IUCN Conservation Outlook Assessment 2014 **(archived)**
Finalised on 31 October 2014

Please note: this is an archived Conservation Outlook Assessment for Sinharaja Forest Reserve. To access the most up-to-date Conservation Outlook Assessment for this site, please visit https://www.worldheritageoutlook.iucn.org.

Sinharaja Forest Reserve

SITE INFORMATION

Country:
Sri Lanka
Inscribed in: 1988
Criteria:
(ix) (x)

Site description:
Located in south-west Sri Lanka, Sinharaja is the country's last viable area of primary tropical rainforest. More than 60% of the trees are endemic and many of them are considered rare. There is much endemic wildlife, especially birds, but the reserve is also home to over 50% of Sri Lanka's endemic species of mammals and butterflies, as well as many kinds of insects, reptiles and rare amphibians. © UNESCO

SUMMARY

2014 Conservation Outlook

Significant concern

The value of Sinharaja as a natural World Heritage site continues to be recognized by the discovery of several endemic species of plants and animals since the declaration of this forest as a world heritage in 1988. Some of the recent discoveries include several species of herpetofauna that are restricted (‘point endemic species’) to the eastern region of Sinharaja. These findings are a result of well-planned systematic research work carried out in Sinharaja over the past two decades. The site is an icon of biodiversity conservation in Sri Lanka, which has led to a considerable increase in conservation awareness among the general public. However, existing conservation issues such as encroachment of forest due to agricultural expansion (e.g., tea plantations), human dwellings and fragmentation due to road construction could seriously compromise the conservation of the World Heritage site in the future. The management authority needs to take immediate steps, including preparation of an updated management plan in consultation with pertinent stakeholders, and implementation of a plan of action to address threats and fill management gaps.

Current state and trend of VALUES

Low Concern
Trend: Stable

Since the inscription of the site on the World Heritage list in 1988, many species of plants and animals new to science have been discovered from this site, as a result of a significant increase in research work over the past two decades. Research indicates a gradual regeneration of forest in areas subjected to selective logging in the 1970s, with an increase in primary forest vegetation. However, it is difficult to predict trends for most taxonomical groups, due to inadequate baseline data and continuous monitoring.

Overall THREATS

High Threat

Illegal encroachment has led to the loss and reduction of forest cover. Other activities such as illegal gem mining, deliberate fires and road construction has resulted in habitat degradation. Illegal poaching, and logging has also been reported and documented by conservation groups. Overuse of agrochemicals in tea plantations bordering the forest can lead to the pollution of streams and rivers and associated aquatic biodiversity. Exotic plants introduced for forest restoration purposes, e.g. Mahogany Sweitenia macrophylla and spread of invasive alien plants such as Alstonia macrophylla, Clidemia hirta, and Wedelia trilobata can cause adverse impacts on the native flora and ecology of Sinharaja.

Overall PROTECTION and MANAGEMENT

Some Concern

Enforcement of legislation to conserve Sinharaja needs significant improvement. The boundary of the existing WHS needs to be clearly defined, and a possibility to expand the extent of the site to conserve remaining primary rainforest patches in the adjoining areas needs to be considered. A long-term research plot has been successfully established to document the temporal and spatial dynamics of the ecology of Sinharaja, including its fauna and flora. Several national and local NGOs have carried out successful education and interpretation programs on Sinharaja WHS, leading to raising general awareness about Sinharaja at the national level.

FULL ASSESSMENT

Description of values

Values

World Heritage values

► Rare and endemic trees

Criterion:(x)

60% of trees in Sinharaja are endemic and many of them are rare. Among the Dipterocarpaceae – trees dominating the forest canopy in Sinhraja, endemism is greater than 90% (Gunatilleke and Gunatilleke, 1980; Gunatilleke et al., 1995).

► Rare and endemic Orchids

Criterion:(x)

About 80 orchid species recorded from Sinharaja, of which 32 species are endemic (Rajeev and Vidanapathirana, 2012)

► Endemic Pteridophytes

Criterion:(x)

63 species of pteridophytes have been recorded in 0.36 ha of randomly placed sample plots in a single hill in Sinharaja, which includes 15 endemic species (Ranil et al., 2007). A new tree fern species (Cyathea srilankensis) was discovered from Sinharaja in 2010 (Ranil et al., 2010).

► Rare, threatened and endemic freshwater fish

Criterion:(x)

Of the 19 species of freshwater fish species inhabiting the streams and rivers

in Sinharaja, 50% are endemic (Bambaradeniya et al., 2006).

▶ Rare, threatened and endemic amphibians

Criterion:(x)

The eastern corner of Sinharaja (e.g., Morningside area) is considered as a hotspot for endemic amphibians. This small area harbors 10 Pseudo¬philautus species of which 5 are Critically Endangered (Ps. procax, Ps. papillosus, Ps. lunatus, Ps. simba and Ps. limbus), 4 are Endan¬gered (Ps. poppiae, Ps. ocularis, Ps. auratus and Ps. decoris) and 1 is Data Deficient (Ps. regius).

▶ Rare, threatened and endemic reptiles

Criterion:(x)

Half of the tetrapod and serpentoid reptiles recorded from Sinharaja (35 species) are endemic to Sri Lanka (Bambaradeniya et al., 2003).

▶ Rare, threatened and endemic birds

Criterion:(x)

Over 150 species of birds have been recorded from Sinharaja. A majority of the bird species endemic to Sri Lanka (33 species) occur in Sinharaja (> 30 species) (Bambaradeniya et al., 2006). An Owl species new to science (Serendib Scops Owl – Otus thilohoffmanni) was discovered from the Sinharaja WHS in 2004 (Warakagoda and Rasmussen, 2004). This species is listed as Globally Endangered (EN) by IUCN.

▶ Rare, threatened and endemic mammals

Criterion:(x)

75% of the mammal species (15 of 20) endemic to Sri Lanka occur in Sinharaja (Bambaradeniya et al., 2003; Rajeev and Vidanapathirana, 2012)). A small mammal species new to science (Sinharaja Shrew - Crocidura hikmiya (Meegaskumbura et al., 2007) was discovered from the Sinharaja WHS in 2007 (Meegaskumbura et al., 2007). This species is listed as Globally Endangered (EN) by IUCN.

▶ **Rare, threatened and endemic invertebrate species**
Criterion:(x)

Endemic invertebrates in Sinharaja nine species of butterflies, and 12 species of land snails (Bambaradeniya et al, 2003). An endemic tree-climbing crab (Ceylonthelphusa scansor) was discovered from Sinharaja during the mid 1990's (Ng, 1995). A new odonate species was discovered in the buffer zone of the forest in 2009 (van der Poorten, 2009). A study on species richness of ants in a 0.6 ha research plot in Sinharaja has documented 100 species, including the endemic and relict ant Aneuretus simoni (Gunawardena et al., 2012).

▶ **The largest and relatively undisturbed remnant of Sri Lanka's tropical lowland rain forest**
Criterion:(x)

Sinharaja Forest Reserve is the largest and relatively undisturbed remnant of Sri Lanka's tropical lowland rainforest; over 60% of the trees are endemic and many of these are rare; and there are 21 endemic bird species as well as a number of rare insects, reptiles and amphibians (WHC website, 2014).

Assessment information

Threats

Current Threats
High Threat

Sinharaja is currently facing many conservation issues that can be broadly classified under habitat destruction/degradation, over-exploitation of species, and spread of invasive alien species. Specific actions are needed to address these existing threats.

▶ Housing/ Urban Areas

Low Threat
Outside site

Expansion of villages is evident in the northern area of Sinharaja, resulting in the clearance of forest in buffer zone as well as interior areas (Chamikara, 2013; Rajeev and Vidanapathirana, 2012);

▶ Tourism/ Recreation Areas

High Threat
Inside site

Several tourist hotels and guest houses have been constructed around Sinharaja over the past decade, leading to adverse issues such as garbage, storm water runoff, forest clearance, and disturbance to wildlife (Chamikara, 2013; Rajeev and Vidanapathirana, 2012).

▶ Crops

Very High Threat
Inside site
Outside site

Gradual loss of forest cover and degradation of habitats (Bambaradeniya et al., 2006; Surasinghe and Jayaratne, 2006; Gunatilleke, 2011; Chamikara, 2013.)

▶ Mining/ Quarrying

High Threat
Inside site
Outside site

Illegal gem mining is being carried out by organized gangs in a discrete manner inside the forest, leading to habitat degradation of forest and stream/river habitats (Bambaradeniya et al., 2006; Surasinghe and Jayaratne, 2006; Gunatilleke, 2011; Chamikara, 2013).

▶ Renewable Energy

Low Threat

Inside site
Outside site

Construction of dams, vers and ponds affects the ecology of streams and rivers impounded (Bambaradeniya et al., 2006; Chamikara, 2013)

► Roads/ Railroads

Very High Threat
Inside site
Outside site

A road is currently being constructed in the northern area, resulting in fragmentation of forest, and destruction of habitats (Bambaradeniya et al., 2006; Surasinghe and Jayaratne, 2006; Gunatilleke, 2011; Chamikara, 2013).

► Utility / Service Lines

Low Threat
Inside site
Outside site

Power lines associated with mini hydro power stations have led to forest clearance in strips (Chamikara, 2013; Rajeev and Vidanapathirana, 2012).

► Commercial hunting

High Threat
Inside site
Outside site

Illegal poaching of wild animals such as Sambar, Mouse deer, Wild boar is reported in Sinharaja. Set up of noose traps is a major conservation issue to the small population of endangered Leopard in Sinharaja (Bambaradeniya et al., 2006; Chamikara, 2013; Rajeev and Vidanapathirana, 2012

► Logging/ Wood Harvesting

High Threat
Inside site
Outside site

The villagers around Sinharaja are also involved in illegal logging, especially in the northern region (Bambaradeniya et al., 2006; Chamikara, 2013; Rajeev

and Vidanapathirana, 2012).

► Other Activities

Low Threat
Inside site
Outside site

Night-time illumination of large hotels in the north-eastern border area contributes to light pollution that has adverse effects on nocturnal fauna (Chamikara, 2013).

► Tourism/ visitors/ recreation

Low Threat
Inside site
Outside site

The Mulavella hill trail has been heavily eroded due to over visitation, while similar effects are also present along the Sinhagala trail. Some of the hotels and guest houses in and around Sinharaja have also established additional trails without the consent of the Forest Department (Bambaradeniya et al., 2003, 2006; Rajeev & Vidanapathirana)..

► Crops

High Threat
Inside site
Outside site

Encroachment of forest for tea and cardamom cultivation is a major issue in the northern areas of Sinharaja, resulting in the loss of valuable habitats (Bambaradeniya et al., 2006; Surasinghe and Jayaratne, 2006; Gunatilleke, 2011; Chamikara, 2013).

► Avalanches/ Landslides

Low Threat
Inside site
Outside site

Several landslides were observed in the Pitadeniya area in the southern border subjected to illegal clearance. Landslides have also been documented in the northern border (Bambaradeniya et al., 2006; Chamikara, 2013).

► Erosion and Siltation/ Deposition

Low Threat
Inside site
Outside site

Illegal road construction activities and clearance of land for tea cultivation has led to soil erosion and siltation of streams in Sinharaja (Bambaradeniya et al., 2006; Rajiv & Vidanapathirana, 2012).

► Fire/ Fire Suppression

High Threat
Inside site

Deliberate forest fires created by villagers for illegal hunting and/or clearance of forest have been observed in the north-eastern area (e.g., the morningside area) of Sinharaja, which is a hotspot for endemic and threatened herpetofauna (Surasinghe and Jayaratne, 2006)

► Agricultural/ Forestry Effluents

Data Deficient
Inside site
Outside site

Agrochemical usage for pests and weed management is common in the tea plantations around Sinharaja, leading to the pollution of streams due to agrochemical runoff (Bambaradeniya et al., 2006; Surasinghe and Jayaratne, 2006; Chamikara, 2013; Rajiv and Vidanapathirana, 2012)

► Other Biological Resource Use

Low Threat
Inside site
Outside site

There have been several instances where researchers have been involved in illegal collection of specimens from Sinharaja over the past 10 years. Furthermore, illegal collection of live plant and animal specimens from Sinharaja (e.g., freshwater fish, molluscs, butterflies, orchids & Sri Lankan agarwood etc.) for commercial trade have also been documented. (Bambaradeniya et al., 2006; Surasinghe and Jayaratne, 2006; Gunatilleke,

2011; Chamikara, 2013).

▶ Invasive Non-Native/ Alien Species

High Threat
Inside site
Outside site

Some species of woody plants (e.g., Sweitenia macrophylla, Alstonia macrophylla) that were introduced to Sinharaja for reforestation purposes are spreading in an invasive manner in some areas in the forest, while other herbaceous invasive alien plants such as Wedelia trilobata, Clidemia hirta and Lanatana camara have also established thick cover along disturbed areas (e.g., trails) in the forest (Bambaradeniya et al., 2006). In the eastern lower montane sector Psidium cattleianum (strawberry guava,) is spreading in Morningside and Hadapanella areas which are currently outside the Sinharaja WHS boundary but the potential of its invasion in to the WHS exists. Similarly there is a likelihood of spreading Tibouchina and Clusia rosea in the Eastern part.

Potential Threats

Data Deficient

Data to evaluate the impacts of potential threats highlighted is insufficient. The population expansion in surrounding villages needs to be investigated as a matter of priority.

▶ Temperature changes

Data Deficient
Inside site

The eastern region of Sinharaja is a hotpsot for herpetofauna, including representatives of the amphibian Genus Pseudophilatus. The entire Sinharaja area, especially the cooler eastern region provides a gradual gradient for animals to disperse, in the wake of climate change (Meegaskumbura et al., 2012). Therefore, future studies should monitor the climate of this region, to gather baseline data.

► Other Activities

High Threat
Inside site

Expansion of village populations is evident mainly in the northern border of Sinharaja, leading to an increased pressure on land resources (Chamikara, 2013; Rajeev and Vidanapathirana, 2012).

► Utility / Service Lines

High Threat
Outside site

Several communication towers have already been established in hilltops bordering Sinharaja, resulting in adverse impacts on natural habitats due to establishment of access roads, and loss of aesthetic value as well (Rajeev and Vidanapathirana, 2012).

Protection and management

Assessing Protection and Management

► Management effectiveness

Some Concern

At present, overall management of Sinharaja is unsatisfactory. Management plans for Sinharaja need to be updated on a regular basis, in order to implement actions to address new conservation issues (Gunatillake, 2011; Chamikara, 2013; Rajeev and Vidanapathirana, 2012; Bambaradeniya et al., 2006)

► Research

Highly Effective

Several long-term research programmes were initiated in Sinharaja, covering tropical forest ecology, fauna and flora (Gunatillake et al., 2004; Gooddale and Kotagama; Meegaskumbura et al., 2012)

▶ Relationships with local people

Mostly Effective

The Forest Department has maintained good relationships with local people through the implementation of collaborative programmes with “Sinharaja Sumithuro” - a local community based organization.

▶ Legal framework and enforcement

Serious Concern

Implementation of the existing legal framework to address serious conservation issues at Sinharaja is poor at present (Chamikara, 2013; Rajeev and Vidanapathirana, 2012)

▶ Integration into regional and national planning systems

Some Concern

Concerted efforts and actions to protect Sinharaja should be well integrated into local development plans to avoid adverse impacts related to development (Gunatillake, 2011; Chamikara, 2013; Rajeev and Vidanapathirana, 2012)

▶ Management system

Some Concern

The management of the Sinharaja forest is vested with the Forest Department, which operates two main offices in the northern and southern areas. However, gaps in the management system are evident when considering the current threats in Sinharaja (Gunatillake, 2011; Chamikara, 2013; Rajeev and Vidanapathirana, 2012; Bambaradeniya et al., 2006)

▶ Implementation of Committee decisions and recommendations

Some Concern

The Committee decision 17COMX has recognized the fact that there are many incremental threats to the site, but the Committee noted that a Management Plan to address these had been completed. It was further noted that continued monitoring of the site should be implemented as a priority activity of the Plan. The committee decision has specifically mentioned the

need to monitor forest encroachment, but the management authority has not been able to address the issue of illegal encroachments in a satisfactory manner.

▶ Boundaries

Serious Concern

Discrepancies related to boundary demarcation has led to illegal encroachments around Sinharaja (Gunatillake, 2011; Chamikara, 2013; Rajeev and Vidanapathirana, 2012)

▶ Sustainable finance

Data Deficient

Inadequate data to verify aspects related to sustainable financing.

▶ Staff training and development

Mostly Effective

The Forest Department staff stationed in Sinharaja, and members of the ‘Sinharaja Sumithrayo’ have participated in various training programmes from research institutions, IUCN and NGOs in Sri Lanka.

▶ Sustainable use

Data Deficient

Inadequate data to verify aspects related to sustainable use.

▶ Education and interpretation programs

Highly Effective

Sinharaja has been well integrated into the school curriculum, and university degree programmes as well. The management authority as well as several NGOs conduct education and awareness programmes on Sinharaja (Bambaradeniya et al., 2006).

▶ Tourism and interpretation

Mostly Effective

There is a visitor center at the Kudawa entrance in the north. IUCN has

produced a general guide to the biodiversity of Sinharaja, including trail guides (Bambaradeniya et al., 2006). Several other NGOs/individuals have published guides on Sinharaja.

▶ Monitoring

Some Concern

Monitoring of conservation issues in Sinharaja is inadequate (Gunatillake, 2011; Chamikara, 2013).

Overall assessment of protection and management

Some Concern

Enforcement of legislation to conserve Sinharaja needs significant improvement. The boundary of the existing WHS needs to be clearly defined, and a possibility to expand the extent of the site to conserve remaining primary rainforest patches in the adjoining areas needs to be considered. A long-term research plot has been successfully established to document the temporal and spatial dynamics of the ecology of Sinharaja, including its fauna and flora. Several national and local NGOs have carried out successful education and interpretation programs on Sinharaja WHS, leading to raising general awareness about Sinharaja at the national level.

▶ Assessment of the effectiveness of protection and management in addressing threats outside the site

Serious Concern

The buffer zone and adjoining forests in Sinharaja are currently facing major issues related to illegal encroachment and clearance due to poor protection/ poor enforcement of law and management (Chamikara, 2013; Rajeev and Vidanapathirana, 2012)

▶ Best practice examples

• A Forest Dynamics Plot (500m x 500m) established in 1993 to study the temporal and spatial dynamics in a tropical rainforest, and species richness and diversity of fauna and flora;
• Restoration of tropical rainforest using Pinus as a nurse crop.

• Empowerment of local community based organizations (the network of ‘Sinharaja Sumithrayo’) in Sinharaja.

State and trend of values

Assessing the current state and trend of values

World Heritage values

▶ **Rare and endemic trees**

Low Concern
Trend:Stable

The endemicity among the trees of Sinharaja is high, where in some families (e.g., Dipterocarpaceae), endemism is greater than 90%. Long-term research data on the ecology of tree flora indicates stable conditions (Gunatilleke and Gunatilleke, 1980; Gunatilleke et al., 1995; Gunatilleke et al., 2004).

▶ **Rare and endemic Orchids**

Data Deficient
Trend:Data Deficient

The site harbours many endemic species of orchids, while several new orchid species have been recorded from the site since its inscription as a world heritage. However, the current data is insufficient to assess trends related to the ecology of orchid flora in Sinharaja.

▶ **Endemic Pteridophytes**

Data Deficient
Trend:Data Deficient

The site harbours many endemic species of pteridophytes, while several new species of ferns have been recorded from the site since its inscription as a world heritage. However, the current data is insufficient to assess trends related to the ecology of Pteidophytes in Sinharaja.

▶ **Rare, threatened and endemic freshwater fish**

Data Deficient
Trend:Data Deficient

The diversity and ecology of freshwater fish in the streams of Sinharaja have not been adequately researched.

▶ Rare, threatened and endemic amphibians

High Concern
Trend:Deteriorating

Several new species of amphibians have been discovered from Sinharaja, including point endemics restricted to the Eastern Sinharaja region. This area is currently under threat due to many adverse anthropogenic activities, which could threaten the survival of these sensitive species (Meegaskumbura et al., 2012; Surasinghe and Jayaratne, 2006).

▶ Rare, threatened and endemic reptiles

Data Deficient
Trend:Data Deficient

Similar to amphibians, several new species of tetrapod reptiles have been recorded from Sinharaja since its declaration as a World Heritage site. However, further studies are needed to assess the current status of reptile in Sinharaja.

▶ Rare, threatened and endemic birds

Low Concern
Trend:Stable

Observations carried out by the Ceylon Birds Club (CBS) and the Field Ornithology Group (FOG) indicates that the populations of endemic avifauna in Sinharaja are stable.

▶ Rare, threatened and endemic mammals

Low Concern
Trend:Stable

Research indicates adverse impacts on the ecology and distribution of endemic small mammals in Sinharaja due to selective logging activities carried out prior to the inscription of the site as a world heritage (Wijesinghe and de Brooke, 2005). However, these areas have recovered well over the

past two decades, providing stable conditions to endemic mammals.

▶ **Rare, threatened and endemic invertebrate species**

Data Deficient
Trend:Data Deficient

Needs further study to gather data to assess status.

▶ **The largest and relatively undisturbed remnant of Sri Lanka’s tropical lowland rain forest**

Low Concern
Trend:Improving

Research indicates a gradual regeneration of forest in areas subjected to selective logging in the 1970s, with an increase in primary forest vegetation. However, it is difficult to predict trends for most taxonomical groups, due to inadequate baseline data and continuous monitoring.

Summary of the Values

▶ **Assessment of the current state and trend of World Heritage values**

Low Concern

Trend: Stable

Since the inscription of the site on the World Heritage list in 1988, many species of plants and animals new to science have been discovered from this site, as a result of a significant increase in research work over the past two decades. Research indicates a gradual regeneration of forest in areas subjected to selective logging in the 1970s, with an increase in primary forest vegetation. However, it is difficult to predict trends for most taxonomical groups, due to inadequate baseline data and continuous monitoring.

Additional information

Key conservation issues

▶ Illegal encroachment

Local

Encroachment of the forest by agricultural lands, tourist hotels and village dwellings

▶ Habitat fragmentation

Local

Fragmentation of forest habitats of Sinharaja and adjoining forests by road construction and agricultural lands

▶ Poaching

Local

Poaching of wild animals is frequently reported from Sinharaja and adjoining forests

▶ Illegal logging

Local

Illegal logging of timber species in the buffer zone areas and adjoining forests of Sinharaja. More recently, there has been a wave of large scale illegal extraction of CITES App II listed Sri Lanka agarwood (Gyrinops walla – Thymeliaceae) in Sinharaja and all other moist forests of Sri Lanka.

▶ Agrochemical use

Local

Heavy use of agrochemicals is seen in tea estates and other agricultural land bordering the Sinharaja forest and its adjoining forests

▶ Spread of invasive alien species

Local

Several species of invasive alien plants are spreading in Sinharaja, which could adversely affect the native flora and ecology of the forest

▶ Climate change related impacts

Local

Climate change, including extreme weather events could affect the sensitive and unique flora and fauna of Sinharaja (especially the point endemics)

▶ **Fire**

Local

Man-made fires are reported from the eastern Sinharaja area

Benefits

Understanding Benefits

▶ **Is the protected area valued for its nature conservation?**

Biodiversity significance: The site harbors over 900 species of flowering plants, with >60% of them being endemic. Of the > 300 species of vertebrate fauna recorded from the site, >30% are endemic. Many species of herpetofauna are point endemics restricted to Sinharaja. The site is considered as a biodiversity hotspot of global significance.

▶ **Does management of the site provide jobs (e.g. for managers or rangers)?**

Employment opportunities: The management of the site as a World Heritage has provided direct employment to over 30 forest rangers and guides, while several locals are also engaged in ecotourism related small businesses

▶ **Access to drinking water**

Non commercial: All villages around the Sinharaja forest are dependent on the streams, rivers and groundwater resources sustained by the forest for drinking water and water for their day-to-day uses

▶ **Commercial wells**

Commercial: Several mini-hydro power plants located around Sinharaja are sustained from streams and rivers originating from this forest.

► Collection of medicinal resources for local use

Medicinal plants are extracted by local communities from buffer zone areas

► Outdoor recreation and tourism

Sinharaja is a popular ecotourism destination among local and foreign tourists

► Importance for research

Resource for building knowledge and education: Taxonomic, biogeographical and exploratory research in Sinharaja over the past three decades has contributed to the discovery of many plants and animals that are new to science. Research on forest restoration has generated a wealth of knowledge on regeneration of tropical rainforests.

► Soil stabilisation

Sinharaja contributes to sustain an array of environmental services, including the regulation of local climate, soil conservation, generate and sustain quality freshwater, and sustain natural pollinators.

► Collection of timber, e.g. fuelwood

Rattan is extracted from the buffer zone areas for local livelihoods

Summary of benefits

Sinharaja has immense global value in relation to biodiversity conservation, as it harbors many species of animals and plants that are restricted (point endemics) to this forest. The villages surrounding Sinharaja (22 in total) benefit from an array of environmental services from Sinharaja.

Projects

Compilation of active conservation projects

№	Organization/ individuals	Project duration	Brief description of Active Projects
1	Herpetological Foundation of Sri Lanka (HFS)		Research on new species of amphibians and reptiles in Sinharaja WHS
2	Center for Applied Biodiversity Research and Education (CABRE)		Research on orchids in Sinharaja
3	Ceylon Bird Club (CBC)		Annual monitoring of avifauna in Sinharaja, including
4	Field Ornithology Group (FOG)		Mixed-species foraging bird flocks in Sinharaja
5	Madhava Meegaskumbura		Monitoring of amphibians in Eastern Sinharaja, Morningside (long-term study)
6	Savitri Gunatilleke and Nimal Gunatilleke		Restoration of forest in buffer zones (long-term study initiated in 1990)

Compilation of potential site needs

№	Site need title	Brief description of potential site needs	Support needed for following years
1	N.A.	Conservation education projects for preparation of information material, upgrading the existing education centers and establishing new ones on other key locations.	
2	N.A.	Study the impact of invasive alien flora and fauna on the ecology of Sinharaja	
3	N.A.	Impact of climate change and extreme weather events on the ecology and endemic species in Sinharaja need to be studied	
4	N.A.	A comprehensive study on ecosystem services related to Sinharaja, including production, regulating, supporting and cultural services.	
5	N.A.	A systematic study on the species richness, distribution, and ecology of freshwater fishes in Sinharaja	

REFERENCES

№	References
1	Bambaradeniya, C. N. B., Ekanayake, S. P. and Amarasinghe, S. (2006). Guide to Sinharaja: A Biodiversity Hotspot of the World. The World Conservation Union in Sri Lanka vi + 55pp.
2	Bambaradeniya, C.N.B., M.S.J. Perera, W.P.N. Perera, L.J.M. Wickramasinghe, L.D.C.B. Kekulandala, V.A.P. Samarawickrema, R.H.S.S. Fernando and V.A.M.P.K. Samarawickrema (2003). Composition of faunal species in the Sinharaja World Heritage Site in Sri Lanka. The Sri Lanka Forester, 26: 21-40.
3	Chamikara, S (2013). A request to integrate adjoining forests into the Sinharaja World Heritage Site. Unpublished article submitted to the Forest Department and Ministry of Environment and Natural Resources in Sri Lanka, by Environmental Conservation Trust of Sri Lanka (written in Sinhala language).
4	Gunatilleke, C.V.S. and Gunatilleke I.A.U.N, (1980). The floristic Composition of Sinharaja – A Rain forest in Sri Lanka with special reference to Endemics. The Sri Lanka Forester, XIV (3 & 4): 171-179.
5	Gunatilleke, C.V.S., Gunatilleke, I.A.U.N., & Ashton, P.M.S. (1995). Rain forest research and conservation: the Sinharaja experience in Sri Lanka. Sri Lanka Forester, XXII (1 & 2): 49-60
6	Gunatilleke, C.V.S., Gunatilleke, I.A.U.N., & Ashton, P.M.S., Ethugala, A,U.K. Esufali, S. (2004). Ecology of Sinharaja and the Forest Dynamics Plot in Sri Lanka’s Natural World Heritage Site. WHT Publications (PVT) Ltd, Colombo. 221 pp.
7	Gunatilleke, N (2011). Green gold rush in the 21st Century: A potential threat to Sinharaja World Heritage Site. Newspaper article published in The Island, September20, 2011.
8	Gunawardene, N.R., Majer, J.D., Edirisinghe, J.P. (2010). Investigating residual effects of selective logging on ant species assemblages in Sinharaja Forest Reserve, Sri Lanka. Forest Ecology and Management, 259: 555-562.
9	Gunawardene, N.R., Majer, J.D., Edirisinghe, J.P. (2012). Correlates of ant (Hymnoptera: Formicidae) and tree species diversity in Sri Lanka. Myrmecological News, 17: 81-90.
10	Meegaskumbura, S., Meegaskumbura, Gunatilleke, N., M., Manamendra-Arachchi, K., Bowatte, G., Gunathilake, T., and Bandara, C. 2012. Conservation and Biogeography of amphibians in eastern Sinharaja. FrogLog, 100: 12-14.

№	References
11	Meegaskumbura, S., Meegaskumbura, M., Pethiyagoda, R., Manamendra-Arachchi, K. and Schneider, C. J. 2007. Crocidura hikmiya, a new shrew (Mammalia: Soricomorpha: Soricidae) from Sri Lanka. Zootaxa 1665: 19-30.
12	Ng, P.K.L. (1995). Ceylonthelphusa scansor, a new species of tree-climbing crab from Sinharaja forest in Sri Lanka (Crustacea: Decapoda: Brachyura: Parathelphusidae). J. South Asian Nat. Hist., 1 ;175-184
13	Rajeev, M.D.G., and Vidanapathirana, D.R. (2012). Environmental Report on Conservation of Highly Diverse Forest Areas Adjacent to Sinharaja World Heritage Forest Reserve. Unpublished report submitted to Hon. Minister of Environment and Natural Resources in Sri Lanka, by Herpetological Foundation of Sri Lanka.
14	Ranil, R.H.G., Pushpakumara, D.K.N.G, Janssen, T., .Wijesundera, D.S.A., Dhanasekera, D.U.M.B. 2010. Cyathea srilankensis (Cyatheaceae): a new tree fern Species from Sri Lanka. American Fern Journal, 100(1): 39-44.
15	Ranil, R.H.G., Pushpakumara, D.K.N.G., Suriyagoda., B.M., Sivanathaweri, T., Samitha, S. (2007). Biodiversity of Pteridophytes at Moulawella mountain of Sinharaja forest. Proceedings of International Forestry and Environment Symposium, Sri Lanka. Published by Department of Forestry and Environmental Science, University of Sri Jayewardenepura
16	Surasinghe, T. Conservation overview of herpetofauna of Sinharaja Man and Biosphere Reserve of Sri Lanka. Zoo’s Print Journal, 22(1):2535-2538
17	Van der Poorten, N. 2009. Lyriothemis defonsekai Spec.nov. Sri Lanka with a review of the known species in the Genus (Anisoptera, Libellulidae). Odonatologica, 38(1):15-27.
18	Warakagoda, D. H.; Rasmussen, P. C. 2004. A new species of scops-owl from Sri Lanka. Bulletin of the British Ornithologists' Club 124: 85-105.
19	Wijesinghe, M. R. and de Brooke, M. L. 2005. Impact of habitat disturbance on the distribution of endemic species of small mammals and birds in a tropical rain forest in Sri Lanka. Journal of Tropical Ecology 21(6): 661-668.