus</i> spp. (Kiri issa) <i>Panulirus</i> spp. (Pokirissa) <i>Scyllarus</i> spp. (Sapatthuwa) <i>Loligo</i> spp. (Della) <i>Sepia</i> spp. (Pothu Della) <i>Octopus</i> spp. (Buwalla) <i>Portunas pelagicus</i> (Muhudu Kakuluwa) <i>Scylla serrata</i> (Kalapu kakuluwa)	2,120
Total marine fish production in year 2000 (MT)		58,940

(Source: Ministry of Fisheries and Ocean Resources)

9 CULTURAL AND OTHER RELATED DIVERSITY

Bio-archaeological sites

The Fa-Hien's Cave (in Bulathsinhala, Kalutara district) is a prehistoric cave, named after the famous Chinese Buddhist monk Fa-Hien who travelled in India and Sri Lanka from AD 399 to 414, and he had stayed in this cave for the major part of his sojourn in Sri Lanka. The cave is important for the late pleistocene human skeletal remains discovered there in the 1960s and 1980s. A female body remains embedded in a rock dates back to 30,500 BC and is considered the world's oldest proof of consumption of rice, maize and salt.

The Kotte marshes and the Muthurajawela marsh were part of the Kotte kingdom, where extensive paddy cultivation has been carried out.

There are several ancient buddhist temples ('Raja Maha Vihara'), in the Western Province, most of which are surrounded by temple gardens and/or forests (see Table 15). Some of these temples also harbour rock-outcrops and caves, which have not been explored/excavated up to now. These caves are believed to be places where humans lived since prehistoric periods.

Table 15: Some ancient temples in the Western Province, which is of bio-archaeological significance

Temple	Location/District	Prominent landscape features
Gallena Rajamahaviharaya	Kalutara	Caves, forest and medicinal plants garden
Weligalpotte monastery	Kalutara	Caves
Pahurakanda Viharaya	Walallavita, Kalutara	Caves and forest
Pokunuvita Viharaya	Kalutara	
Korathota Viharaya	Colombo	Rock outcrops and caves
Maniyangama Viharaya	Colombo	Caves
Bellanwila Viharaya	Colombo	Ponds, marshes
Attanagalle Viharaya	Gampaha	Temple forest garden
Maligatenne and Pilikutuwa monasteries	Gampaha	Caves, forest
Varana Gal Viharaya	Gampaha	Rock-outcrops and caves

Bio-cultural aspects

Traditional dance techniques related to the environment are prevalent in the Kalutara district. Several other ancient folk rituals related to the environment are practiced mainly in the Kalutara district. Some of these include ceremonial dance rituals (ie., 'shanti karmayas'), which are performed to ward off illness and bring prosperity to the local people. These ceremonies comprises of different dance routines, chants, drum-beats and dance-parades. Preparations for these ceremonies are made in an open-air hall, where banana tree trunks, natural varieties of flowers, herbal trees, and creepers are used in decoration as well as in erecting the different sections in the dance ritual such as paths (Vidi), beds (Yahan) and elevated seats (Ayik). An example is the Sooniyam Yagaya or Sooniyam Kepilla practices in Horana and Kalutara areas. Plant species

such as *Mesua nagasarium* (‘Na’), *Musa* spp. (‘Kesel’), *Atalantia zeylanica* (‘Yakdehi’), *Morinda citrifolia* (‘Ahu’), *Cocos nucifera* (‘Pol’), *Areca catechu* (‘Puwak’), *Cerbera manghas* (‘Kaduru’), *Hibiscus* spp., (‘Wada Mal’), (‘Puhul’), and *Piper betel* (‘Bulath’), and *Piper chuya* (‘Siviya Bulath’) are commonly used for such traditional rituals.

A variety of folk recital of poems related to environment and biodiversity exist in the province and most of them are verses associated with various stages of agriculture, while some are related to child care/baby-sitting, religious ceremonies and traditional dances.

Documentation related to folk and traditional art in the province could be located at the Folk/Traditional Art Units of the Sri Lanka Broadcasting Corporation, and Sri Lanka Rupavahini (TV) Corporation. In addition, the libraries of the Department of Aesthetic Studies, University of Kelaniya, also has a valuable collection of literature related to traditional folklore and art. The District Secretariat of Kalutara has prepared a database and a handbook related to traditional art and folklore in the district.

Traditional knowledge profile

The communities in the rural areas of the province possess an immense wealth of traditional knowledge related to biodiversity, which can be examined under species used for traditional ayurvedic medicine, species used for food and preparation of various dishes (local cuisine), agricultural pest control methods, traditional harvesting practices targeting specific biological resources (extraction of non-timber forest products, fisheries extraction etc.), and production of handicrafts and other useful items using biological resources.

Human ethnic diversity

The Western Province probably has the highest human ethnic diversity in Sri Lanka at present, with communities belonging to the races of Sinhala, Tamil, Muslim, Burgher, and Malay being settled, especially in the Colombo district (Table 16)

Table 16: Percentage distribution of population in the Western Province

District	Sinhala	SL Tamil	Indian Tamil	SL Muslim	Burgher	Malay	SL Chetti	Other
Colombo	76.6	11.0	1.1	9.0	0.7	1.0	0.1	0.5
Gampaha	91.0	3.2	0.4	3.8	0.5	0.7	0.3	0.1
Kautara	67.1	1.2	2.7	8.7	0.1	0.1	0.0	0.0

(Source: Department of Census and Statistics - 2001 data)

List of historical, important, rare and memorial trees

There are several historically significant trees occurring in the Western Province, most of which have been lanted by eminent personalities (see Table 17). Species such as *Ficus religiosa* and *Mesua nagasarium* in ancient temples in the province are of religious significance to Buddhists. The first imported rubber tree to Sri Lanka (The Para rubber tree - *Hevea brasiliensis*) was first planted in the Henarathgoda Botanical Gardens in Gampaha, in 1876 AD, where it is still visible. Infact, it is supposed to be the site of the first seedlings of Brazilian rubber tree ever planted in Asia.

Table 17: List of memorial/historically significant tree species in the Western Province

Species	Significance	Location
<i>Mangifera indica</i> ('Amba')	Planted on the day of independence - 4th of February, 1948 by Hon. D.S. Senanayake (first Prime Minister in Sri Lanka)	Polwatta Temple, Bambalapitiya (Colombo District)
<i>Pterocarpus marsupium</i> ('Gammalu')	Planted by Hon. Nehru (first Prime Minister in India)	Ayurveda Research Institute Navinna (Colombo District)
<i>Tamarindus indicus</i> ('Siyambala')	Planted by the great poet Rabindranath Tagore	Sri Pali College, Horana (Kalutara District)
<i>Sweitenia macrophylla</i> ('Mahogany')	Planted in 1957 by Ernasto Che Guveira	Yahalakelle Estate, Horana (Kalutara District)
Several trees	Planted by King Edward VII	Hanwella (Colombo District)
<i>Cassia fistula</i> ('Ehela')	Planted by Hon. J.R. Jayewardena (first Executive President in Sri Lanka)	Sri Pali College, Horana (Kalutara District)
<i>Santalum album</i> ('Sudu Handun')	Planted by Hon. Mrs. Sirimavo Bandaranaike (First Woman Prime Minister in the World)	Ayurveda Research Institute Navinna (Colombo District)
<i>Bambusa arundinacea</i> ('Pethangoda Una Pandura') ('Katu una')	King Rajasinghe was injured by a thorn, leading to his death	Pethangoda, Awissawella (Colombo District)
<i>Mesua nagsarium</i> ('Na')	Shade tree of Ven. Sri Rahula	Kotte (Colombo District)
<i>Mesua nagsarium</i> ('Na')	A Sacred tree with historical relevance of Prince Sapumal	Kotte (Colombo District)
<i>Mesua nagsarium</i> ('Na')	A tree where an ornament of God Pattini was hidden	Kaduwela (Colombo District)
<i>Artocarpus heterophyllus</i> ('Peni Waraka')	An ancient tree	Awissawella (Colombo District)
<i>Ficus religiosa</i> ('Sacred Bo')	Religious significance to Buddhists	Kalutara (Kalutara District)
<i>Ficus religiosa</i> ('Sacred Bo')	Religious significance to Buddhists	Nitta Bodhiya, Nittambuwa (Gampaha District)
<i>Ficus religiosa</i> ('Sacred Bo')	Religious significance to Buddhists	Sudu Bodhiya, Makewita (Gampaha District)
<i>Ficus religiosa</i> ('Sacred Bo')	Religious significance to Buddhists	Bellawila Temple (Colombo District)
<i>Cycus circinalis</i> ('Madu')	A group of cycus trees	Gampaha (Gampaha District)
<i>Hevea brasiliensis</i> ('Rubber')	First Rubber tree planted in Sri Lanka	Henarathgoda (Gampaha District)
<i>Alstonia scholaris</i> ('Rukattana')	An ancient tree	Gahanuwela, Padukka (Kalutara District)
<i>Tetrameles nudiflora</i> ('Maha Mugunna')	Giant Tree	Salgala Forest, Galapitamaha

10 IMPACTS ON BIODIVERSITY

Human population Pressure

The Western Province harbour the highest human population density in Sri Lanka. The estimated mid-year human population density (per km²) in year 2004 for Colombo, Gampaha and Kalutara districts were 3631, 1523 and 688 individuals, respectively (Source: Department of Census and Statistics). These figures are much higher than the national average, highlighting the pressure on the remaining natural and semi-natural habitats within the province (See Table 18). The population in the Colombo and Gampaha districts continue to increase annually, as a result of migration from other provinces, for employment opportunities.

Table 18: Statistics on the human population density, forest cover, threatened vertebrates and threatened plants in the different districts in Sri Lanka

District	Area (Km ²)	Human Population Density (per Km ²) ¹	Forest Cover ² %	Threatened Vertebrates	Threatened Plants
Ampara	4318	143	37.50	18	15
Anuradhapura	7034	111	35	25	68
Badulla	2803	294	19	67	90
Batticaloa	2686	204	21	2	9
Colombo	656	3631	2.80	28	22
Galle	1635	629	13	76	187
Gampaha	1386	1523	0.30	26	10
Hambantota	2579	210	20.50	38	32
Jaffna ³	2218	337	1.10	8	7
Kalutara	1588	688	13	59	126
Kandy	1906	704	17	90	310
Kegalle	1693	468	9.50	51	98
Kurunegala	4813	311	5	21	44
Mannar	1985	50	60	6	5
Matale	1993	233	40.50	57	71
Matara	1282	620	16	37	101
Monaragala	5545	75	40.50	35	56
Mullaitivu	2517	56	60	8	0
Nuwara Eliya	1720	423	24.50	79	150
Polonnaruwa	3224	117	38	15	26
Puttalam	3013	245	25	15	21
Ratnapura	3255	325	20	106	264
Trincomalee	2631	147	48	11	10
Vavuniya	1967	74	51	9	1

(Source: IUCN Sri Lanka and MOENR, 2007 National List of Threatened Species)

¹ Estimated mid year population density in year 2004: Source: Department of Census and Statistics

² Estimated from year 1998 RS images (Includes secondary vegetation, but excludes plantation forests)

³ Includes Kilinochchi

Habitat loss, fragmentation and transformation

The high human population density in the Western Province has resulted in an immense pressure on natural and semi-natural habitats, resulting in the transformation of most of these areas into human settlements, industrial areas and related infrastructure. The closed canopy forest cover in the Colombo and Gampaha districts is extremely low, while the Kalutara district maintains 13% of its land area as forests.

Population loss/reduction of wild species

According to the 2007 national redlist of threatened species, several species of endemic and/or threatened animals have already undergone local extinctions from several places in the Western Province, over the past two to three decades. For instance, among the threatened mammals, isolated populations of three arboreal endemic mammals - the Purple-faced Leaf Monkey (*Semnopithecus vetulus*), the Golden Palm Civet (*Paradoxurus zeylonensis*) and the Red Slender Loris (*Loris tardigradus*), have disappeared from several localities in the Western Province, due to loss of tree cover.

Reclamation of lowland marshes and swamps especially in the Western Province has led to local extinction and drastic reduction of the populations of two species of blind eels (*Monopterus desilvai* and *Monopterus bengalensis*). These species were once known to be common and widely distributed in lowland marshes in the western part of Sri Lanka (Deraniyagala, 1952). Among the threatened mammals, the Fishing Cat (*Prionailurus viverrinus*) and the Otter (*Lutra lutra*) have also been subjected to local extinctions, due to loss of lowland marshes. The latter two species of threatened mammals are also subjected to frequent road accidents, due to access roads built across marshes and paddy fields.

Many species of colourful endemic freshwater fish species (ie., *Puntius nigrofasciatus*, *P. titteya*, *P. cuningii*, *Rasbora vaterifloris*) are over-exploited from the streams in the western province, for export trade, leading to drastic declines in their populations. Similarly, endemic aquatic plants such as *Cryptocoryne*, *Aponogeton* and *Lagenandra* species are also over-exploited from wild habitats for export.

Environment pollution

A majority of the threatened freshwater fish species are concentrated in the major river basins of the wet zone (ie., Kelani, Kalu, Nilwala and Gin) and the water quality of these rivers and their tributaries are adversely affected by gem mining, sand mining, and discharge of agro-chemical residues. The lower reaches of the Kalani river also receives the highest load of domestic sewage and other organic waste. It is also the largest recipient of industrial effluents in the country. It is also affected by salinity intrusion, as a result of over-extraction of water for human use, and sand mining. Discharge of chemical effluents from rubber factories and water treatment plants has resulted in the pollution of certain stream segments of the Kalu and Kelani rivers. The Lunawa lagoon is heavily polluted by industrial effluents and sewage, while the Bolgoda lake is polluted by wood powder dumped by furniture manufacturers in the Moratuwa and Panadura area. Other wetlands such as the Muthurajawela marsh and the Beira lake have been subjected to organic pollution, due to garbage disposal and sewage, respectively. Kelaniya estuary has been subjected to conventional organic pollution. Garbage disposal is a serious environmental issue in the Western Province, especially in the greater Colombo area. The presence of open garbage dumps, and roadside garbage piles has become a serious health issue as well, for urban dwellers. Clogging of drains in the greater Colombo area as a result of non-biodegradable material such as polythene has resulted in frequent flashfloods.

Overuse of agrochemicals (pesticides, fertilizers) for paddy and leafy vegetable cultivations is a serious environmental issue in the Gampaha and Kalutara districts, which could lead to human health implications as well.

Pollution of air in the Colombo city limits is on the increase, as a result of vehicle emissions that contain particulate matter. Emission of green house gases such as CO₂, CH₄, SO₂ is also a growing concern in the heavily populated urban areas of the Western Province. These gases are released by vehicles (especially due to traffic blocks), industries, open garbage dumps and excessive use of air conditioners and power generators in the cities. A study conducted in 2004, using the diversity of lichens as an indicator of air

quality, has highlighted that the quality of air in the Colombo City Center is relatively poor compared to suburbs and rural areas.

Spread of invasive alien species (IAS)

Several species of invasive alien plants and animals have established breeding populations in natural and semi-natural habitats of the Western Province. Field observations carried out by IUCN has enabled to document more than 20 species of invasive plants (Table 19) and more than 15 species of invasive animals (Table 20) from the Western Province. These invasive species have caused adverse impacts on native fauna, flora and their habitats, by functioning as superior competitors for resources, predators, pests and disease vectors. The ornamental fish importers and horticultural traders are the main sources that contribute to the introduction and spread of IAS in the Western Province. Wetlands such as Bellanwila-Attidiya marsh, Sri J'pura marsh and Muthurajawela marsh harbour several species of aquatic invasive plants and animals.

The alien invasive Clown Knife Fish (*Chitala ornatus*) was introduced to Sri Lanka as an ornamental aquarium fish, and soon escaped into wild habitats. Today, this voracious carnivore has established breeding populations in streams and reservoirs in the wet zone, which harbour several species of threatened endemic freshwater fish. It has been reported that the populations of many species of endemic fish have been reduced subsequent to the introduction and spread of *C. ornatus*.

The spread of invasive alien plants such as *Annona glabra*, *Dillenia suffruticosa* and *Eichhornia crassipes* has resulted in further degradation of the remaining marshy habitats of the threatened blind eels (*Monopterus* spp.) in the western part of Sri Lanka.



Wormia suffruticosa (Photo: Channa Bambaradeniya)

Table 19: Invasive alien flora established in natural ecosystems of the Western Province

Species & Life-form	Mode;Source; Purpose	Distribution	Affected Habitats/ Ecosystems
1. <i>Eichhornia crassipes</i> * – Floating (Water hyacinth)	Negligence/ Deliberate; Ornamental plant	Col; Kal;Gam	Tanks, ponds, marshes, streams
2. <i>Salvinia molesta</i> – Floating (Salvinia)	Negligence/ Deliberate; Ornamental plant	Col; Kal;Gam	Tanks, ponds, marshes, streams
3. <i>Pistia stratiotes</i> – Floating Water lettuce	Unknown	Col; Kal;Gam	Tanks and marshes
4. <i>Hydrilla verticillata</i> – Submerged plant (Hydrilla)	Negligence; Aquarists; Ornamental Fish Trade	Col; Kal;Gam	Tanks, ponds, streams, canals
5. <i>Egria densa</i> – Submerged plant (Canadian Pondweed or leafy Elodia).	Negligence; Aquarists; Ornamental Fish Trade	Col; Kal	Tanks, ponds, streams, canals, marshes
6. <i>Najas marina</i> – Submerged plant (Pond weed)	Unknown	Kal	Coastal aquatic habitats
7. <i>Alocasia macrorhiza</i>	Unknown	Col; Kal;Gam	Marshes and riparian areas
8. <i>Colocasia esculenta</i>	Unknown	Col; Kal;Gam	Marshes and riparian areas
9. <i>Typha angustifolia</i> – Reed Cattail	Unknown	Col; Kal; Gam	Estuaries, tanks and marshes.
10. <i>Phragmites karka</i> – Reed	Unknown	Col;Gam	Marshes, riverbanks.
11. <i>Annona glabra</i> – Small tree /shrub (Pond Apple)	Unknown	Col; Kal; Gam	Coastal lagoons, marshes, riverbanks, streambanks
12. <i>Wormia suffruticosa</i> – Small tree ('Diyapara').	Negligence; Horticulturists; Ornamental plant	Col; Kal; Gam	Marshes, streambanks, riverbanks.
13. <i>Alternanthera philoxeroides</i> – Runner (Alligator weed)	Deliberate; Horticulturists; Food	Col; Kal; Gam	Fallow fields, marshy/ riparian areas
14. <i>Lantana camara</i> * – Shrub (Prickly Lantana)	Negligence; Horticulturists; Ornamental plant	Col; Kal; Gam	Scrubland, degraded open forests
15. <i>Chromolaena odorata</i> – Shrub Siam weed	Negligence; Horticulturists; Ornamental plant	Col; Kal; Gam	Forest edge & pathways.
16. <i>Clidemia hirta</i> * – Shrub (Hairy Clidemia/Koster's curse)	Unknown	Col; Kal; Gam	Rainforests
17. <i>Swietenia macrophylla</i> – Large tree (Mahogany)	Deliberate; State; Forestry/ Timber	Kal	Disturbed Forests.
18. <i>Mimosa invisa</i> – Creeper	Unknown	Col; Kal; Gam	Disturbed Forests.
19. <i>Wedelia trilobata</i> * – Runner (Wedelia)	Negligence; Horticulturists; Ornamental plant	Col; Kal; Gam	Forest edge
20. <i>Mikania micrantha</i> * – Wine (Mile-a-minute weed)	Negligence; Horticulturists; Ornamental plant	Islandwide	Disturbed forests & scrubland
21. <i>Alstonia macrophylla</i> – Tree (‘Hawarinuga’)	Deliberate; State; Forestry/ Timber	Kal;Gam	Secondary forests
22. <i>Imperata cylindrica</i> * – Grass (‘Illuk’ – Cogon grass)	Unknown	Col; Kal; Gam	Disturbed forests & scrubland
23. <i>Panicum maximum</i> – Grass (Guinea grass)	Unknown	Col; Kal; Gam	Disturbed forests & scrubland

* Species included in the list of 100 of the world's worst invasive alien species (IUCN ISSG, 2001)

Table 20: Invasive alien fauna established in natural ecosystems of the Western Province

Species	Mode;Source; Purpose	Distribution	Affected Habitats/ Ecosystems
1. Clown knife fish <i>Chitala ornata</i>	Negligence; Aquarists; Ornamental fish trade.	Col;Gam;Kal	Tanks, ponds, slow-flowing rivers, marshes.
2. Plectosomus catfish <i>Hypostomus plecostomus</i>	Negligence; Aquarists; Ornamental fish trade.	Col;Gam;Kal	Tanks, ponds, slow-flowing rivers, marshes.
3. Walking catfish* <i>Clarias batrachus</i>	Negligence; Aquarists; Ornamental fish trade.	Col;Gam	Marshes, streams and canals.
4. Guppy <i>Poecilia reticulata</i>	Deliberate; State; Mosquito control. Ornamental fish trade	Col;Gam;Kal	Tanks, ponds, slow-flowing rivers, marshes, streams.
5. Western mosquito fish* <i>Gambusia affinis</i>	Deliberate; State; Mosquito control.	Col;Gam;Kal	Marshes, streams and canals.
6. Mozambique Tilapia* <i>Oreochromis mossambicus</i>	Deliberate; State; Commercial fishery.	Col;Gam;Kal	Tanks, reservoirs, slow-flowing rivers, marshes.
7. Carp* <i>Cyprinus carpio</i>	Deliberate; State; Commercial fishery.	Col;Gam;Kal	Tanks, reservoirs.
8. Red-eared slider turtle* <i>Trachemys scripta</i>	Negligence; Aquarists; Ornamental fish trade.	Col	Marshes, steams and canals.
9. Golden apple snail <i>Pomacea bridgesi</i>	Negligence; Aquarists; Ornamental fish trade.	Col	Tanks, ponds, marshes
10. Giant african snail* <i>Achatina fulica</i>	Negligence; British planter; Research/Hobby.	Col;Gam;Kal	Natural and managed terrestrial habitats.
11. Slug <i>Laevicaulis alte</i>	Accidental; Horticulturists.	Col;Gam;Kal	Natural and managed terrestrial habitats.
12. House Mouse* <i>Mus musculus</i>	Accidental; Ships.	Col;Gam;Kal	Natural and managed terrestrial habitats.
13. Ship rat* <i>Rattus rattus</i>	Accidental; Ships.	Col;Gam;Kal	Natural and managed terrestrial habitats.
14. Domestic/feral cat* <i>Felis catus</i>	Deliberate; Pet trade	Col;Gam;Kal	Natural and managed terrestrial habitats.
15. Domestic/feral dog <i>Canis familiaris</i>	Deliberate; Pet trade	Col;Gam;Kal	Natural and managed terrestrial habitats.

* Species included in the list of 100 of the world's worst invasive alien species (IUCN ISSG, 2001)



Clown Knife fish - *Chitala ornata*

11 BIODIVERSITY RELATED INSTITUTIONAL ASPECTS

Biodiversity related institutional network (government, private sector, NGO's etc.)

The biodiversity related institutional network in the Western Province includes government institutes (under the central government), provincial government institutes, the private corporates, non-governmental organizations (NGO's) and international organizations. Among the government institutes, some are involved in the conservation and sustainable use of biodiversity (see Table 21(a), 21(b)), while the activities of others have adverse impacts on biodiversity in the Western Province (see Table 22).

A few private corporates located in the Colombo district invest on biodiversity conservation activities, such as awareness raising and publication of useful books, posters and monographs (see Table 23). Similarly, more than 10 local NGO's are involved in biodiversity conservation activities in the Western Province as well as other areas in Sri Lanka (see Table 24). A few international organizations that promote biodiversity conservation activities are based in the Colombo district (see Table 25), and these include a few donors as well.

Table 21 (a): Government institutions related to biodiversity conservation and sustainable use

Department	Main mandate
Under Central Government	
Ministry of Environment and Natural Resources	Policy development, Information generation and management,
Department of Wildlife Conservation	Management of Protected Areas under Fauna and Flora Protection Ordinance
Forest Department	Management of Protected Areas under Forest Ordinance
Central Environmental Authority	Review of EIA's, Declaration of environmentally sensitive areas under National Environmental Act
Customs Department (Biodiversity Unit)	Monitoring illegal trade of biological resources and prosecution under Customs Ordinance
Universities of Colombo, Kelaniya, Sri J'pura and Open University	Education, research and awareness raising
National Science Foundation (NSF)	Administration of research grants, knowledge dissemination
National Aquatic Resources Research and Development Agency (NARA)	Implementing and coordinating research, development and management activities on Aquatic Resources
National Aquaculture Development Authority (NAQDA)	Manage, conserve and develop aquatic resources used for aquaculture and aquaculture operations
Marine Pollution Prevention Authority (MPPA)	Protect the marine and ocean resources of the country from ship based and shore and offshore based marine pollution
Coast Conservation Department (CCD)	Conservation of the coastal zone, through the coast conservation act.
Department of Fisheries and Aquatic Resources	Manage, regulate, conserve and develop fisheries activities in a sustainable manner
Agriculture Department	Promotion of agricultural activities
Divisional Secretariat	Issue of Licences
Geological Survey and Mines Bureau (GSMB)	Issue of Licences for mining
State Timber Corporation	Production of timber
Ministry of Indigenous Medicine and Department of Ayurveda	Promotion of indigenous medicine; maintenance of ayurvedic plant aboreta
Ministry of Lands (Landuse and Policy Planning Division)	Landuse policies
Irrigation Department	Maintenance of irrigation systems
Department of Agrarian Services	Promotion of agriculture
Bandaranaike Memorial Ayurveda Research Institute (Navinna, Maharagama)	Research on Ayurvedic Medicine

Table 21 (b): Provincial Government Agencies related to biodiversity conservation and sustainable use.

Provincial Government Agency	Main mandate
Provincial Agriculture Department	Promotion of agricultural activities, capacity development for agriculture
Provincial Land Commissioners Department	Allocation and approval of land for development
Provincial Livestock Development Department	Livestock development
Provincial Irrigation Department	Maintenance of irrigation systems
Urban Development Authority	Urban development, including the design of urban parks

Table 22: Government agencies related to biodiversity impacts in the Western Province

Agency	Biodiversity related issue/Impact
Ministry of Industrial Development	Pollution, , loss of natural habitats, over-exploitation of biological resources
Provincial Road Development Authority	Soil erosion, loss of natural habitats
Sri Lanka Land Reclamation and Development corporation	Reclamation of wetlands and low-lying areas for development activities
Urban councils, Pradeshiya Sabhas	Disposal of solid waste, land sales, building approvals (affects on sensitive areas)
Board of Investment (BOI)	Pollution, , loss of natural habitats, over-exploitation of biological resources (approval of harmful industries i.e., mini-hydropower projects)
Ceylon Petroleum Corporation	Dumping of oil wastes into waterbodies
Urban Development Authority (UDA)	Land sales

Table 23: Private corporates involved in biodiversity conservation activities in the Western Province

Private corporates	Main Activities
SINGER Sri Lanka Ltd	Sponsoring the publication of books related to biodiversity conservation by expert authors
Sri Lanka Telecom Ltd	Sponsoring the biodiversity conservation projects implanted by NGOs; sponsoring useful publications; publication of calendars with aspects related to nature conservation
ODEL	Sponsoring useful publications
WHT Publications Ltd	Publication of useful books, guides, monographs etc.
Dilmah Teas Ltd	Sponsor biodiversity conservation projects
Jetwing Eco Holidays Ltd	Nature related publications; awareness raising

Table 24: Main NGO's in Western Province involved in biodiversity conservation

NGO	Main Activities
Wildlife & Nature Protection Society (WNPS)	Education and Awareness raising
Wildlife Heritage Trust (WHT)	Research (Taxonomy and Ecology)
Young Zoologists Association	Research, Education and Awareness
The Natural History Society (NHS)	Awareness raising
Ceylon Bird Club (CBC)	Bird Census, Research and Awareness
Field Ornithology Group (FOG)	Avifaunal research, Education and Awareness
Ruk Rekaganno	Education and Awareness
Environmental Foundation Limited (EFL)	Policy development, Litigation
Sri Lanka Wildlife Conservation Society (WCS)	Networking, Research and Awareness
Sri Lanka Environmental Journalists Federation (SLEJF)	Communication, Awareness raising
Haritha Mithuro	Education and Awareness raising
Green Movement	Education and Awareness raising

Table 25: Some international organizations involved in conservation activities

Organization	Main Activities
UN Agencies (UNEP, UNDP)	Operate grants for environmental conservation
IUCN (The World Conservation Union)	Field assessments and research, pilot projects on conservation and sustainable livelihoods, ecosystem restoration, policy development; identification of endangered species; capacity development for conservation
IWMI (International Water Management Institute)	Research related to water management, wetland conservation, development of related policies
CIDA	Donor
JAICA	Donor
CARE International	Promotion of sustainable agriculture and livelihoods
GTZ	Promotion of sustainable agriculture and livelihoods

Human resources for biodiversity conservation and sustainable use

The four government universities in the Western Province offer undergraduate and postgraduate courses related to biodiversity, forestry and environmental conservation. The university of Colombo and Kelaniya offer undergraduate studies related to indigenous medicine. There are four district agricultural training centers in the province, to conduct training programmes related to agriculture.

The main human resources related to biodiversity conservation and sustainable use activities in the Western Province include protected area managers (under the Department of Wildlife conservation and Forest Department), Divisional Environmental Officers (attached to CEA), Agriculture Research and Development Officers and Instructors (under the Provincial Agricultural Ministry), Development Officers (under Agrarian Services), District Fisheries Officers (under the Fisheries Ministry), Aquaculture Extension Officers, Provincial Livestock Development Officers and Provincial Veterinary Officers. The Department of Customs has a separate task force for monitoring of illegal trade of species.

12 BIODIVERSITY RELATED POLICY AND LEGAL ASPECTS

National laws, customary laws, traditions, codes and other non legally binding instruments

Sri Lanka has many national laws drafted to conserve its biological diversity. The main national laws and regulations relevant to biodiversity conservation are (i) Land Development Act, (ii) Crown Land Ordinance, (iii) Fauna and Flora Protection Ordinance, (iv) National Wilderness Heritage Act, (v) National Environmental Act, (vi) National Aquatic Resources Research and Development Agency Act, (vii) Fisheries and Aquatic Resources Act, (viii) Plant Protection Act, (ix) Animal Diseases Act, (x) Coast Conservation Act, (xi) Forest Ordinance, (xii) Botanic Garden Ordinance, (xiii) National Zoological Gardens Act, (xiv) Ayurvedic Act 31 and (xv) Soil Conservation Act. Environmental resources comes under the jurisdiction of various institutions to whom the state has delegated legal authority, under the power of different acts, ordinances and regulation, to manage them (see Table 26 for details).

Table 26: National laws related to biodiversity conservation and sustainable use, under different institutions, relevant for Western Province

Law	What it covers	Responsible Institution(s)
Fauna and Flora Protection Ordinance	Conservation of plants and animals which have been declared protected, or which are found within gazetted protected areas. Defines protected areas where no commercial exploitation is permitted	Department of Wildlife Conservation
Forest Ordinance	Consolidates laws relating to forests, and to the felling and transport of trees. Declare forest protected areas (plantation and natural forests), and establishes other state land as forests	Forest Department
National Environmental Act	Umbrella environmental protection legislation. Sets up licensing procedures, environmental standards and project approval procedures. Allows CEA to prosecute and enforce environmental safeguards	Central Environmental Authority
Coast Conservation Act	Identifies coastal zone and regulates activities within it	Coast Conservation Department
Land Acquisition act	Acquisition of lands by the state for public purposes, including environmental conservation	Ministry of Agricultural Development
Marine Pollution Prevention Act	Measures to minimise and controls marine pollution	Marine Pollution Prevention Authority
Fisheries and Aquatic Resources Act	Protect and conserve fisheries and aquatic biodiversity and marine and freshwater areas	Ministry of Fisheries and Aquatic Resources; Department of Wildlife Conservation
Customs Ordinance	Covers import and export of any plant or animal, and their products	Customs Department

(Cont.)

Law	What it covers	Responsible Institution(s)
Soil Conservation Act	Conservation of soil resources, mitigation of erosion, protection of land against floods and drought	Ministry of Agriculture
Pesticides Control Act	Regulates importation, sale, production and use of pesticides	Office of Registrar of Pesticides
Plant Protection Act	Prevents the spread of wild plants, weeds and plant diseases, and controls the introduction of new species	Department of Agriculture, Customs Department
Urban Development Authority Act	Empowers UDA to deal with the management of the urban environment	Urban Development Authority
Animal Diseases Act	Measures to prevent the spread of animal diseases	Department of Livestock Development
SL Land Reclamation and Development Corporation Act	Allows SLLRDC to reclaim low lying lands and wetlands	Sri Lanka Land Reclamation and Development Corporation
Food Act	Biosafety	Ministry of Health
State Lands Encroachment Ordinance	Prevents illegal occupation of and encroachment on state lands	Ministry of Agricultural Development; District Secretaries; Police
Irrigation Ordinance	Deals with the environmental aspects of water and land use in irrigated agriculture	Irrigation Department
Agrarian Services Act	Agricultural land	Department of Agrarian Services

(Source : EFL, 2006)

Biodiversity conservation and sustainable use related provincial policies

Apart from a Statute on Solid Waste Management for Western Province (under the Provincial Solid Waste Management Authority), other biodiversity conservation and sustainable use related provincial policies are scanty. The provincial agricultural ministry has initiated several programmes to enhance agricultural productivity at the provincial level.

Impact/influence of national policies

The main policies and action plans related to biodiversity conservation in Sri Lanka are: (i) The National Conservation Strategy-1988, (ii) National Conservation Review, (iii) Environmental Action Plan, (iv) National Environmental Action Plan-1990 and 1990-2001, (v) National Forest Policy, (vi) Forestry Sector Master Plan, (vii) Biodiversity Conservation in Sri Lanka: A Framework for Action-1999, (viii) Wetland Conservation Plan, (ix) Coast Conservation Master Plan, (x) National Wildlife Conservation Policy-2000, (xi) Pollution Abatement Strategy, (xii) Clean Air 2000 Action Plan, (xiii) Climate Change Action Plan, and (xiv) National Biosafety Guidelines. At present, these national policies cover the entire island. However, parallel provincial level policies are yet to be developed.

Policy conflicts and gaps

At present, the national policies related to biodiversity conservation cannot be implemented at the provincial level, since the subject of Environment is not integrated into the Provincial Council Act. There are no concurrent policies and legislation at provincial level to implement relevant conservation policies and legislation under central government. The Central Government Acts have not provided adequate power to provincial agencies to implement actions.

Although there is a statute related to provincial lands, the central government has not provided authority to implement it. This has resulted in the inability to address issues related to illegal settlements, illegal deeds, and allocation of land for suitable development activities.

When providing approval for buildings, residential areas and industrial areas etc., no proper analysis and evaluation is conducted to see whether these development activities have negative impacts on the environment. Lack of suitable guidelines is a further constraint related to the latter aspect.

Implementation constraints

The following could be highlighted as constraints in implementing national laws and policies at the provincial level:

- Lack of coordination and planning;
- Inadequate understanding on functions/responsibilities/duties;
- Inability to utilise funds for development in an efficient manner;
- Lack of ownership (due to lack of clarity/understanding);
- Dearth of suitable sites for disposal of solid waste (issues related to identification);
- Inadequate funding for conservation and sustainable use of biodiversity;
- Inadequate human resources for conservation and sustainable use of biodiversity;
- Inefficient use of available human resources for environmental conservation activities;
- Lack of clarity regarding boundaries of conservation areas;
- Inadequate awareness on available central government policies, legislation and regulations related to conservation and sustainable use of biodiversity;
- Inadequate knowledge/data on biodiversity at Provincial Council level;
- Contradictory interpretation in legislation/regulations (ie., livestock development related legislation vs. farms);
- Cattle grazing and security zones (closure of farms in Kotte/Jayawardenapura area); and
- The subject of environment is not holistically covered by the provincial council

13 BIO-INDUSTRY AND BIO-PROSPECTING

Bio-industries and demand and supply of biological material for bio industries

Several types of industries that are dependant on biological resources are located in the Western Province (Table 27).

Table 27: Bio-industries in the Western Province

Industry	Species used	Examples/Statistics
Trade of ornamental species (Export and import)	Fish, reptiles, birds and plants	Lumbini Aquaria; Wayamba Aquaria; Mike Flora
Canaries	Edible Fruits (ie. Dehydration of jak etc.)	KVC, SMAK, MD, Lanka canaries Ltd, Cicil foods
Production of Cosmetics, soaps etc	Azadirachta indica, Pavatta, Alovera, Carrot, Avacado Bee Honey	Naturesecrets, Janet Products; Swadeshi Industries; Delma; Lever Brothers
Production of pharmaceuticals	Venivel (Coscinium fenestratum),	LINK, Hettigoda Indistries, Vendol, , Ayurvedic Drug Corporation
Handicraft productions	Rattan furniture Masks Coconut Coire Products Reed Mats Spoons Packing material (Cair)	Weveldeniya village
Trade of agricultural produce (fruits, vegetables – Export and local)	Cashew; Rambutan; Pineapple; Ginger; Dragonfruit; Fruits and Vegetables	Kajugama, Malwana, Gampaha, Bulathsinhala
Forestry	Teak, Mahogany	Touchwood; Helpgreen
Plant nurseries	Ornamental plants, Fruit plants, Tree species (ie., teak, mahogany)	33 registered fruit plant nurseries in the Western province (Registered under Department of Agriculture)
Trade of cut flowers	Roses, Anthuriums, Orchids	Undertakers/florists; Lakmalsala; Mike flora
Fisheries	Freshwater, brackish and marine fish	Fishing villages in Colombo (38), Gampaha (82) and Kalutara (33) Districts; 58,940 MT of marine fish ibn year 2000
Fisheries Products (exports)	Export of fish, shrimps, crabs, lobster	Several companies
Rubber and Pinus products	Treated Rubber and Pinus	Singer, Damro
Wood processing	Production of plywood etc.	Merbok Ltd
Culture of Lotus flowers in abandoned paddylands	<i>Nymphaea</i> spp.	Kaluthara
Restaurants/Culinary trade	Fish, fruits, vegetables, paultry	Several
Mushroom cultivation	Mushrooms (Agaricales)	Several household operations – about 300 producers in the western province; 39750 kg in 2006/2007
Other export agricultural produce (spices etc.)	Bulath (Beatle), Pepper, Coffee, Vanilla, Cinnamon, Cocoa	1716ha of pepper, 3387 ha of cinnamon in province
Oil extraction	Coconut	Watawala Ltd.
Production of Bee Honey	Honey bees (Apis cerana)	261 producers in western province; 1690 Kg in 2006/2007
Production of milk, yoghurt and curd	Cows and buffaloes	A few house-hold operations

Agricultural produce (rice, vegetables, fruits, yams etc.) is in heavy demand in the Western Province, as a result of the high human population density. Apart from catering to the demand of the local population in the province, agricultural produce such as fruits and vegetables are also exported to the Middle-east and Maldives. There are several industries in the province that are involved in preserving and processing fruit varieties for the local and export markets. Similarly, several species of spices are also processed by several industries in the province.

There are several industries in the Western Province that produce ayurvedic pharmaceuticals, which use a variety of medicinal plants. In most instances, the local supply is inadequate to meet the demand, and large quantities are imported from India.

Several species of ornamental plants and fish (freshwater and marine) are exported from Sri Lanka, for the ornamental trade. Most of these export industries are based in the Western Province.

Access of biological material within the province and outside province

Although the province has several agricultural produce and fisheries, the high population demand in the three districts has resulted in the transportation of fruits, vegetables, cereals and fish from other provinces, to meet the high demands. Similarly, the timber for construction purposes and furniture production is mainly obtained from other provinces. Ornamental species such as freshwater fish and plants are also collected from wild habitats in other provinces, and transported to the Western Province.

Income, social welfare and benefit sharing related to bio-industries

A major issue related to export oriented bioindustries in the province is lack of benefit sharing mechanisms, to facilitate sharing of benefits with local communities. A typical example is the ornamental aquatic plant and fish trade, which is currently dependent mainly on wild collections. The advanced technology of today has provision for captive breeding/propagation of these species, through involvement of local communities, and also consider other essential aspects such as value addition to exports, which would enable the country to enhance its foreign revenue.

Ecotourism in the Western Province

Some of the natural ecosystem types in the Western Province attract visitors (foreign and local), which has led to small-scale business initiatives by local communities. For instance, some local people in Muthurajawela, Negombo lagoon, Bolgoda river, Kalu river and Benthara operate motor boat and/or canoe trips for visitors in the above aquatic ecosystems, to observe nature. Several holiday homes have been built on either side of the Bolgoda river and its islands (ie., Ruskin Island apartments)

There are several waterfalls in the Kalutara district, which are visited by local tourists. The more popular ones include the Thudugala Ella, Ahasabokku Ella, and the Makeli Ella. Several others are located in isolated rainforests with a hilly terrain (ie., in Morapitiya-Runakanda, and Yagirala forest areas). The wetlands such as Muthurajawela, Bellanwila-Attidiya, Thalangama tank and Kotte marshes are visited by bird-watchers.

The Pasgama village (Gampaha district) depicts all aspects of an authentic Sri Lankan village life with Sri Lankan hospitality and smiling people. A visitor is able to witness traditional pottery, brick making, crafts and various other livelihood activities in pristine form here. Visitors will find here gently sloping pathways through a landscape of multi-colored foliage and typical village homes to the open spaces of paddy fields. The Ministry of Tourism is also promoting the Madurawala and Ittapana villages in the Kalutara districts, as traditional village tourist attractions.

14 RECOMMENDED ACTIONS FOR CONSERVATION AND SUSTAINABLE USE OF PROVINCIAL BIODIVERSITY

High Priority Recommendations

Conduct awareness programmes on available central government policies, legislation and regulations related to conservation and sustainable use of biodiversity for provincial administration officers and field officers.

Establish an institutional mechanism to coordinate the environmental conservation activities in the Western Province (Chaired by the Provincial Secretary, represented by provincial authorities, NGO's and the private sector)

Conduct an inventory of biodiversity in the Western Province, and identify critical areas for conservation of biodiversity and related ecological services

Establish a provincial register of traditional knowledge (including cultural aspects) related to biodiversity

Conduct a policy, legal and institutional analysis related to biodiversity conservation and sustainable, to identify relevant gaps and needs (capacity, infrastructure etc.)

Implement the solid waste management plan developed by the provincial council, and monitor its progress.

Develop a provincial land policy (to address illegal reclamation, and avoid constructions in sensitive areas)

Demarcate the boundaries of existing protected areas in the Western Province, under the relevant central government departments.

Conduct strategic environmental assessments (SEA's) on major development projects proposed/identified for the Western Province

Priority Recommendations

Conduct an evaluation of bio-industries in the province, to identify the species used and their origins, and see how these industries could contribute to sustainable use of species and benefit sharing with local communities.

Promote the propagation of ornamental aquatic plants in abandoned paddy fields, for export trade

Identify the industries which release untreated effluents into rivers and streams, and ban/regulate these practices through legal and fiscal instruments.

General Recommendations

Promote school biodiversity parks among urban and sub-urban school premises

Promote urban agricultural programmes (demonstration plots, roof-top gardens – using organic agricultural practices)

Encourage the government departments and private sectors to estimate their carbon footprint, and take appropriate steps to reduce carbon emissions.

Encourage the corporate sector to invest on carbon sequestration activities such as reforestation of degraded areas, and biodiversity offsets related to development projects that have a significant negative impact on natural ecosystems in the province.

15 STRATEGIC AREAS OF FOCUS AND SPECIFIC ACTIONS TO CONSERVE BIODIVERSITY IN THE WESTERN PROVINCE

The following strategic areas of focus, could be considered during a consultative process for preparing a detailed Action Plan to conserve the biodiversity of the Western Province.

1. Establishment of baseline information on biodiversity
2. Promote In-situ conservation
3. Promote Ex-situ conservation
4. Strengthen institutional mechanisms, legislative frameworks and law enforcement
5. Regulation and management of species exploitation for trade
6. Development of capacity for conservation
7. Promote education and awareness related to biodiversity conservation
8. Promote community participation in conservation
9. Promote private sector involvement in conservation
10. Promote provincial/district cooperation for biodiversity conservation

STRATEGY 1: ESTABLISHMENT OF BASELINE INFORMATION ON BIODIVERSITY

A good baseline database is an essential tool to monitor the status of biodiversity in a particular region.

Issues:

- Inadequate information on the occurrence and abundance of plant and animal species in the province, and specific threats to them
- Lack of a central database on biodiversity of the province
- Lack of a data sharing mechanism (formal and informal)
- Lack of reference material/updated bio-repository

Specific Actions to address issues:

Specific Actions	Responsible Institution/s	Technical Support	Time Frame
Compile and synthesize available secondary information on biodiversity of the province	PA	BDS, IUCN, Universities	December, 2009
Carry out an inventory on biodiversity of the province, through a systematic field survey	PA; Department of Census and Statistics	BDS, IUCN, Universities	Jan – December 2010
Establish a digital database on biodiversity of the province, including information on specific ecosystems/habitats, and species of plants and animals	BDS; Department of Census and Statistics	IUCN; Universities	December, 2009
Prepare a list of biodiversity hotspots in the province (areas with high richness of species – particularly endemics, and high habitat degradation)	BDS; PA	IUCN	December 2010

(cont.)

Specific Actions	Responsible Institution/s	Technical Support	Time Frame
Carry out systematic monitoring of biodiversity in the province at three year intervals	PA; Department of Census and Statistics	IUCN, Universities, local NGO's	June - December, 2013
Develop a strategy to update the species repository in the National Museum	Department of National Museums	IUCN, Universities	June, 2010
Develop a data sharing mechanism, to encourage different stakeholders (ie., school students, university students/researchers, district environmental officers, PA managers etc.) submit data related to field observations.	BDS	IUCN, Universities,	
Divisional Secretariats; Department of Census and Statistics	December, 2007		
Establish a mechanism to validate the data received from different stakeholders, prior to updating the database.	BDS	IUCN, Universities	December, 2009
Conduct risk assessments/impact evaluations related to specific threats such as invasive alien species, and industries etc.	BDS, CEA	IUCN, Universities	Jan - December, 2010
Prepare Provincial List of Threatened Species	BDS	IUCN, Universities	Jan - December, 2010

STRATEGY 2: IN-SITU CONSERVATION

Conserving plant and animal populations in the wild and safeguarding their habitats is a priority need to save species from local extinctions. There are several protected areas in the Western Province (5-7% of land area), majority of which are concentrated in the Kaluthara district.

Issues:

- Severe pressures related to population expansion and development on existing wild habitats/protected areas (clearance and fragmentation of forests, reclamation of wetlands, pollution etc.)
- Inadequate protection for rare and/or threatened species occurring outside protected areas
- Inadequate management of existing protected areas
- Lack of boundaries for reservation areas (protected areas, rivers, tanks etc.)
- Introduction and spread of invasive alien species
- Inadequate mechanisms to address solid waste disposal (dumping sites etc.)

Specific Actions to address issues:

Specific Actions	Responsible Institution/s	Technical support	Time Frame
Development activities (ie., road constructions, industrial zones, agricultural expansion, human settlements, water resource development etc.) which are implemented in and around natural habitats and protected should be subjected to an independent, transparent and thorough Environmental Impact Assessment, in accordance with national laws.	PA, UDA	BDS, IUCN, Universities	December, 2009
Allocation of funds for implementation of damage mitigatory options, and conservation actions in specific development projects should be made mandatory • Prepare a statute to initiate this action	PA	UDA, CEA	Jan, 2010 onwards
Demarcate boundaries of PA's and reservation areas, and gazette them (any illegal encroachments should be prevented through legal measures)	DWC, FD	IUCN	July, 2009 – December, 2010
Prepare Management Plans for prioritized protected areas within the province.	DWC, FD	IUCN, Universities	Jan-December 2010
The populations of unique, rare and/or threatened species occurring outside protected areas should be conserved and monitored, through the involvement of local communities. • Identify unique and threatened species occurring outside PA's	PA, DWC, FD	IUCN, Universities, NGO's	Identification: Jan-Dec, 2010, Annual monitoring
Identify the current IAS and their spread in the province, and prepare and action plan to manage them	BDS	IUCN, Universities, DWC, FD	Jan-Dec, 2010
Capture and translocate isolated and less mobile species s heavily degraded habitats into more suitable areas	BDS	IUCN, Universities	December, 2009
Restore degraded wild habitats in a scientific manner, through the involvement of local communities. • Identify factors that degrade existing wild habitats • Initiate scientific restoration of prioritized degraded habitats	BDS	IUCN, Universities	December, 2009
Prepare guidelines for specific development activities, to integrate environmental concerns at the planning stage itself	PA, UDA	IUCN, Universities	June, 2010
Identify suitable areas for housing/settlement sites/industrial areas/commercial areas, through a scientific evaluation which considers environmental aspects/potential impacts	PA, UDA	IUCN, Universities	July, 2009 – June, 2010
Focus on the development of high-rise structures (with apartments) for housing and office space, to minimize pressure on remaining natural habitats in urban/sub-urban areas	PA, UDA		
Evaluate the environmental impacts, prior to issuing permits to reclaim wetlands (marshes, paddy fields etc.)	PA, CEA	IUCN, Universities	
Regulate use of harmful chemicals (agrochemicals and industrial chemicals) at provincial level	PA, CEA	Pesticide Registrar	December, 2009
Implement the solid waste management plan developed by the provincial authority, and monitor the progress of its implementation	PA, Municipal Councils		July-December, 2009 (with annual monitoring)

STRATEGY 3: EX-SITU CONSERVATION AND RE-INTRODUCTION

Since natural habitats and protected areas have become scarce in the Western Province (especially in Colombo and Gampaha districts), ex-situ conservation programmes need to be popularized, in order to sustain biodiversity.

Issues:

- Haphazard release of confiscated wild animals into natural habitats
- Lack of a scientific captive breeding/propagation and rearing facilities
- Haphazard release of ornamental animals and plants into wild habitats by aquaria.
- Loss of home gardens

Specific actions to address issues:

Specific Actions	Responsible Institution/s	Technical support	Time Frame
Establish botanical gardens at district level, and maintain unique and threatened flora occurring in the province.	PA, DBG	Universities	Jan-December, 2010
Establish medicinal plant gardens at district level	PA, DAM	DBG, Universities	Jan-December, 2010
Promote biodiversity parks/gardens at school level in each district	PA, DE	Local NGO's	Jan – December, 2010
Establish avenue plantations in roadsides, using native tree species	PA, RDA, Municipal councils	Universities	Jan 2008-December 2009
Promote home gardens with multi-species vegetation • Establish plant nurseries	PA, DA	Universities, NGO's	Jan, 2010 – Dec, 2011.
Release and/or re-introduction of confiscated species should be done with the assistance of scientific expertise, to suitable ecosystems/habitats	DWC, ZG	IUCN, Universities.,	From Jan 2010 onwards
Develop captive breeding/propagation/rearing facilities in the Zoological Gardens and Botanical Gardens in the Province	DZG, DBG	IUCN, Universities	Jan-Dec, 2010
Develop an inventory of commercial aquaria in the province, and provide operational guidelines to prevent haphazard release/accidental escape of plants and animals into wild habitats • Issue a license and renew it at annual intervals	PA, District Authority	IUCN, Universities	Jan-June, 2010
Promote green architecture in urban landscapes • Roof-top gardens • Urban agriculture	PA, UDA	Universities, Local NGOs	

STRATEGY 4: STRENGTHENING INSTITUTIONAL MECHANISMS, LEGISLATIVE FRAMEWORKS AND LAW ENFORCEMENT

Issues:

- Although there are several acts that are related to the environment, there is no specific legal framework for environment at the provincial level.
- The subject of environment has not been handed over to the provincial council, resulting in the lack of a legal power to address environmental issues (no provincial environmental ministry at the moment).
- Existing environmental committees (at DS division levels) are not functioning properly.
- Existing penalties for offences related to environmental conservation are weak and inadequate
- Environmental aspects are not adequately integrated into urban and industrial development programmes
- Inadequate capacity among relevant government officials to implement legislation against people who continuously violate environment conservation laws.
- Lack of understanding among the political authority (often leading to conflicts with administration authority)
- Inadequate coordination in implementing existing legislation at local authority level

Specific actions to address issues:

Specific Actions	Responsible Institution/s	Technical support	Time Frame
Include the subject on environmental conservation into the 13th amendment, so that the provincial council is provided legal authority to address environmental issues in the province	PA		June - December, 2009
Establish a provincial focal authority to coordinate biodiversity conservation activities	PA	BDS	By December, 2009
Strengthen enforcement capability of relevant agencies (eg. customs, police, fisheries, forestry) through training and capacity-building programmes. • Conduct a training needs assessment • Organize training programmes	PA	BDS, IUCN, Universities	Jan-December, 2010
Conduct an analysis on institutional, policy and legal aspects related to environmental conservation in the province, and identify gaps	PA	EFL	Jan – June, 2010
Establish a Provincial Environmental Authority (Chaired by Chief Secretary, and represented by commissioner of local government, Chief Minister, Secretary of Ministry of Agriculture, Land and Irrigation).	PA	CEA	By December 2009
The current action plan should be converted into a legal statute and enforced (this could be the base for approving development activities etc.)	PA		By June, 2010

STRATEGY 5: REGULATION AND MANAGEMENT OF SPECIES EXPLOITATION FOR TRADE

Issues

Haphazard expansion of aquaria and pet shops which exploit species from wild habitats for commercial trade (local and export)

Specific actions to address issues:

Specific Actions	Responsible Institution/s	Technical support	Time Frame
The aquaria established for exporting of aquatic plants and animals should be made mandatory to register and obtain a license from the Central Environmental Authority (Provincial EA), which is issued only if it is clear that the operation is based on captive bred specimens. • Establish mechanism • Annual renewal of license.	PA	CEA	Jan-March, 2010
Develop best practice guidelines to standardize the operations of aquaria for trade	PA	IUCN, Researchers	By December, 2009
Develop inspection guidelines for captive breeding facilities and aquaria	PA	IUCN, Researchers	By December, 2009
Recruit and train inspectors to conduct frequent routine and ad-hoc monitoring of farms, aquaria and other captive collections in pet shops	PA	IUCN, Universities	Jan – March, 2010
Identify training needs of the aquarium industry, in order to persuade them to follow best practice guidelines, and organize training courses	PA	IUCN, Researchers	By December 2010

STRATEGY 6: CAPACITY DEVELOPMENT FOR CONSERVATION

Issues:

Inadequate capacity among government departments to implement environmental conservation activities in the province

Specific actions to address issues:

Specific Actions	Responsible Institution/s	Technical support	Time Frame
Conduct training programmes for relevant government agencies in the province, to implement environmental conservation activities, subsequent to a thorough assessment of training and capacity needs	PA, DWC, FD,CEA	BDS, IUCN, Universities	Jan-Dec, 2010
Enhance the capacity of regulating and law enforcement agencies such as the Sri Lanka Customs and Police Department, to conserve biodiversity	Sri Lanka Customs and Police Department	BDS, IUCN, Universities	Jan-Dec, 2010

STRATEGY 7: PUBLIC AWARENESS AND EDUCATION

Issues:

Inadequate awareness on the status of district level biodiversity

Specific actions to address issues:

Specific Actions	Responsible Institution/s	Technical support	Time Frame
Conduct targeted awareness and education programmes for different stakeholders in the districts using the available national level information sources (ie., the 2006 national list of threatened species, the national database of species and the national wetland directory).	PA	NGO's, Universities, IUCN	Jan - December, 2010
Produce local language awareness material, including TV documentaries that highlight the biodiversity and conservation issues in the province	PA	SLRC, Private media	Jan – Dec, 2010
Conduct media campaigns through print and electronic media Establish a provincial environmental journalists group	PA	SLRC, Lakehouse, Private media	By Jan, 2010
Identify champion leaders (ambassadors) to promote environmental education and awareness (politicians – national, provincial, local institutions; leading film stars, sports personalities, lawyers etc.)	PA		By Jan, 2010
Strengthen local NGO's and CBOs to function as joint pressure groups with a better 'voice' to convince political authorities Identify active environmental NGO's/ CBO's in the province	PA	CEA	By Jan, 2010
Integrate environmental education into school curriculum, with an emphasis on practical experience	PA	NIE, Universities, IUCN	By June 2010
Re-mobilize school environmental committees attached to CEA	PA	CEA	By Jan, 2010

STRATEGY 8: COMMUNITY PARTICIPATION IN CONSERVATION

Any effective attempts to conserve endangered species in the wild needs active involvement and commitment by local communities, as demonstrated in past species conservation activities. Both in-situ and ex-situ approaches demand extensive support from community based organizations (CBO's), farmers and the general public. Achieving sustainable community participation for conservation of endangered species in the wild is a challenging prospect. Site level conservation programmes should have provision for involvement of local communities, which would enable to inculcate a sense of ownership of the specific conservation programme. Experience across the world has proven that community participation can be effectively mobilized only if the community has a strong conviction towards conserving such a resource base, and the community's livelihood is essentially linked to the resource base, depending on it for goods and services. Success of such conservation activities would also depend on whether the community members feel that the conservation actions in the short-term will result in some form of tangible benefits.

Issues:

- Lack of tangible benefits for local communities to conserve biodiversity in the province
- Lack of involvement of local communities in environmental conservation programmes in the province
- Inadequate capacity among local communities to pursue in conservation activities that afford tangible benefits
- Lack of involvement of local communities in conserving natural habitats and protected areas in the province

Specific actions to address issues:

Specific Actions	Responsible Institution/s	Technical support	Time Frame
Identify tangible benefits related to biodiversity conservation for local communities and implement pilot projects/programmes at district level	PA	NGO's, CBO's	Jan 2010- December, 2012
Develop capacity among local communities to engage in enterprises related to sustainable use of biodiversity in the province	PA	Private Sector	Jan – Dec, 2010
Develop local procedures for biodiversity conservation and community-based enforcement, in consultation with local communities living around natural habitats and protected areas	PA	FD, DWC	By Jan, 2010
Mobilize local youth organizations to actively engage in environmental conservation activities, and lobby against harmful activities that affect the environment	PA	NGO's, CBO's, DA	Jan - Dec, 2010
Create pressure groups at local level to convince local politicians on the importance of environmental conservation (green political groups)	PA	NGO's, CBO's, DA	Jan - Dec, 2010
Establish an environmental awards scheme for individuals among local communities	PA	NGO's, CBO's, DA	from 2010 onwards

STRATEGY 9: PROMOTE PRIVATE SECTOR INVOLVEMENT IN ENVIRONMENTAL CONSERVATION ACTIVITIES

Issues:

Lack of incentives for the private sector to invest on biodiversity conservation activities at provincial level

Specific actions to address issues:

Specific Actions	Responsible Institution/s	Technical support	Time Frame
Design a mechanism of incentives to encourage the private sector investments towards conservation of and sustainable use of biodiversity in the province.	PA	Universities, BDS, IUCN	By Jan, 2010
Identify and promote ecotourism projects in predetermined sites (through hotels and tour operators)	PA	SLTB	Jan-Dec, 2010
Annual environmental awards for private sector agencies	PA		2008 onwards

STRATEGY 10: PROMOTE PROVINCIAL/DISTRICT COOPERATION FOR BIODIVERSITY CONSERVATION

Issues:

Inadequate collaboration between provinces to conserve biodiversity

Specific actions to address issues:

Specific Actions	Responsible Institution/s	Technical support	Time Frame
Establish a collaborative mechanism between relevant provincial government agencies to curb illegal activities that affect environmental conservation in each province	PA, Police	Universities	Jan, 2010 (Quarterly meetings)
Establish and maintain a provincial database of illegal hunters, dealers and buyers involved in illegal trade of wild species	PA, Police	DC, FD, DWC	Jan, 2010
Strengthen the coordination between provincial environmental authorities	CEA	Local NGO's	Jan – December, 2010

DEFINITIONS

Alien species means a species, subspecies, or lower taxon occurring outside of the range it occupies naturally or could not occupy without direct or indirect introduction or care by humans, and includes any part of that species that might survive and subsequently reproduce.

Benefit sharing means the equitable distribution of the results of access to biological resources and the traditional knowledge associated with them and includes both monetary and non-monetary benefits.

Biological diversity, or ***biodiversity***, means the variability among living organisms from all sources including, among other things, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.

Biological resources include genetic resources, organisms or parts thereof, populations, or any other biotic component of ecosystems with actual or potential use or value for humanity.

Bioprospecting means the process of surveying and collecting biological resources, genetic resources, and the traditional knowledge associated with them for research and development that leads to a commercial application.

Biosafety means the conditions created by all measures and efforts to identify and manage the potential risks to human health and the environment and biodiversity resulting from all activities involving genetically modified organisms, GMO products and alien species.

Biotechnology means any technological application that uses biological systems, living organisms, or derivatives thereof, to make or modify products or processes for specific use.

Buffer zone means an area lying outside the boundary of a protected area that is managed to enhance the conservation of the protected area by the adoption of special development activities that contribute to improving the socio-economic well being of buffer zone inhabitants.

Conservation status means the total of all influences acting on a species that may affect its long-term distribution and abundance.

Ecosystem means a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit.

Endemic species means a species which occurs naturally in the wild only in Sri Lanka or in marine areas under the jurisdiction of Sri Lanka, or a species which breeds in the wild only in Sri Lanka or in marine areas under the jurisdiction of Sri Lanka.

Ex-situ conservation means the conservation of biological resources outside their natural habitats.

Export means intentional transboundary movement from Sri Lanka to another country.

Genetic resources include the genetic material of animals, plants, fungi, and micro-organisms which have actual or potential value for humankind, are farmed, naturally exist in wildlife or imported in Sri Lanka, have been or not yet found in the territory of Sri Lanka.

Habitat means the place or type of site where an organism or population naturally occurs, finds shelter, feeds, and breeds.

Import means intentional transboundary movement into Sri Lanka from another country.

In-situ conservation means the conservation of ecosystems and natural habitats and the maintenance and recovery of viable populations of species in their natural surroundings and, in the case of domesticated or cultivated species, in the surroundings where they have developed their distinctive properties.

Indigenous knowledge means traditional experience with the utilization, conservation and development of biological resources, which is handed down from one generation to another in communities and ethnic groups of Sri Lanka in different forms including:

- In verbal form;
- In written form, possessed by a family, or recorded and published as scientific documents; or
- Registered and granted a certificate of intellectual property right by the State.

Introduction means the movement, by human action, of a species, sub-species or lower taxon, including any part that may survive and subsequently reproduce, outside its past or present natural range, and the movement of a genetically modified organism or GMO product out of contained use. This movement may be within the country or between Sri Lanka and another country.

Invasive alien species means an alien species which becomes established in natural or semi-natural ecosystems or habitat, is an agent of change, and threatens native biological diversity.

Marine area includes open water, water column, islands, and the seabed.

Migratory species means an entire population or any geographically separate part of a population of any species or sub-species of wild animals, a significant proportion of whose members cyclically and predictably cross one or more national jurisdictional boundaries.

Native species means a species, sub-species, or lower taxon that occurs naturally in a given area, within its known historical range, and with no evidence of direct or indirect introduction or care by humans.

Population means a group of animals or plants belonging to the same species or sub-species which is geographically separate from other groups belonging to the same species or sub-species.

Protected area means a geographically defined area of land, freshwater and/or sea which is designated and managed to achieve specific conservation objectives, including the protection and maintenance in perpetuity of biological diversity and natural and associated cultural resources.

Re-establishment means the successful re-introduction of a species.

Re-introduction means to bring a species back into an area from which it has been removed or become extinct.

Release means intentional introduction into the environment of alien species, genetically modified organisms and GMO products, including trials and placing on the market of genetically modified organisms and GMO products.

Species means a group of organisms that share similar characteristics and can interbreed with one another to produce fertile offspring and includes sub-species and lower taxa as well as any part of the species that is capable of survival and reproduction.

Sustainable use means the use of components of biological diversity in a way and at a rate that does not lead to the long-term decline of biological diversity, thereby maintaining its potential to meet the needs and aspirations of present and future generations.

Wildlife means plant and animal species occurring within natural ecosystems and habitats with no, or only limited, human influence in their existence and reproduction.

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ANNEXURES

Annex 1: List of freshwater and brackishwater fish in the Western Province

Family	Species	Colombo	Gampaha	Kaluthara
Anabantidae	Climbing Perch - <i>Anabas testudineus</i>	+	+	+
Anguillidae	Level-finned Eel - <i>Anguilla bicolor</i>	+	+	+
Aplocheilidae	Day's Killifish - <i>Aplocheilus dayi</i> ^E	+	+	
Aplocheilidae	Dwarf Panchax - <i>Aplocheilus parvus</i>	+	+	+
Ariidae	Sea catfish - <i>Arius</i> sp.		+	+
Bagridae	Long-whiskered catfish - <i>Mystus gulio</i>	+	+	+
Bagridae	Yellow Catfish - <i>Mystus keletius</i>	+	+	+
Bagridae	Striped dwarf Catfish - <i>Mystus vittatus</i>	+	+	+
Balitoridae	Banded mountain Loach - <i>Schistura notostigma</i> ^E	+		
Balitoridae	<i>Acanthocobitis urophthalmus</i> ^E	+	+	+
Belontiidae	Paradise Fish - <i>Pseudosphromenus cupanus</i>	+	+	
Belontiidae	Snakeskin Gouramy - <i>Trichogaster pectoralis</i> ^{Ex}	+	+	
Belontiidae	Combtail - <i>Belonta signata</i> ^E			+
Belontiidae	Three-spot Gouramy - <i>Trichogaster trichopterus</i> ^{Ex}	+		
Belontiidae	<i>Malpulutta kretseri</i> ^E		+	+
Belonidae	<i>Xenentodon cancila</i>	+		
Carangidae	Big-eye Trevally - <i>Caranx sexfasciatus</i>		+	
Centropomidae	Common Glassfish - <i>Ambassis commersoni</i>		+	+
Chaniidae	Spotted snakehead - <i>Channa punctata</i>	+	+	+
Channidae	Smooth-breasted Snakehead - <i>Channa orientalis</i> ^E	+	+	
Channidae	Murrel - <i>Channa striata</i>	+	+	+
Channidae	<i>Channa ara</i> ^E		+	+
Charangidae	Bigeye trevally - <i>Caranx sexfasiatus</i>		+	+
Cichlidae	Orange Chromide - <i>Etroplus maculatus</i>	+	+	
Cichlidae	Pearl Spot - <i>Etroplus suratensis</i>	+	+	
Cichlidae	Tilapia - <i>Sarotherodon mossambicus</i> ^{Ex}	+	+	+
Cichlidae	Nile Tilapia - <i>Oreochromis mossambicus</i> ^{Ex}	+		
Clariidae	Walking Catfish - <i>Clarias brachysoma</i> ^E	+	+	
Clupeidae	Malabar Sprat - <i>Ehirava fluviatilis</i>		+	+
Cobitidae	Spiny Loach - <i>Lepidocephalichthys thermalis</i>		+	+
Cobitidae	<i>Lepidocephalichthys jonklaasi</i> ^E			+
Cyprinidae	Striped Rasbora - <i>Rasbora daniconius</i>	+	+	
Cyprinidae	<i>Rasbora wilpita</i> ^E	+		
Cyprinidae	<i>Rasboroides vaterifloris</i> ^E	+		+
Cyprinidae	Filamented Barb - <i>Puntius sinhalaya</i> ^E	+	+	
Cyprinidae	<i>Puntius cumingi</i>	+	+	+
Cyprinidae	Cherry Barb - <i>Puntius titteya</i> ^E	+	+	+
Cyprinidae	Swamp barb - <i>Puntius chola</i>	+		
Cyprinidae	<i>Puntius nigrofasciatus</i> ^E	+	+	+
Cyprinidae	Redside Barb - <i>Puntius bimaculatus</i>	+	+	+
Cyprinidae	Silver Barb - <i>Puntius vittatus</i>	+	+	+

(Cont.)

Family	Species	Colombo	Gampaha	Kaluthara
Cyprinidae	Olive Barb - <i>Puntius sarana</i>	+	+	
Cyprinidae	<i>Puntius pleurotaenia</i>	+		+
Cyprinidae	Scarlet-banded Barb - <i>Puntius amphibius</i>	+	+	
Cyprinidae	Long-snouted Barb - <i>Puntius dorsalis</i>	+	+	
Cyprinidae	Common Labeo - <i>Labeo dussumieri</i>	+	+	
Cyprinidae	Silver Carplet - <i>Amblypharyngodon melettinus</i>	+	+	+
Cyprinidae	Flying Barb - <i>Esomus thermoicos</i> ^E	+	+	+
Cyprinidae	Horadandiya - <i>Horadandiya atukorali</i>	+	+	
Cyprinidae	Caverii Barb - <i>Rasbora carverii</i>	+		+
Cyprinidae	Giant Danio - <i>Danio malabaricus</i>	+	+	+
Cyprinidae	Stone Sucker - <i>Garra ceylonensis</i> ^E	+	+	+
Eleotridae	Upside-down Sleeper - <i>Butis butis</i>			+
Eleotridae	Brown Gudgeon - <i>Eleotris fusca</i>			+
Gerridae	Silver Bleddy - <i>Gerres abbreviatus</i>		+	
Gerridae	Silver Bleddy - <i>Gerres oyana</i>		+	
Gobiidae	Bar-eyed Goby - <i>Glossogobius giuris</i>	+	+	+
Gobiidae	<i>Awaous melanocephalus</i>			+
Gobiidae	<i>Redigobius balteatops</i>			+
Gobiidae	<i>Schismatogobius deraniyagalai</i> ^E			+
Gobiidae	<i>Sicyopterus griseus</i>			+
Gobiidae	<i>Sicyopus jonklaasi</i> ^E			+
Helostomiidae	Kissing Gourami - <i>Helostoma temminckii</i> ^{Ex}	+	+	
Hemiramphidae	Halfbeak - <i>Zenarchopterus dispar</i>		+	+
Heteropneustidae	Stinging Catfish - <i>Heteropneustes fossilis</i>	+	+	+
Hypostomidae	Tank Cleaner - <i>Hypostomus plecostomus</i> ^{Ex}		+	
Kuhliidae	Spotted Flagtail - <i>Kuhlia marginata</i>		+	
Lutjanidae	Red Snapper - <i>Lutjanus argentimaculatus</i>		+	+
Megalopidae	Tarpon - <i>Megalops cyprinoides</i>	+	+	
Mastacembelidae	<i>Mastacembelus armatus</i>	+		
Mastacembelidae	<i>Macrognathus aral</i>	+	+	
Monodactylidae	Mono - <i>Monodactylus argenteus</i>		+	+
Mullidae	Largescale mullet - <i>Liza micolepis</i>			+
Notopteridae	Knife fish - <i>Chitala ornata</i> ^{Ex}	+		+
Oryziidae	Blue-eye - <i>Oryzias melastigma</i>		+	+
Osphronemidae	Giant Gourami - <i>Osphronemus goramy</i> ^{Ex}			+
Poeciliidae	Guppy - <i>Poecilia reticulata</i> ^{Ex}	+		
Poeciliidae	Mosquito fish - <i>Gambusia affinis</i> ^{Ex}	+		+
Scatophagidae	Scat - <i>Scatophagus argus</i>			+
Siluridae	<i>Ompok bimaculatus</i>	+		
Siluridae	<i>Wallagu attu</i>	+	+	+
Synbranchidae	<i>Ophisternon bengalense</i>	+	+	+
Synbranchidae	<i>Ophisternon desilvai</i> ^E			+
Tetraodontidae	Common Puffer - <i>Tetraodon fluviatilis</i>		+	+
Theraponidae	Target Fish - <i>Therapon jabua</i>		+	+
Toxotidae	Archer fish - <i>Toxotes chatareus</i>			+

(Status: E – Endemic; Ex – Exotic)

Annex 2: List of amphibians in the Western Province

Family	Species	Colombo	Gampaha	Kaluthara
Bufonidae	Common Toad - <i>Bufo melanostictus</i>	+	+	+
	Athokorale's Dwarf Toad - <i>Bufo atukoralei</i> ^E	+	+	+
Microhylidae	Common Bull Frog - <i>Kaloula taprobanica</i>	+	+	+
	Red Narrow-mouthed Frog - <i>Microhyla rubrum</i>	+	+	+
	Ornate Narrow-mouthed Frog - <i>Microhyla ornata</i>	+	+	+
	White Bellied Pugsnout Frog - <i>Ramanella variegata</i>	+	+	+
	Baloon Frog - <i>Uperodon systoma</i>	+	+	+
Ranidae	Common Paddy field Frog - <i>Limnonectes limnocharis</i>	+	+	+
	Corrugated Water Frog - <i>Lankanectus corrugatus</i> ^E		+	+
	Small Wood Frog - <i>Rana aurantiaca</i>	+	+	+
	Sri Lanka Wood Frog - <i>Rana gracilis</i> ^E	+	+	+
	Six-toed Green Frog - <i>Euphlyctis hexadactyla</i>	+	+	+
	Skipper Frog - <i>Euphlyctis cyanophlyctis</i>	+	+	+
	Indian Bull Frog - <i>Hoplobatrachus crassus</i>	+	+	+
	Sri Lanka Rock Frog - <i>Nannophrys ceylonensis</i> ^E	+	+	+
Rhacophoridae	Pygmy Tree Frog - <i>Philautus</i> spp.		+	+
	Hour-glass Tree Frog - <i>Polypedates cruciger</i> ^E	+	+	+
	Chunam Tree Frog - <i>Polypedates maculatus</i>	+	+	+

(Status: E – Endemic)

Annex 3: Reptiles in the Western Province

Family	Species	Colombo	Gampaha	Kaluthara
Crocodylidae	Estuarine Crocodile - <i>Crocodylus porosus</i>		+	+
Crocodylidae	Mugger - <i>Crocodylus palustris</i>			+
Trionychidae	Flapshell Turtle - <i>Lissemys punctata</i>	+	+	+
Bataguridae	Parker's Black Turtle - <i>Melanochelys trijuga</i>	+	+	+
Testudinidae	Star Tortoise - <i>Geochelone elegans</i>	+	+	
Varanidae	Water Monitor - <i>Varanus salvator</i>	+	+	+
	Land Monitor - <i>Varanus bengalensis</i>	+	+	+
Agamidae	Green Garden Lizard - <i>Calotes calotes</i>	+	+	+
	Common Garden Lizard - <i>Calotes versicolor</i>	+	+	+
	Sri Lanka Kangaroo Lizard - <i>Otocryptis wiegmanni</i> ^E	+	+	+
Gekkonidae	Common House Gecko - <i>Hemidactylus frenatus</i>	+	+	+
	<i>Hemidactylus depressus</i>	+		+
	Spotted House Gecko - <i>Hemidactylus brookii</i> ^E	+	+	+
	Fourclaw Gecko - <i>Gehyra mutilata</i>	+	+	+
	<i>Lepidodactylus lugubris</i>			+

(Cont.)

Family	Species	Colombo	Gampaha	Kaluthara
Scincidae	Common Lanka Skink - <i>Lankascincus fallax</i> ^E	+	+	+
	Bronze-green Little Skink - <i>Mabuya macularius</i>		+	+
	Common skink - <i>Mabuya carinata</i> ^E	+	+	+
	Gan's Lanka Skink - <i>Lankascincus gansi</i> ^E			+
	Three-toe snake Skink - <i>Nessia burtonii</i>			+
	<i>Rayopa punctata</i>			+
	<i>Sphenomorphus rufogulus</i>			+
Colubridae	Green vine snake - <i>Ahaetulla nasutus</i>	+	+	+
	Dog-faced Water Snake - <i>Cerberus rhynchops</i>	+	+	+
	The Olive Keelback - <i>Atridium schistosum</i>	+	+	+
	Rat Snake - <i>Ptyas mucosus</i>	+	+	+
	Common Bronzeback - <i>Dendrelaphis tristis</i>	+	+	+
	<i>Dendrolaphis bifrenalis</i>	+	+	+
	Common Pond Snake - <i>Xenochrophis asperimus</i> ^E	+	+	+
	Checkered Keelback - <i>Xenochrophis piscator</i>	+	+	+
	Buff-striped Keelback - <i>Amphiesma stolata</i>	+	+	+
	Common Kukri Snake - <i>Oligodon arnensis</i>	+	+	+
	Dumeril's Kukri Snake - <i>Oligodon sublineatus</i> ^E	+	+	+
	Wolf Snake - <i>Lycodon aulicus</i>	+	+	+
	Gunther's Roughside - <i>Aspidura guentheri</i> ^E		+	+
	<i>Boiga ceylonensis</i>	+	+	+
	<i>Coelognathus helena</i>			+
	<i>Sibynophis subpunctatus</i>			+
	<i>Lycodon osmanhillii</i>	+	+	+
	<i>Lycodon striatus</i>	+	+	+
Elapidae	Cobra - <i>Naja naja</i>	+	+	+
Viperidae	Russell's Viper - <i>Daboia russellii</i>	+	+	+
	Merrem's Hump-nosed Viper - <i>Hypnale hypnale</i>	+	+	+
Boidae	Indian Python - <i>Python molurus</i>	+	+	+
Achrochordidae	Wart Snake - <i>Achrochordus granulatus</i>	+	+	+
Typhlopidae	<i>Ramphotyphlops braminus</i>	+	+	+
Cylindrophidae	Pipe snake - <i>Cylindrophis maculatus</i> ^E	+	+	+

(Status: E – Endemic species)

Annex 4: List of birds in the Western Province

Family	Species	Colombo	Gampaha	Kaluthara
Anhingidae	Darter - <i>Anhinga melanogaster</i>	+		
Accipitridae	Shikra - <i>Accipiter badius</i>	+	+	+
Accipitridae	Crested Goshawk - <i>Accipiter trivirgatus</i>			+
Accipitridae	Besra - <i>Accipiter virgatus</i>			+
Accipitridae	Brahminy Kite - <i>Haliastur indus</i>	+	+	+
Accipitridae	Western Marsh Harrier - <i>Circus aeruginosus</i> ^{WM}		+	
Accipitridae	Pale Harrier - <i>Circus macrourus</i> ^{WM}		+	
Accipitridae	Crested Serpent Eagle - <i>Spilornis cheela</i>	+	+	+
Accipitridae	White-bellied Fish Eagle - <i>Haliaeetus nipalensis</i>		+	+
Alaudidae	Oriental Skylark - <i>Alauda gulgula</i>		+	

(Cont.)

Family	Species	Colombo	Gampaha	Kaluthara
Alcedinidae	White-breasted Kingfisher - <i>Halcyon smyrnensis</i>	+	+	+
Alcedinidae	Black-capped Kingfisher - <i>Halcyon pilcata</i> ^{HM}		+	
Alcedinidae	Stork-billed Kingfisher - <i>Pelargopsis capensis</i>	+	+	+
Alcedinidae	Common Kingfisher - <i>Alcedo atthis</i>	+	+	+
Alcedinidae	Pied Kingfisher - <i>Ceryle rudis</i>		+	+
Anatidae	Lesser Whistling Teal - <i>Dendrocygna javanica</i>	+	+	+
Apodidae	White-browed Swift - <i>Apus affinis</i>	+	+	+
Apodidae	Alpine Swift - <i>Tachymarptis melba</i>		+	
Apodidae	Asian Palm Swift - <i>Cypsiurus balasiensis</i>	+	+	+
Apodidae	Indian Swiftlet - <i>Collocalia unicolor</i>		+	
Ardeidae	Intermediate Egret - <i>Mesophoyx intermedia</i>	+	+	+
Ardeidae	Little Egret - <i>Egretta garzetta</i>	+	+	+
Ardeidae	Large Egret - <i>Casmerodius albus</i>	+	+	+
Ardeidae	Cattle Egret - <i>Bubulcus ibis</i>	+	+	+
Ardeidae	Purple Heron - <i>Ardea purpurea</i>	+	+	+
Ardeidae	Indian Pond Heron - <i>Ardeola grayii</i>	+	+	+
Ardeidae	Little Green Heron - <i>Butorides striatus</i>	+	+	+
Ardeidae	Yellow Bittern - <i>Ixobrychus sinensis</i>	+	+	+
Ardeidae	Chestnut Bittern - <i>Ixobrychus cinnamomeus</i>	+	+	+
Ardeidae	Black Bittern - <i>Dupetor flavicollis</i>	+	+	+
Ardeidae	Black Crowned Night Heron - <i>Nycticorax nycticorax</i>	+	+	+
Artamidae	Ashy Swallow-Shrike - <i>Artamus fuscus</i>		+	+
Burhinidae	Eurasian Thick-Knee - <i>Burhinus oedicephalus</i>		+	
Bucerotidae	Sri Lanka Grey Hornbill - <i>Ocyeros gingalensis</i> ^E			+
Campephagidae	Little Minivet - <i>Pericrocotus cinnamomeus</i>	+	+	+
Capitonidae	Brown-headed Barbet - <i>Megalaima zeylanica</i>	+	+	+
Capitonidae	Small Barbet - <i>Megalaima rubricapilla</i> ^E	+	+	+
Capitonidae	Sri Lanka Yellow-fronted Barbet - <i>Megalaima flavifrons</i> ^E			+
Capitonidae	Coppersmith Barbet - <i>Megalaima haemacephala</i>		+	+
Caprimulgidae	Long-tailed Nightjar - <i>Caprimulgus atripennis</i>		+	+
Charadriidae	Red-wattled Lapwing - <i>Vanellus indicus</i>	+	+	+
Ciconiidae	Asian Openbill - <i>Anastomus oscitans</i>	+	+	+
Columbidae	Spotted Dove - <i>Streptopelia chinensis</i>	+	+	
Columbidae	Rock Pigeon - <i>Columba livia</i>	+	+	+
Columbidae	Emerald Dove - <i>Chalcophaps indica</i>	+	+	+
Columbidae	Green Imperial Pigeon - <i>Ducula aenea</i>			+
Columbidae	Pompadour Green Pigeon - <i>Treron pompadora</i> ^E		+	+
Columbidae	Sri Lanka Wood Pigeon - <i>Columba torringtoni</i> ^E			+
Coraciidae	Indian Roller - <i>Coracias benghalensis</i>		+	
Corvidae	House Crow - <i>Corvus splendens</i>	+	+	+
Corvidae	Jungle Crow - <i>Corvus macrorhynchos</i>	+	+	+
Corvidae	Sri Lanka Blue Magpie - <i>Urocissa ornata</i> ^E			+
Cuculidae	Common Coucal - <i>Centropus sinensis</i>	+	+	+
Cuculidae	Blue-faced Malkoha - <i>Phaenicophaeus viridirostris</i>		+	+

(Cont.)

Family	Species	Colombo	Gampaha	Kaluthara
Cuculidae	Asian Koel - <i>Eudynamis scolopacea</i>	+	+	+
Cuculidae	Pied Crested Cuckoo - <i>Oxylophus jacobinus</i>		+	
Cuculidae	Green-billed Coucal - <i>Centropus chlororhynchus</i> ^E	+	+	+
Cuculidae	Red-faced Malkoha - <i>Phaenicophaeus pyrrhocephalus</i> ^E			+
Cuculidae	Drong-cuckoo - <i>Surniculus lugubris</i>			+
Dicaeidae	Pale-billed Flowerpecker - <i>Dicaeum erythrorhynchos</i>	+	+	+
Dicaeidae	Legge's Flowerpecker - <i>Dicaeum vincens</i> ^E	+	+	+
Dicruridae	White-vented Drongo - <i>Dicrurus caerulescens</i>	+	+	+
Hirundinidae	Barn Swallow - <i>Hirundo rustica</i> ^{WM}	+	+	+
Hirundinidae	Red-rumped Swallow - <i>Hirundo daurica</i> ^E		+	
Irenidae	Common Iora - <i>Aegithina tiphia</i>	+	+	+
Jacaniidae	Pheasant-tailed Jacana - <i>Hydrophasianus chirurgus</i>	+	+	+
Laniidae	Brown Shrike - <i>Lanius cristatus</i> ^{WM}	+	+	+
Laridae	Gull-billed Tern - <i>Gelochelidon nilotica</i> ^{WM}		+	
Laridae	Whiskered Tern - <i>Chlidonias hybridus</i> ^{WM}	+	+	+
Laridae	Lesser Crested Tern - <i>Sterna bengalensis</i> ^{WM}		+	
Laridae	Little Tern - <i>Sterna albifrons</i>		+	
Meropidae	Blue-tailed Bee-eater - <i>Merops philippinus</i> ^{WM}		+	
Monarchidae	Asian Paradise Flycatcher - <i>Terpsiphone paradisi</i>	+	+	+
Monarchidae	White-browed Fantail - <i>Rhipidura aureola</i>		+	+
Motacillidae	Grey Wagtail - <i>Motacilla cinerea</i> ^{WM}	+	+	+
Motacillidae	Forest Wagtail - <i>Dendronanthus indicus</i> ^{WM}	+	+	+
Motacillidae	Indian Pipit - <i>Anthus rufulus</i>		+	+
Muscicapidae	Brown Flycatcher - <i>Muscicapa daurica</i> ^{WM}		+	+
Muscicapidae	Spot-winged Thrush - <i>Zoothera spiloptera</i> ^E			+
Nectariniidae	Purple Sunbird - <i>Nectarinia asiatica</i>	+	+	+
Nectariniidae	Purple-rumped Sunbird - <i>Nectarinia zeylonica</i>	+	+	+
Nectariniidae	Loten's Sunbird - <i>Nectarinia lotenia</i>	+	+	+
Oriolidae	Black-headed Oriole - <i>Oriolus xanthornus</i>	+	+	+
Pelicanidae	Spot-billed Pelican - <i>Pelecanus philippensis</i>	+		+
Phalacrocoracidae	Little Cormorant - <i>Phalacrocorax niger</i>	+	+	+
Phalacrocoracidae	Indian Cormorant - <i>Phalacrocorax fuscicollis</i>	+	+	+
Picidae	Red-backed Woodpecker - <i>Dinopium benghalense</i>	+	+	+
Pittidae	Indian Pitta - <i>Pitta brachyura</i> ^{WM}	+	+	+
Ploceidae	White-rumped Munia - <i>Lonchura striata</i>	+	+	+
Ploceidae	Spotted Munia - <i>Lonchura punctulata</i>	+	+	+
Ploceidae	Black-headed Munia - <i>Lonchura malacca</i>	+	+	+
Podicipedidae	Little Grebe - <i>Tachybaptus ruficollis</i>	+	+	+
Psittacidae	Rose-ringed Parakeet - <i>Psittacula krameri</i>	+	+	+
Psittacidae	Alexandrine Parakeet - <i>Psittacula eupatria</i>		+	+
Psittacidae	Sri Lanka Hanging Parrot - <i>Loriculus beryllinus</i> ^E		+	+
Pycnonotidae	Red-vented Bulbul - <i>Pycnonotus cafer</i>	+	+	+

(Cont.)

Family	Species	Colombo	Gampaha	Kaluthara
Pycnonotidae	White-browed Bulbul - <i>Pycnonotus luteolus</i>	+	+	+
Rallidae	White-breasted Waterhen - <i>Amaurornis phoenicurus</i>	+	+	+
Rallidae	Ruddy-breasted Crane - <i>Porzana fusca</i>	+	+	+
Rallidae	Purple Coot - <i>Porphyrio porphyrio</i>	+	+	+
Rallidae	Watercock - <i>Gallicrex cineria</i>		+	+
Rallidae	Common Moorhen - <i>Gallinula chloropus</i>		+	+
Recurvirostridae	Black-winged Stilt - <i>Himantopus himantopus</i>	+	+	+
Rostratulidae	Greater Painted-Snipe - <i>Rostratula benghalensis</i>		+	
Scolopacidae	Whimbrel - <i>Numenius phaeopus</i> ^{WM}		+	
Scolopacidae	Eurasian Curlew - <i>Numenius arqueta</i> ^{WM}		+	
Scolopacidae	Common Sandpiper - <i>Actitis Hypoleucos</i> ^{WM}	+	+	+
Scolopacidae	Curlew Sandpiper - <i>Calidris ferruginea</i> ^{WM}		+	
Scolopacidae	Marsh Sandpiper - <i>Tringa stagnatilis</i> ^{WM}	+	+	+
Scolopacidae	Pintail Snipe - <i>Gallinago stenura</i> ^{WM}		+	+
Strigidae	Collared Scops Owl - <i>Otus bakkamoena</i>	+	+	+
Strigidae	Brown Fish Owl - <i>Ketupa zeylonensis</i>		+	+
Strigidae	Chestnut-backed owl - <i>Glaucidium castanonotum</i> ^E			+
Sturnidae	Common Mynah - <i>Acridotheres tristis</i>	+	+	+
Sturnidae	White-faced starling - <i>Sturnus albofrontatus</i> ^E			+
Sturnidae	Hill Myna - <i>Gracula religiosa</i>			+
Sturnidae	Sri Lanka Mynah - <i>Gracula ptilogenys</i> ^E			+
Sylviidae	Green Tree Warbler - <i>Phylloscopus nitidus</i> ^{WM}			+
Sylviidae	Common Tailorbird - <i>Orthotomus sutorius</i>	+	+	+
Sylviidae	White-browed Prinia - <i>Prinia inornata</i>	+	+	+
Sylviidae	Fantail Warbler - <i>Cisticola juncidis</i>	+	+	+
Sylviidae	Large Prinia - <i>Prinia sylvatica</i>	+	+	+
Sylviidae	Ashy Prinia - <i>Prinia socialis</i>	+	+	+
Sylviidae	Great Reed Warbler - <i>Acrocephalus stentoreus</i>		+	+
Threskiornithidae	White Ibis - <i>Threskiornis melanocephalus</i>		+	
Timaliidae	Dark-fronted Babbler - <i>Rhopocichla atriceps</i>			+
Timaliidae	Tawny-bellied Babler - <i>Dumetia hyperythra</i>			+
Timaliidae	Ashy-headed Laughing Thrush - <i>Garrulax cinereifrons</i> ^E			+
Timaliidae	Sri Lanka Orange-billed Babbler - <i>Turdoides rufescens</i> ^E			+
Timaliidae	Common Babbler - <i>Turdoides affinis</i>	+	+	+
Turdidae	Magpie Robin - <i>Copsychus saularis</i>	+	+	+
Turdidae	Black Robin - <i>Saxicoloides fulicata</i>	+	+	+

(Status: E – Endemic; WM – Winter Migrants)

Annex 5: List of mammals in the Western Province

Family	Species	Colombo	Gampaha	Kaluthara
Cercopithecidae	Toque Macaque - <i>Macaca sinica</i> ^E		+	+
	Purple -faced Leaf Monkey - <i>Trachypithecus vetulus</i> ^E	+	+	+
Loridae	Slender Loris - <i>Loris tardigradus</i> ^E		+	+
Leporidae	Black-naped Hare - <i>Lepus nigricollis</i>	+	+	+
Scuridae	Palm squirrel - <i>Funambulus palmarum</i>	+	+	+
	Flame-striped Jungle Squirrel - <i>Funambulus layardi</i> ^E			+
	Dusky-striped Jungle Squirrel - <i>Funambulus sublineatus</i>			+
	Giant Squirrel - <i>Ratufa macroura</i>		+	+
Hystericidae	Indian Crested Porcupine - <i>Hystrix indica</i>	+	+	+
Muridae	Indian Bandicoot - <i>Bandicota bengalensis</i>	+	+	+
	House Rat - <i>Rattus rattus</i>	+	+	+
	House Mouse - <i>Mus musculus</i>	+	+	+
	Brown Mouse - <i>Mus cervicolor</i>	+	+	+
Soricidae	Musk Shrew - <i>Suncus murinus</i>	+	+	+
Pteropidae	Flying-Fox - <i>Pteropus giganteus</i>	+	+	+
	Fruit Bat - <i>Rousettus seminus</i>	+	+	+
	Short-nosed fruit bat - <i>Cynopterus sphinx</i>			+
Rhinolophidae	Great Horse-shoe Bat - <i>Rhinolopus beddomei</i>		+	+
Hipposiderosidae	Fulvous Leaf-nosed Bat - <i>Hipposideros fulvus</i>		+	+
	<i>Dekhan Leaf-nosed Bat - Hipposideros galeritus</i>			+
Vespertilionidae	Painted Bat - <i>Kirivoula pictus</i>			+
	Kellart's Pipistrel - <i>Pipistrellus ceylonicus</i>			+
	Great Yellow Bat - <i>Scotophilus heathii</i>			+
	Long-winged Bat - <i>Miniopterus schreibersii</i>	+		
Molossidae	<i>Wrinkled-lip Bat - Chaerephon plicatus</i>			+
Viverridae	Brown Mongoose - <i>Herpestes fuscus</i>	+	+	+
	Ruddy Mongoose - <i>Herpestes smithii</i>		+	+
	Indian Palm-Cat - <i>Paradoxurus hermaphrodites</i>	+	+	+
	Small Civet-Cat - <i>Viverricula indica</i>		+	+
	Golden Palm Cat - <i>Paradoxurus zeylonensis</i> ^E	+	+	+
Mustellidae	Eurasian Otter - <i>Lutra lutra</i>	+	+	+
Felidae	Indian Fishing Cat - <i>Prionailurus viverrinus</i>	+	+	+
	Rusty-spotted Cat - <i>Felis rubiginosa</i>	+	+	+
Tragulidae	Mouse Deer - <i>Tragulus meminna</i> ^E		+	+
Canidae	Jackal - <i>Canis aureus</i>		+	+
Manidae	Pangolin - <i>Manis crassicaudata</i>			+

(Status: E – Endemic species)

Annex 6: Checklist of butterflies in the Western Province

Family	Species	Colombo	Gampaha	Kaluthara
Lycaenidae	Lesser Grass Blue - <i>Zizina otis</i>		+	+
	Large Oak Blue - <i>Arhopala amantes</i>		+	
	Dark Grass Blue - <i>Zizeeria karsandra</i>		+	
	Tiny Grass Blue - <i>Zizula hylax</i>		+	
	Dark Cerulean - <i>Jamides coruscans</i>		+	+
	Common Cerulean - <i>Jamides celeno</i>			+
	Indian Sunbeam - <i>Curetis thetis</i>			+
	Redspot - <i>Zesius chrysomallus</i>			+
	Common Imperial - <i>Cheritra freja</i>			+
	Long-banded silverline - <i>Spindasis lohita</i>			+
	Pointed Ciliate Blue - <i>Anthene lycaenina</i>			+
	Ceylon cerulean - <i>Jamides coruscans</i> ^E			+
	Silverstreak Blue - <i>Iraota timoleon</i>	+		
	Nilgiri Tit - <i>Hypolycaena nilgirica</i>	+		
Satyridae	Common Evening Brown - <i>Melanitis leda</i>		+	+
	Dark Evening Brown - <i>Melanitis phedima</i>		+	+
	Dark-Brand Bush Brown - <i>Mycalesis mineus</i>		+	+
	Common Bush Brown - <i>Mycalesis perseus</i>		+	+
	Cingalese Bushbrown - <i>Mycalesis rama</i> ^E	+		+
	White Four-Ring - <i>Ypthima ceylonica</i>		+	+
	Common Palm Fly - <i>Elymnias hypermnestra</i>		+	+
	Nigger - <i>Orsotriaena medus</i>		+	+
	Large Oakblue - <i>Arhopala amantes</i>			+
Danaidae	Blue Glassy Tiger - <i>Ideopsis similis</i>		+	+
	Glassy Tiger - <i>Parantica aglea</i>		+	+
	Dark Blue Tiger - <i>Tirumala septentrionis</i>		+	+
	Plain Tiger - <i>Danaus chrysippus</i>		+	+
	Common Tiger - <i>Danaus genutia</i>		+	+
	Common Crow - <i>Euploea core</i>		+	+
	Brown King Crow - <i>Euploea klugii</i>		+	+
	Great Crow - <i>Euploea phaenareta</i>		+	+
Nymphalidae	Leopard - <i>Phalanta phalantha</i>		+	
	Great Egg Fly - <i>Hypolimnas bolina</i>		+	
	Danaid Egg Fly - <i>Hypolimnas misippus</i>		+	
	Common Sailor - <i>Neptis hylas</i>		+	
	Grey Pansy - <i>Junonia atlites</i>		+	
	Peacock Pansy - <i>Junonia almana</i>		+	
	Tamil Lacewing - <i>Cethosia nietneri</i>		+	
	Blue Oakleaf - <i>Kallima philarchus</i> ^E		+	+
	Gaudy Baron - <i>Euthalia lubentina</i>			+
	Southern Duffer - <i>Discophora lepida</i>			+
Acraeidae	Tawny Coster - <i>Acraea violae</i>		+	
Pieridae	Psyche - <i>Leptosia nina</i>	+	+	+
	Jezebel - <i>Delias eucharis</i>	+	+	+

(Cont.)

Family	Species	Colombo	Gampaha	Kaluthara
	Chocolate Albatross - <i>Appias lyncida</i>		+	+
	Striped Albatross - <i>Appias libythea</i>		+	+
	Common Albatross - <i>Appias albina</i>		+	+
	Lemon Emigrant - <i>Catopsilia pomona</i>		+	+
	African immigrant - <i>Catopsilia pyranthe</i>		+	+
	Small Grass Yellow - <i>Eurema brigitta</i>		+	+
	Three-spot Grass Yellow - <i>Eurema blanda</i>		+	+
	Common Grass Yellow - <i>Eurema hecabe</i>		+	+
	One-spot Grass-yellow - <i>Eurema andersoni</i>		+	
Papilionidae	Blue Mormon - <i>Papilio polymnestor</i>		+	+
	Common Mormon - <i>Papilio polytes</i>		+	+
	Common Rose - <i>Pachliopta aristolochiae</i>		+	+
	Ceylon Rose - <i>Pachliopta jophori</i> ^E			+
	Crimson Rose - <i>Pachliopta hector</i>		+	+
	Lime Butterfly - <i>Papilio demoleus</i>		+	+
	Tailed Jay - <i>Graphium agamemnon</i>		+	+
	Fivebar Swordtail - <i>Pathysa antiphates</i>			+
Hesperiidae	Indian Skipper - <i>Pelopidas mathias</i>		+	
	Large Branded Swift - <i>Pelopidas thrax</i>		+	
	Dark Palm Dart - <i>Telicota ancilla</i>		+	
	Paddy field Skipper - <i>Ampittia dioscorides</i>			+
	Ceylon Palm Bob - <i>Suastus minuta</i>			+
	Restricted Demon - <i>Notocrypta curvifascia</i>			+
	Indian Dart - <i>Potanthus pallida</i>			+
	Chestnut Bob - <i>Suastus gremius</i>		+	+

(Status: E – Endemic species)

Annex 7: Provisional list of flowering plants in the Western Province

Family	Species	Colombo	Gampaha	Kaluthara
Acanthaceae	<i>Acanthus ilicifolius</i>		+	+
Acanthaceae	<i>Strobilanthes adenophora</i>	+		
Acanthaceae	<i>Strobilanthes lupulina</i>	+		+
Acanthaceae	<i>Strobilanthes rhytisperma</i>	+		
Aizoaceae	<i>Mollugo disticha</i>		+	
Aizoaceae	<i>Mollugo oppositifolia</i>		+	
Amaranthaceae	<i>Alternanthera sessile</i>	+	+	+
Amaranthaceae	<i>Amaranthus viridis</i>		+	
Amaryllidaceae	<i>Crinum zeylanicum</i>	+	+	
Anacardiaceae	<i>Campanosperma zeylanicum</i> ^E			+
Anacardiaceae	<i>Mangifera indica</i>	+	+	+
Anacardiaceae	<i>Mangifera zeylanica</i> ^E			+
Anacardiaceae	<i>Lannea coromandelica</i>	+	+	+
Anacardiaceae	<i>Nothopegi beddomei</i>			+
Anacardiaceae	<i>Spondias dulcis</i>	+	+	+
Anacardiaceae	<i>Semecarpus acuminata</i>			+
Anacardiaceae	<i>Semecarpus marginata</i> ^E			+
Anacardiaceae	<i>Semecarpus moonii</i>			+

(Cont.)

Family	Species	Colombo	Gampaha	Kaluthara
Anacardiaceae	<i>Semecarpus coriacea</i>		+	
Anacardiaceae	<i>Semecarpus nigro-viridis</i> ^E			+
Anacardiaceae	<i>Semecarpus walkeri</i> ^E			+
Annonaceae	<i>Annona muricata</i>	+	+	+
Annonaceae	<i>Polyalthia longifolia</i>	+	+	+
Annonaceae	<i>Annona glabra</i> ^{IAS}	+	+	+
Annonaceae	<i>Desmos zeylanica</i> ^E			+
Annonaceae	<i>Xylopiya championii</i> ^E			+
Aponogetonaceae	<i>Aponogeton crispus</i>	+	+	+
Apiaceae	<i>Centella asiatica</i>	+	+	+
Apocynaceae	<i>Cerbera manghas</i>	+	+	+
Apocynaceae	<i>Plumeria obtusa</i>	+	+	+
Apocynaceae	<i>Plumeria rubra</i>	+	+	+
Apocynaceae	<i>Alstonia scholaris</i>	+	+	+
Apocynaceae	<i>Alstonia macrophylla</i> ^{IAS}	+	+	+
Apocynaceae	<i>Nerium oleander</i>		+	
Apocynaceae	<i>Thevetia peruviana</i>		+	
Apocynaceae	<i>Cerbera odollam</i>		+	
Apocynaceae	<i>Walidda antidysenterica</i> ^E		+	
Apocynaceae	<i>Allamanda cathartica</i>		+	
Apocynaceae	<i>Tabernaemontana divaricata</i>		+	
Apocynaceae	<i>Pagianta dichotoma</i>		+	
Aponogetonaceae	<i>Aponogeton natans</i>		+	
Araceae	<i>Lagenandra ovata</i>		+	
Araceae	<i>Pistia stratiotes</i> ^{IAS}	+	+	+
Araceae	<i>Alocasia macrorrhizos</i>	+	+	+
Araceae	<i>Lasia spinosa</i>		+	
Araceae	<i>Pothos scandens</i>		+	
Araceae	<i>Pothos parvispadix</i>			+
Araceae	<i>Pothos remotiflorus</i>			+
Araceae	<i>Cryptocoryne alba</i> ^E			+
Araceae	<i>Cryptocoryne beckettii</i> ^E			+
Araceae	<i>Lagenandra koenigii</i> ^E	+		+
Araceae	<i>Lagenandra praetermissa</i> ^E			+
Araceae	<i>Lagenandra thwaitesii</i> ^E			+
Araceae	<i>Rhaphidophora pertusa</i>			+
Arecaceae	<i>Areca concinna</i> ^E			+
Arecaceae	<i>Areca catechu</i>		+	
Arecaceae	<i>Caryota urens</i>		+	
Arecaceae	<i>Cocos nucifera</i>	+	+	
Arecaceae	<i>Nypa fruticans</i>	+	+	+
Arecaceae	<i>Phoenix pusilla</i>	+	+	
Arecaceae	<i>Calamus pachystemonus</i> ^E			+
Arecaceae	<i>Calamus radiatus</i>			+
Arecaceae	<i>Calamus rivalis</i>		+	+
Arecaceae	<i>Calamus zeylanicus</i> ^E			+

(Cont.)

Family	Species	Colombo	Gampaha	Kaluthara
Arecaceae	<i>Oncosperma fasciculatum</i> ^F			+
Aristolochiaceae	<i>Pentatropis carpensis</i>	+	+	
Aristolochiaceae	<i>Thottea siliquosa</i>			+
Asteraceae	<i>Acanthospermum hispidum</i>	+	+	
Asteraceae	<i>Ageratum conyzoides</i>		+	
Asteraceae	<i>Blainvillea acmella</i>	+	+	
Asteraceae	<i>Eleautherantha ruderalis</i>		+	
Asteraceae	<i>Elephantopus scaber</i>	+	+	+
Asteraceae	<i>Eupatorium odoratum</i> ^{AS}	+	+	+
Asteraceae	<i>Mikania cordata</i> ^{AS}	+	+	+
Asteraceae	<i>Synedrella nodiflora</i>	+		
Asteraceae	<i>Tridax procumbens</i>	+	+	+
Asteraceae	<i>Vicoa indica</i>	+	+	
Asteraceae	<i>Wedelia trilobata</i> ^{AS}	+	+	+
Asteraceae	<i>Ageratum conyzoides</i>	+	+	+
Asteraceae	<i>Emilia sonchifolia</i>	+	+	+
Asteraceae	<i>Vernonia cinerea</i>	+	+	+
Asteraceae	<i>Wedelia chinensis</i>	+	+	+
Asteraceae	<i>Wedelia trilobata</i> ^{AS}	+	+	+
Balsaminaceae	<i>Impatiens ciliifolia</i>			+
Balsaminaceae	<i>Impatiens flaccida</i>			+
Balsaminaceae	<i>Impatiens janthina</i>			+
Bignoniaceae	<i>Dolichandrone spathacea</i>		+	+
Bignoniaceae	<i>Tabebuia rosea</i>	+	+	
Bignoniaceae	<i>Tabebuia serratifolia</i>	+	+	
Bignoniaceae	<i>Tecoma stans</i>	+	+	
Bombacaceae	<i>Ceiba pentandra</i>	+	+	+
Burseraceae	<i>Canarium zeylanicum</i> ^F			+
Butomaceae	<i>Limnocharis flava</i>		+	
Caricaceae	<i>Carica papaya</i>	+	+	+
Celestraceae	<i>Pleurostyliia opposita</i>		+	
Celestraceae	<i>Atlantia missiol</i>		+	
Celestraceae	<i>Bhesa ceylanica</i> ^F			+
Ceratophyllaceae	<i>Ceratophyllum demersum</i>		+	
Clusiaceae	<i>Callophyllum inophyllum</i>		+	+
Clusiaceae	<i>Mesua ferrea</i>		+	+
Clusiaceae	<i>Garcinia quaesita</i> ^F		+	+
Clusiaceae	<i>Garcinia zeylanica</i> ^F			+
Clusiaceae	<i>Garcinia terpnophylla</i> ^F			+
Combretaceae	<i>Lumnitzera racemosa</i>		+	+
Combretaceae	<i>Terminalia catappa</i>	+	+	+
Combretaceae	<i>Terminalia arjuna</i>		+	+
Combretaceae	<i>Terminalia bellirica</i>		+	
Commelinaceae	<i>Anelema spiratum</i>		+	
Commelinaceae	<i>Commelina benghalensis</i>		+	+
Commelinaceae	<i>Commelina diffusa</i>		+	

(Cont.)

Family	Species	Colombo	Gampaha	Kaluthara
Commelinaceae	<i>Murdannia spirata</i>	+	+	+
Commelinaceae	<i>Commelina clavata</i>		+	
Convolvulaceae	<i>Erycybe paniculata</i>		+	
Convolvulaceae	<i>Ipomoea carnea</i>		+	
Convolvulaceae	<i>Ipomoea obscura</i>		+	
Convolvulaceae	<i>Jacquemontia paniculata</i>	+	+	
Convolvulaceae	<i>Merrimia tridentata</i>	+	+	
Convolvulaceae	<i>Ipomea aquatica</i>	+	+	+
Convolvulaceae	<i>Ipomoea mauritiana</i>	+		
Cucurbitaceae	<i>Trichosanthes cucumerina</i>			+
Cyperaceae	<i>Cyperous haspan</i>	+	+	+
Cyperaceae	<i>Cyperus corymbosus</i>		+	+
Cyperaceae	<i>Cyperus exaltatus</i>		+	+
Cyperaceae	<i>Cyperus haspan</i>		+	+
Cyperaceae	<i>Cyperus pangori</i>		+	+
Cyperaceae	<i>Cyperus rotandus</i>		+	+
Cyperaceae	<i>Cyperus stoloniferous</i>		+	+
Cyperaceae	<i>Cyperus tenuiculmis</i>	+	+	+
Cyperaceae	<i>Eleocharis dulcis</i>	+	+	+
Cyperaceae	<i>Eleocharis geniculata</i>	+	+	+
Cyperaceae	<i>Fimbristylis cinnamomorum</i>	+	+	+
Cyperaceae	<i>Fimbristylis dipsaca</i>	+	+	+
Cyperaceae	<i>Fimbristylis ferruginea</i>	+	+	+
Cyperaceae	<i>Fimbristylis littoralis</i>	+	+	+
Cyperaceae	<i>Fimbristylis schoenoides</i>	+	+	+
Cyperaceae	<i>Fimbristylis tetragona</i>	+	+	+
Cyperaceae	<i>Fimbristylis triflora</i>	+	+	+
Cyperaceae	<i>Fimbristylis umbellaris</i>	+	+	+
Cyperaceae	<i>Lepironia articulata</i>	+	+	+
Cyperaceae	<i>Pycnus polystachyos</i>	+	+	+
Cyperaceae	<i>Rhynchospora corymbosa</i>	+	+	+
Cyperaceae	<i>Schenoplectus juncoides</i>	+	+	+
Cyperaceae	<i>Schoenoplectes littoralis</i>	+	+	+
Cyperaceae	<i>Schoenoplectus grossus</i>	+	+	+
Cyperaceae	<i>Carex indica</i>	+	+	+
Cyperaceae	<i>Eleocharis dulcis</i>	+	+	+
Cyperaceae	<i>Scripodondron ghaeri</i>	+	+	+
Dilleniaceae	<i>Dillenia retusa</i> ^E	+	+	+
Dilleniaceae	<i>Dillenia suffruticosa</i> ^{AS}	+	+	+
Dilleniaceae	<i>Dillenia triquetra</i> ^E			+
Dilleniaceae	<i>Schumacheria castaneifolia</i> ^E			+
Dipterocarpaceae	<i>Balanocarpus brevipedicularis</i> ^E			+
Dipterocarpaceae	<i>Semecarpus walkeri</i> ^E	+		
Dipterocarpaceae	<i>Dipterocarpus zeylanicus</i> ^E			+
Dipterocarpaceae	<i>Doona nervosa</i> ^E			+
Dipterocarpaceae	<i>Hopea jucunda</i> ^E			+

(Cont.)

Family	Species	Colombo	Gampaha	Kaluthara
Dipterocarpaceae	<i>Shorea dyeri</i> ^E	+		+
Dipterocarpaceae	<i>Shorea lissophylla</i> ^E			+
Dipterocarpaceae	<i>Shorea pallescens</i> ^E			+
Dipterocarpaceae	<i>Shorea oblongifolia</i> ^E	+		
Dipterocarpaceae	<i>Shorea ovalifolia</i> ^E		+	
Dipterocarpaceae	<i>Stemonoporus canaliculatus</i> ^E			+
Dipterocarpaceae	<i>Stemonoporus moonii</i> ^E			+
Dipterocarpaceae	<i>Vatica affinis</i>			+
Dipterocarpaceae	<i>Vatica obscura</i> ^E			+
Dipterocarpaceae	<i>Vatica paludosa</i> ^E			+
Dipterocarpaceae	<i>Sunaptea scabriuscula</i> ^E	+	+	+
Dipterocarpaceae	<i>Vateria copallifera</i> ^E			+
Droseraceae	<i>Drosera indica</i>	+	+	
Ebenaceae	<i>Diospyros albiflora</i> ^E			+
Ebenaceae	<i>Diospyros attenuata</i>			+
Ebenaceae	<i>Diospyros chaetocarpa</i> ^E			+
Ebenaceae	<i>Diospyros ebenoides</i> ^E		+	+
Ebenaceae	<i>Diospyros moonii</i> ^E			+
Ebenaceae	<i>Diospyros oblongifolia</i> ^E			+
Ebenaceae	<i>Diospyros oppositifolia</i>			+
Ebenaceae	<i>Diospyros quaesita</i>	+	+	+
Ebenaceae	<i>Diospyros racemosa</i>			+
Ebenaceae	<i>Diospyros walkeri</i> ^E	+		+
Ebenaceae	<i>Diospyros ebenum</i> ^E		+	
Ebenaceae	<i>Diospyros malabarica</i>		+	
Ebenaceae	<i>Diospyros nummularifolia</i> ^E	+		
Elaeocarpaceae	<i>Elaeocarpus serratus</i>		+	+
Elantaceae	<i>Bergia carpens</i>		+	
Eriocaulaceae	<i>Eriocaulon quinquangulare</i>		+	
Eriocaulaceae	<i>Eriocaulon thwaitesii</i>		+	
Eriocaulaceae	<i>Eriocaulon truncatum</i>		+	
Euphorbiaceae	<i>Exoecaria agallocha</i>		+	+
Euphorbiaceae	<i>Glochidion zeylanicum</i>		+	
Euphorbiaceae	<i>Macaranga peltata</i>	+	+	+
Euphorbiaceae	<i>Phyllanthus debilis</i>		+	
Euphorbiaceae	<i>Ricinus communis</i>		+	
Euphorbiaceae	<i>Agrostistachys indica</i>			+
Euphorbiaceae	<i>Antidesma pyrifolium</i> ^E			+
Euphorbiaceae	<i>Aporosa lanceolata</i> ^E			+
Euphorbiaceae	<i>Bridelia moonii</i> ^E			+
Euphorbiaceae	<i>Cleistanthus robustus</i> ^E			+
Euphorbiaceae	<i>Cleistanthus ferrugineus</i> ^E			+
Euphorbiaceae	<i>Euphorbia tirucalli</i>		+	
Euphorbiaceae	<i>Mallotus philippensis</i>	+	+	
Euphorbiaceae	<i>Mallotus fuscescens</i> ^E			+
Euphorbiaceae	<i>Drypetes gardneri</i> ^E			+

(Cont.)

Family	Species	Colombo	Gampaha	Kaluthara
Euphorbiaceae	<i>Drypetes sepiaria</i>	+	+	+
Euphorbiaceae	<i>Phyllanthus emblica</i>	+	+	+
Euphorbiaceae	<i>Flueggia leucopyrus</i>		+	+
Euphorbiaceae	<i>Glochidion zeylanicum</i>		+	+
Euphorbiaceae	<i>Glochidion coriaceum</i> ^F			+
Euphorbiaceae	<i>Glochidion moonii</i> ^F		+	
Euphorbiaceae	<i>Glochidion acutifolium</i> ^F			+
Euphorbiaceae	<i>Glochidion pachycarpum</i> ^F			+
Euphorbiaceae	<i>Hevea brasiliensis</i>		+	+
Euphorbiaceae	<i>Phyllanthus debilis</i>		+	
Euphorbiaceae	<i>Sapium indicum</i>		+	
Fabaceae	<i>Abrus precatorius</i>		+	
Fabaceae	<i>Pterocarpus indicus</i>		+	
Fabaceae	<i>Cassia fistula</i>	+	+	+
Fabaceae	<i>Erythrina variegata</i>	+	+	+
Fabaceae	<i>Delonix regia</i>	+	+	
Fabaceae	<i>Pithecellobium dulce</i>		+	
Fabaceae	<i>Albizia saman</i>	+	+	
Fabaceae	<i>Peltophorum pterocarpum</i>	+	+	
Fabaceae	<i>Peltophorum dasyrachis</i>		+	
Fabaceae	<i>Adenanthera pavonina</i>		+	
Fabaceae	<i>Acacia decurrens</i>	+		
Fabaceae	<i>Archidendron subcoriacea</i>	+		
Fabaceae	<i>Leucaena leucocephala</i> ^{IAS}	+	+	
Fabaceae	<i>Pongamia pinnata</i>	+	+	
Fabaceae	<i>Bauhinia variegata</i>	+	+	+
Fabaceae	<i>Bauhinia purpurea</i>	+	+	
Fabaceae	<i>Saraca asoka</i>	+		
Fabaceae	<i>Cynometra cauliflora</i>		+	
Fabaceae	<i>Copaifera officinalis</i>		+	
Fabaceae	<i>Bauhinia racemosa</i>		+	
Fabaceae	<i>Amherstia nobilis</i>	+	+	+
Fabaceae	<i>Caesalpinia crista</i>	+	+	+
Fabaceae	<i>Calapagonium sp.</i>		+	
Fabaceae	<i>Centrocema pubescens</i>	+		
Fabaceae	<i>Clitoria ternatea</i>		+	
Fabaceae	<i>Derris trifoliata</i>	+	+	
Fabaceae	<i>Desmodium dichotomum</i>	+	+	+
Fabaceae	<i>Desmodium heterophyllum</i>	+	+	+
Fabaceae	<i>Desmodium triflorum</i>	+	+	
Fabaceae	<i>Mimosa pudica</i>	+	+	+
Fabaceae	<i>Pycnospora lutescens</i>	+	+	
Fabaceae	<i>Rhyncosia suaveolens</i>	+	+	
Fabaceae	<i>Tephrosia purpurea</i>	+	+	
Fabaceae	<i>Albizzia lebbeck</i>	+	+	
Fabaceae	<i>Gliricidia sepium</i>	+	+	+

(Cont.)

Family	Species	Colombo	Gampaha	Kaluthara
Fabaceae	<i>Tamarindus indica</i>	+	+	+
Fabaceae	<i>Derris scandens</i>		+	+
Fabaceae	<i>Derris trifoliata</i>		+	
Fabaceae	<i>Entada pusaetha</i>		+	+
Fabaceae	<i>Peltophorum pterocarpum</i>	+	+	+
Fabaceae	<i>Pericopsis mooniana</i> ^T	+	+	
Flacourtiaceae	<i>Flacourtia indica</i>	+	+	
Flacourtiaceae	<i>Hydnocarpus venenata</i> ^E			+
Flagellariaceae	<i>Flagellaria indica</i>	+	+	+
Haloragidaceae	<i>Myriophyllum indicum</i>		+	
Hunguanaceae	<i>Hanguana malayana</i>		+	
Hydrilidae	<i>Hydrilla verticillata</i> ^{AS}		+	
Hydrophyllaceae	<i>Hydrolea zeylanica</i>		+	
Hydrophyllaceae	<i>Hydrophylla ariculata</i>		+	
Lamiaceae	<i>Anisomeles indica</i>		+	
Lamiaceae	<i>Hyptis suaveolens</i>		+	
Lamiaceae	<i>Ocimum sanctum</i>	+	+	
Lauraceae	<i>Casyththa filiformis</i>	+		
Lauraceae	<i>Cryptocarya wightiana</i> ^E			+
Lauraceae	<i>Litsea longifolia</i> ^E			+
Lauraceae	<i>Persea americana</i>		+	
Lauraceae	<i>Cinnamomum verum</i>	+	+	+
Lauraceae	<i>Persea americana</i>	+	+	
Lecythidaceae	<i>Couroupita guianensis</i>	+		
Lecythidaceae	<i>Barringtonia asiatica</i>	+	+	+
Lecythidaceae	<i>Barringtonia racemosa</i>	+		
Leeaceae	<i>Leea indica</i>		+	
Lemnaceae	<i>Lemna minima</i>		+	
Lentibulariaceae	<i>Utricularia sp</i>		+	
Liliaceae	<i>Asparagus falcata</i>		+	
Loranthaceae	<i>Dendrophthoe falcatus</i> ^E	+	+	+
Loranthaceae	<i>Dendrophthoe neelgherrensis</i>		+	+
Loranthaceae	<i>Dendrophthoe lonchiphyllus</i> ^E			+
Lythraceae	<i>Rotala indica</i>		+	
Lythraceae	<i>Lagerstroemia speciosa</i>		+	
Lythraceae	<i>Lowsonia inermis</i>		+	
Malvaceae	<i>Hibiscus tiliaceus</i>	+	+	+
Malvaceae	<i>Sida veronicifolia</i>		+	+
Malvaceae	<i>Urena lobata</i>		+	+
Malvaceae	<i>Thespesia populnea</i>	+	+	+
Malvaceae	<i>Hibiscus rosa-sinensis</i>		+	
Malvaceae	<i>Urena sinuata</i>		+	
Melastomataceae	<i>Lijndenia gardneri</i> ^E			+
Melastomataceae	<i>Lijndenia capitellata</i> ^E			+
Melastomataceae	<i>Memecylon petiolatum</i> ^E			+
Melastomataceae	<i>Osbeckia aspera</i>		+	

(Cont.)

Family	Species	Colombo	Gampaha	Kaluthara
Melastomataceae	<i>Melastoma malabathricum</i>		+	
Melastomataceae	<i>Sonerila guneratnei</i>			+
Melastomataceae	<i>Sonerila pedunculosa</i>			+
Melastomataceae	<i>Sonerila rhombifolia</i>			+
Meliaceae	<i>Xylocarpus granatum</i>		+	+
Meliaceae	<i>Sweitenia macrophylla</i>		+	+
Meliaceae	<i>Azadirachta indica</i> (Neem)	+	+	+
Meliaceae	<i>Swietenia macrophylla</i>		+	+
Memecylaceae	<i>Memecylon clarkeanum</i>			+
Memecylaceae	<i>Memecylon giganteum</i>			+
Memecylaceae	<i>Memecylon grande</i>			+
Memecylaceae	<i>Memecylon macrophyllum</i>			+
Memecylaceae	<i>Memecylon parvifolium</i>			+
Memecylaceae	<i>Memecylon petiolatum</i>			+
Memecylaceae	<i>Memecylon hookeri</i> ^f	+		
Memecylaceae	<i>Memecylon capitellatum</i> ^f	+		
Memecylaceae	<i>Memecylon royeri</i> ^f		+	
Memecylaceae	<i>Memecylon rivulare</i>			+
Menispermaceae	<i>Tinospora cordifolia</i>		+	
Menyanthaceae	<i>Nymphoides hydrophylla</i>		+	
Moraceae	<i>Artocarpus nobilis</i> ^f		+	+
Moraceae	<i>Artocarpus altilis</i>	+	+	+
Moraceae	<i>Artocarpus heterophyllous</i>	+	+	+
Moraceae	<i>Ficus religiosa</i>	+	+	+
Moraceae	<i>Ficus benghalensis</i>	+	+	+
Moraceae	<i>Ficus benjamina</i>	+	+	
Moraceae	<i>Ficus racemosa</i>	+	+	+
Moraceae	<i>Ficus tsjahela</i>		+	
Moraceae	<i>Ficus elastica</i>		+	
Moraceae	<i>Artocarpus incisus</i>		+	+
Moraceae	<i>Castille elastica</i>		+	
Moringaceae	<i>Moringa olifera</i>	+	+	
Musaceae	<i>Musa paradisiaca</i>	+	+	+
Musaceae	<i>Musa balbisiana</i> ^f			+
Myristicaceae	<i>Myristica fragrans</i>	+	+	+
Myristicaceae	<i>Myristica dactyloides</i>			+
Myrsinaceae	<i>Ardisia humilis</i>		+	
Myrsinaceae	<i>Ardisia willisii</i>		+	
Myrsinaceae	<i>Ardisia elliptica</i>	+		+
Myrtaceae	<i>Syzygium caryophyllatum</i>	+	+	+
Myrtaceae	<i>Syzygium cummini</i>	+	+	+
Myrtaceae	<i>Syzygium aromaticum</i>			+
Myrtaceae	<i>Psidium guajava</i>	+	+	+
Myrtaceae	<i>Syzygium jambos</i>	+	+	+
Myrtaceae	<i>Eugenia fulva</i>			+
Myrtaceae	<i>Eugenia rivulorum</i>			+
Myrtaceae	<i>Eugenia rufo-fulva</i>			+
Myrtaceae	<i>Syzygium batadamba</i>			+
Myrtaceae	<i>Syzygium cylindricum</i> ^f			+
Myrtaceae	<i>Syzygium lanceolatum</i>			+

(Cont.)

Family	Species	Colombo	Gampaha	Kaluthara
Myrtaceae	<i>Syzygium makul^f</i>	+		
Nyctaginaceae	<i>Boerhavia diffusa</i>	+		
Nymphaeaceae	<i>Nymphaea stellata</i>	+	+	+
Nymphaeaceae	<i>Nymphaea nouchali</i>	+	+	+
Nymphaeaceae	<i>Nymphaea pubescens</i>	+	+	+
Onagraceae	<i>Ludwigia decurrens</i>	+	+	+
Onagraceae	<i>Ludwigia hyssopifolia</i>	+	+	+
Onagraceae	<i>Ludwigia perennis</i>	+	+	+
Onagraceae	<i>Ludwigia peruviana</i>	+	+	+
Onagraceae	<i>Anagallis zeylanica^f</i>			+
Onagraceae	<i>Anagallis setacea^f</i>			+
Orchidaceae	<i>Dendrobium macarthia^f</i>			+
Orchidaceae	<i>Goodyera procera</i>			+
Orchidaceae	<i>Habenaria crinifera</i>			+
Orchidaceae	<i>Malaxis discolor</i>			+
Orchidaceae	<i>Oberonia weragamaensis^f</i>			+
Orchidaceae	<i>Oberonia thwaitesii^f</i>		+	
Orchidaceae	<i>Oberonia scyllae^f</i>			+
Orchidaceae	<i>Taeniophyllum alwisii</i>			+
Orchidaceae	<i>Taeniophyllum gilimalense</i>			+
Orchidaceae	<i>Vanilla moonii^f</i>	+		+
Oxalidaceae	<i>Averrhoa bilimbi</i>		+	
Oxalidaceae	<i>Averrhoa carambola</i>	+	+	
Palmae	<i>Nypa fruticans</i>	+	+	+
Palmae	<i>Phoenix zeylanica^f</i>	+	+	
Palmae	<i>Areca catechu</i>	+	+	+
Palmae	<i>Cocos nucifera</i>	+	+	+
Palmae	<i>Roystonea regia</i>	+		
Palmae	<i>Caryota urens</i>	+	+	+
Palmae	<i>Borassus fabellifer</i>	+		
Pandanaceae	<i>Pandanus tectorius</i>	+	+	+
Parkeriaceae	<i>Ceratopteris sp.</i>		+	
Passifloraceae	<i>Passiflora foetida</i>	+	+	+
Phyllanthaceae	<i>Phyllanthus myrtifolius</i>	+		
Phyllanthaceae	<i>Antidesma alexiteria</i>			+
Phyllanthaceae	<i>Antidesma thwaitesianum</i>			+
Phyllanthaceae	<i>Antidesma walkeri</i>			+
Phyllanthaceae	<i>Aporosa cardiosperma</i>			+
Phyllanthaceae	<i>Aporosa lindleyana</i>			+
Phyllanthaceae	<i>Glochidion acutifolium</i>			+
Phyllanthaceae	<i>Glochidion moonii</i>	+	+	+
Phyllanthaceae	<i>Glochidion nemorale</i>			+
Phyllanthaceae	<i>Glochidion pachycarpum</i>			+
Poaceae	<i>Alloteropsis cimicina</i>		+	
Poaceae	<i>Bambusa vulgaris</i>	+	+	+
Poaceae	<i>Aristida setacea</i>		+	
Poaceae	<i>Axonopus affinis</i>	+	+	+
Poaceae	<i>Axonopus compressus</i>		+	
Poaceae	<i>Brachiaria ramosa</i>		+	
Poaceae	<i>Cirtococcum trigonum</i>		+	

(Cont.)

Family	Species	Colombo	Gampaha	Kaluthara
Poaceae	<i>Commelina attenuata</i>		+	
Poaceae	<i>Cynodon dactylon</i>	+	+	+
Poaceae	<i>Dactyloctenium aegyptium</i>	+	+	+
Poaceae	<i>Digitaria ciliaris</i>		+	
Poaceae	<i>Digitaria longiflora</i>	+	+	+
Poaceae	<i>Dimeria fuscescens</i>	+	+	
Poaceae	<i>Echinochloa frumentacea</i>		+	+
Poaceae	<i>Eleusine indica</i>		+	+
Poaceae	<i>Eragrostis japonica</i>		+	+
Poaceae	<i>Eragrostis riparia</i>		+	+
Poaceae	<i>Eragrostis uniloides</i>		+	+
Poaceae	<i>Isachne globosa</i>		+	+
Poaceae	<i>Ischeamum indicum</i>	+	+	+
Poaceae	<i>Ischeamum rugosum</i>	+		
Poaceae	<i>Ischene elegans</i>	+		
Poaceae	<i>Leerasia hexandra</i>		+	+
Poaceae	<i>Leptochloa chinensis</i>		+	
Poaceae	<i>Panicum repens</i>	+	+	+
Poaceae	<i>Paspaladium flavidum</i>	+	+	+
Poaceae	<i>Paspaladium punctatum</i>	+	+	+
Poaceae	<i>Paspalum scrobiculatum</i>	+	+	+
Poaceae	<i>Paspalum vaginatum</i>	+	+	+
Poaceae	<i>Phragmites karka</i> ^{IAS}	+	+	+
Poaceae	<i>Pseudoraphis spinescence</i>	+	+	+
Poaceae	<i>Sacciolepis indica</i>	+	+	+
Poaceae	<i>Phragmites karka</i> ^{IAS}	+	+	+
Poaceae	<i>Panicum repens</i>	+	+	+
Poaceae	<i>Ischeamum rugosum</i>	+	+	+
Poaceae	<i>Dactyloctenium aegyptium</i>	+	+	+
Polygonaceae	<i>Antigonon leptopus</i>			+
Polypodiaceae	<i>Drymoglossum heterophyllum</i>			+
Polypodiaceae	<i>Drynaria quercifolia</i>		+	+
Pontederiaceae	<i>Eichhornia crassipes</i> ^{IAS}	+	+	+
Pontederiaceae	<i>Monochoria hastata</i>		+	+
Potamogetonaceae	<i>Potamogeton filiformis</i>			
Pteridaceae	<i>Acrosticum aureum</i>		+	+
Punicaceae	<i>Punica granatum</i>			
Rhizophoraceae	<i>Aegiceras corniculata</i>			+
Rhizophoraceae	<i>Brugueira sexangula</i>		+	+
Rhizophoraceae	<i>Ceriops tagal</i>			+
Rhizophoraceae	<i>Rhizophora apiculata</i>		+	+
Rhizophoraceae	<i>Rhizophora mucronata</i>		+	+
Rhizophoraceae	<i>Carallia brachiata</i>			+
Rhizophoraceae	<i>Bruguiera gymnorhiza</i>			+
Rubiaceae	<i>Morinda tinctoria</i>			+
Rubiaceae	<i>Nauclea orientalis</i>			+

(Cont.)

Family	Species	Colombo	Gampaha	Kaluthara
Rubiaceae	<i>Adina cordifolia</i>			+
Rubiaceae	<i>Dentella repens</i>			+
Rubiaceae	<i>Hedyotis corymbosa</i>			+
Rubiaceae	<i>Ixora jucunda</i> ^E			+
Rubiaceae	<i>Ixora coccinea</i>			+
Rubiaceae	<i>Gardenia crameri</i> ^E			+
Rubiaceae	<i>Knoxia corymbosa</i>			+
Rubiaceae	<i>Mitracapus villosus</i>			+
Rubiaceae	<i>Spermoacoca hispida</i>			+
Rubiaceae	<i>Coffea arabica</i>		+	+
Rubiaceae	<i>Hedyotis fruticosa</i>			+
Rubiaceae	<i>Morinda citrifolia</i>			+
Rubiaceae	<i>Morinda umbellata</i>			+
Rubiaceae	<i>Mussaenda frondosa</i>			+
Rubiaceae	<i>Nauclea orientalis</i>			+
Rubiaceae	<i>Pavetta agrostiphylla</i>			+
Rubiaceae	<i>Pavetta blanda</i>			+
Rubiaceae	<i>Pavetta zeylanica</i>			+
Rubiaceae	<i>Psychotria dubia</i>			+
Rubiaceae	<i>Psychotria gardneri</i>			+
Rubiaceae	<i>Psychotria plurivenia</i>			+
Rubiaceae	<i>Psychotria stenophylla</i> ^E			+
Rubiaceae	<i>Psychotria waasii</i> ^E			+
Rutaceae	<i>Aegle marmelos</i>			+
Rutaceae	<i>Chloroxylon swietenia</i>			+
Rutaceae	<i>Citrus aurantifolia</i>		+	+
Rutaceae	<i>Murraya exotica</i>			+
Rutaceae	<i>Limonia acidissima</i>			+
Rutaceae	<i>Citrus reticulata</i>			+
Salviniaceae	<i>Salvinia molesta</i> ^{AS}			+
Santalaceae	<i>Santalum album</i>			+
Sapindaceae	<i>Filicium decipiens</i>	+	+	+
Sapindaceae	<i>Nephelium lappaceum</i>			+
Sapindaceae	<i>Schleichera oleosa</i>			+
Sapotaceae	<i>Manilkara hexandra</i>	+	+	+
Sapotaceae	<i>Madhuca longifolia</i>			+
Sapotaceae	<i>Mimusops elengi</i>			+
Sapotaceae	<i>Ponteria lucuma</i>			+
Sapotaceae	<i>Chrysophyllum roxburghii</i>			+
Schizaeaceae	<i>Lygodium microphyllum</i>			+
Scrophulariaceae	<i>Centranthera indica</i>			+
Scrophulariaceae	<i>Lindernia rotundifolia</i>	+	+	+
Scrophulariaceae	<i>Scoparia dulcis</i>			+
Scrophulariaceae	<i>Bacopa monnieri</i>		+	+
Smilacaceae	<i>Smilax zeylanica</i>			+
Sonneratiaceae	<i>Sonneratia caseolaris</i>		+	+

(Cont.)

Family	Species	Colombo	Gampaha	Kaluthara
Sterculiaceae	<i>Heritaria littoralis</i>		+	+
Sterculiaceae	<i>Sterculia balanghas</i>			+
Symplocaceae	<i>Symplocos cochinchinensis</i>			+
Tiliaceae	<i>Corchorus aestuans</i>			+
Tiliaceae	<i>Corchorus tridens</i>			+
Tiliaceae	<i>Triumfetta rotundifolia</i>			+
Tiliaceae	<i>Berrya cordifolia</i>			+
Tiliaceae	<i>Muntingia calabura</i>			+
Typhaceae	<i>Typha angustifolia</i> ^{IAS}	+	+	+
Ulmaceae	<i>Trema orientalis</i>			+
Utriculariaceae	<i>Utricularia flexosus</i>			+
Verbenaceae	<i>Avicennia marina</i>		+	+
Verbenaceae	<i>Clerodendron inerme</i>			+
Verbenaceae	<i>Lantana camara</i> ^{IAS}	+	+	+
Verbenaceae	<i>Premna latifolia</i>			+
Verbenaceae	<i>Premna serratifolia</i>			+
Verbenaceae	<i>Stachytarpheta jamaicensis</i>			+
Verbenaceae	<i>Tectona grandis</i>	+	+	+
Verbenaceae	<i>Vitex altissima</i>		+	+
Verbenaceae	<i>Vitex negundo</i>			+
Verbenaceae	<i>Premna latifolia</i>			+
Verbenaceae	<i>Stachytarpheta jamaicensis</i>			+
Vitaceae	<i>Cayratia trifolia</i>			+
Xyridaceae	<i>Xyris indica</i>			+

(Status: E – Endemic species; IAS – Invasive Alien Species)

Annex 8: The checklist of pteridophytes recorded in Dombagaskanda Forest Reserve in Kalutara district

Family	Species
Adiantaceae	1. <i>Adiantum capillus veneris</i> 2. <i>Adiantum caudatum</i> 3. <i>Pteris biquirita</i> 4. <i>Pteris cretica</i> 5. <i>Pityrogramma calomelanos</i>
Aspleniaceae	6. <i>Asplenium nidus</i> 7. <i>Asplenium cheilosorum</i> 8. <i>Asplenium gardneri</i>
Blechna	9. <i>Blechnum orientale</i> 10. <i>Doodia dives</i>
Cyatheaceae	11. <i>Cyathea hookers</i>
Davalliaceae	12. <i>Humata repens</i> 13. <i>Nephrolepis hirsutula</i>
Dryopteridaceae	14. <i>Diplazium subsinuatum</i>
Gleicheniaceae	15. <i>Dicranopteris linearis</i>
Hymenophyllaceae	16. <i>Hymenophyllum polyanthos</i> 17. <i>Trichomanes bimarginatum</i>
Lycopodiaceae	18. <i>Lycopodium phlegmaria</i> 19. <i>Lycopodium cernuum</i>
Marsileaceae	20. <i>Marsilea quadrifolia</i>
Ophioglossaceae	21. <i>Ophioglossum pendulum</i> 22. <i>Ophioglossum reticulatum</i> 23. <i>Helminthostachys zeylanica</i>
Parkeriaceae	24. <i>Ceratopteris thalictroides</i>

(Cont.)

Family	Species
Polypodiaceae	25. <i>Drynaria quercifolia</i> 26. <i>Drymoglossum heterophyllum</i>
Psilotaceae	27. <i>Psilotum nudan</i>
Schizaeaceae	28. <i>Schizaea digitata</i> 29. <i>Lygodium flexuosum</i> 30. <i>Lygodium circinnatum</i>
Selaginellaceae	31. <i>Selaginella spp</i>
Vittariaceae	32. <i>Vittaria elongata</i>

(Source: Ranasinghe and Illeperuma, 2001)

Annex 9: List of nationally threatened fauna in the Western Province

Species	District		
Butterflies	Colombo	Gampaha	Kalutara
<i>Anthene lycaenina</i>			+
<i>Cheritra freja</i>			+
<i>Discophora lepida</i>			+
<i>Eurema andersoni</i>			+
<i>Euthalia lubentina</i>			+
<i>Hypolycaena nilgirica</i>	+		
<i>Iraota timoleon</i>	+		
<i>Jamides coruscans</i>			+
<i>Kallima philarchus</i>			+
<i>Mycalesis rama</i>	+		+
<i>Notocrypta curvifascia</i>			+
<i>Pachliopta jophon</i>			+
<i>Pathysa antiphates</i>			+
<i>Potanthus pallida</i>			+
<i>Spindasis lohita</i>			+
<i>Suastus minuta</i>			+
<i>Telicota ancilla</i>		+	
Freshwater Fish	Colombo	Gampaha	Kalutara
<i>Acanthocobitis urophthalmus</i>	+	+	+
<i>Aplocheilus wernerii</i>			+
<i>Channa ara</i>		+	+
<i>Lepidocephalichthys jonklaasi</i>			+
<i>Macrogynathus aral</i>	+	+	+
<i>Malpulutta kretseri</i>		+	+
<i>Ophisternon bengalense</i>	+	+	
<i>Ophisternon desilvai</i>			+
<i>Puntius cuningii</i>	+	+	+
<i>Puntius nigrofasciatus</i>	+	+	+
<i>Puntius pleurotaenia</i>	+		+
<i>Puntius titteya</i>	+	+	+
<i>Rasbora wilpita</i>	+		
<i>Rasboroides vaterifloris</i>	+		+
<i>Schismatogobius deraniyagalai</i>			+
<i>Sicyopterus griseus</i>			+
<i>Sicyopus jonklaasi</i>			+
<i>Wallago attu</i>	+	+	+



(Cont.)

Amphibians	Colombo	Gampaha	Kalutara
<i>Nannophrys ceylonensis</i>	+	+	+
<i>Rana aurantiaca</i>	+	+	+
Reptiles	Colombo	Gampaha	Kalutara
<i>Acrochordus granulatus</i>	+	+	+
<i>Balanophis ceylonensis</i>			+
<i>Calotes liolepis</i>			+
<i>Ceratophora aspera</i>			+
<i>Cerberus rynchops</i>	+	+	+
<i>Cercaspis carinata</i>			+
<i>Cnemaspis podihuna</i>			+
<i>Dendrelaphis caudolineolatus</i>			
<i>Lissemys punctata</i>	+	+	
<i>Nessia layardi</i>			+
<i>Oligodon calamarius</i>			+
Birds	Colombo	Gampaha	Kalutara
<i>Accipiter trivirgatus</i>			+
<i>Accipiter virgatus</i>			+
<i>Centropus chlororhynchus</i>	+	+	+
<i>Columba livia</i>			+
<i>Columba torringtoni</i>			+
<i>Dicaeum vincens</i>	+	+	+
<i>Garrulax cinereifrons</i>			+
<i>Glaucidium castanonotum</i>			+
<i>Gracula ptilogenys</i>		+	+
<i>Hirundapus giganteus</i>	+		
<i>Phaenicophaeus pyrrhocephalus</i>			+
<i>Porzana fusca</i>			+
<i>Sturnus albofrontatus</i>			+
<i>Surniculus lugubris</i>			+
<i>Tachymarpis melba</i>	+		
<i>Turdoides rufescens</i>			+
<i>Urocissa ornata</i>			+
<i>Zoothera spiloptera</i>	+		+
Mammals	Colombo	Gampaha	Kalutara
<i>Chaerephon plicatus</i>			+
<i>Funambulus layardi</i>			+
<i>Funambulus sublineatus</i>			+
<i>Hipposideros fulvus</i>	+	+	+
<i>Hipposideros galeritus</i>			+
<i>Kerivoula picta</i>	+	+	+
<i>Loris tardigradus</i>	+	+	+
<i>Lutra lutra</i>	+	+	+
<i>Miniopterus schreibersii</i>		+	
<i>Paradoxurus zeylonensis</i>	+	+	+
<i>Pipistrellus ceylonicus</i>			+
<i>Prionailurus rubiginosus</i>	+	+	+

(Cont.)

Amphibians	Colombo	Gampaha	Kalutara
<i>Prionailurus viverrinus</i>	+	+	+
<i>Ratufa macroura</i>	+		+
<i>Rhinolophus beddomei</i>		+	+
<i>Scotophilus heathii</i>	+	+	+
<i>Semnopithecus vetulus</i>	+		+

Annex 10: List of nationally threatened flora in the Western Province

Species	Colombo	Gampaha	Kalutara
<i>Acampe ochracea</i>	+		+
<i>Actephila excelsa</i>			+
<i>Agrostistachys hookeri</i>			+
<i>Agrostophyllum zeylanicum</i>			+
<i>Aidia gardneri</i>		+	+
<i>Anthocephalus chinensis</i>			+
<i>Antidesma alexiteria</i>		+	+
<i>Antidesma thwaitesianum</i>	+		+
<i>Antidesma walkeri</i>			+
<i>Aphyllorchis montana</i>	+		
<i>Aporusa cardiosperma</i>			+
<i>Aporusa lindleyana</i>	+		+
<i>Areca concinna</i>			+
<i>Arisaema tortuosum</i>			+
<i>Balanocarpus brevipetiolaris</i>	+		
<i>Barleria vestita</i>			+
<i>Bulbophyllum elegans</i>			+
<i>Byrsophyllum ellipticum</i>			+
<i>Calamus pachystemonus</i>			+
<i>Calamus radiatus</i>			+
<i>Calamus rivalis</i>	+	+	+
<i>Calamus zeylanicus</i>			+
<i>Chaetocarpus pubescens</i>			+
<i>Chiloschista fasciata</i>			+
<i>Cleistanthus robustus</i>			+
<i>Cottonia peduncularis</i>			+
<i>Cryptocoryne alba</i>			+
<i>Cryptocoryne beckettii</i>			+
<i>Dendrobium maccarthiae</i>			+
<i>Dendrophthoe lonchiphyllus</i>	+		
<i>Desmos zeylanica</i>			+
<i>Diospyros acuminata</i>			+
<i>Diospyros albiflora</i>			+
<i>Diospyros attenuata</i>			+
<i>Diospyros chaetocarpa</i>			+
<i>Diospyros ebenoides</i>			+
<i>Diospyros moonii</i>			+
<i>Diospyros oblongifolia</i>			+

(Cont.)

Species	Colombo	Gampaha	Kalutara
<i>Diospyros oppositifolia</i>			+
<i>Diospyros quaesita</i>			+
<i>Diospyros racemosa</i>			+
<i>Diospyros walkeri</i>			+
<i>Drypetes lanceolata</i>			+
<i>Enicosanthum acuminata</i>			+
<i>Eugenia fulva</i>			+
<i>Eugenia rivulorum</i>			+
<i>Eugenia rufo-fulva</i>			+
<i>Eulophia zollingeri</i>		+	
<i>Exallage auricularia</i>		+	
<i>Gardenia crameri</i>			+
<i>Geophila repens</i>			+
<i>Glochidion acutifolium</i>			+
<i>Glochidion moonii</i>	+	+	+
<i>Glochidion nemorale</i>			+
<i>Glochidion pachycarpum</i>			+
<i>Goniothalamus gardneri</i>	+		
<i>Goniothalamus salicina</i>			+
<i>Goniothalamus thomsonii</i>			+
<i>Goodyera procera</i>			+
<i>Habenaria crinifera</i>			+
<i>Impatiens ciliifolia</i>			+
<i>Impatiens flaccida</i>			+
<i>Impatiens janthina</i>			+
<i>Ixora jucunda</i>	+		+
<i>Knoxia zeylanica</i>			+
<i>Lagenandra koenigii</i>	+		+
<i>Lagenandra ovata</i>			+
<i>Lagenandra praetermissa</i>			+
<i>Lagenandra thwaitesii</i>			+
<i>Lasianthus moonii</i>			+
<i>Lasianthus oliganthus</i>			+
<i>Lasianthus strigosus</i>			+
<i>Lijndenia gardneri</i>	+		+
<i>Macaranga digyna</i>			+
<i>Macrosolen capitellatus</i>			+
<i>Malaxis discolor</i>			+
<i>Margaritaria indicus</i>			+
<i>Memecylon clarkeanum</i>			+
<i>Memecylon giganteum</i>			+
<i>Memecylon grande</i>			+
<i>Memecylon macrophyllum</i>			+
<i>Memecylon parvifolium</i>			+
<i>Memecylon petiolatum</i>			+
<i>Memecylon rivulare</i>			+

(Cont.)

Species	Colombo	Gampaha	Kalutara
<i>Miliusa zeylanica</i>			+
<i>Nargedia macrocarpa</i>			+
<i>Neurocalyx zeylanicus</i>			+
<i>Nypa fruticans</i>		+	+
<i>Oberonia thwaitesii</i>		+	
<i>Oberonia weragamaensis</i>	+		+
<i>Oncosperma fasciculatum</i>			+
<i>Ophiorrhiza pectinata</i>	+		
<i>Pavetta agrostiphylla</i>			+
<i>Pavetta blanda</i>			+
<i>Pavetta zeylanica</i>			+
<i>Phoenicanthus obliqua</i>			+
<i>Phyllanthus myrtifolius</i>	+		
<i>Pomatocalpa decipiens</i>		+	
<i>Pothos parvispadix</i>			+
<i>Pothos remotiflorus</i>			+
<i>Psychotria dubia</i>			+
<i>Psychotria gardneri</i>			+
<i>Psychotria plurivenia</i>			+
<i>Psychotria stenophylla</i>		+	+
<i>Psychotria waasii</i>			+
<i>Ptychopyxis thwaitesii</i>			+
<i>Putranjiva zeylanica</i>			+
<i>Rhaphidophora pertusa</i>	+		+
<i>Rungia longifolia</i>			+
<i>Sageraea thwaitesii</i>			+
<i>Sapium indicum</i>			+
<i>Semecarpus acuminata</i>			+
<i>Semecarpus coriacea</i>		+	
<i>Semecarpus marginata</i>			+
<i>Semecarpus moonii</i>			+
<i>Shorea dyeri</i>	+		+
<i>Shorea lissophylla</i>			+
<i>Shorea pallescens</i>			+
<i>Sonerila guneratnei</i>			+
<i>Sonerila pedunculosa</i>			+
<i>Sonerila rhombifolia</i>			+
<i>Stemonoporus canaliculatus</i>			+
<i>Stemonoporus moonii</i>			+
<i>Strobilanthes adenophora</i>	+		
<i>Strobilanthes lupulina</i>	+		+
<i>Strobilanthes rhytisperma</i>	+		
<i>Sunaptea scabriuscula</i>	+		+
<i>Syzygium batadamba</i>			+
<i>Syzygium cylindricum</i>			+
<i>Syzygium lanceolatum</i>			+

(Cont.)