IUCN Conservation Outlook Assessment 2017 **(archived)**
Finalised on 09 November 2017

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

Sangay National Park

SITE INFORMATION

Country:
Ecuador
Inscribed in: 1983
Criteria:
(vii) (viii) (ix) (x)

Site description:

With its outstanding natural beauty and two active volcanoes, the park illustrates the entire spectrum of ecosystems, ranging from tropical rainforests to glaciers, with striking contrasts between the snowcapped peaks and the forests of the plains. Its isolation has encouraged the survival of indigenous species such as the mountain tapir and the Andean condor. © UNESCO

SUMMARY

2017 Conservation Outlook

Good with some concerns

The conservation outlook for the site’s values related to geological processes and geomorphic features is good as these are robust and relatively immune from human intervention. Some concerns exist regarding the site’s ecological processes, biodiversity, and threatened species. However, relative to the large area and isolation of the Park, human impacts from agriculture, livestock and hunting, although increasing, are still minor and have only localized effects on biological diversity and threatened species. Recent and historical inventories and registers are evidencing that despite of the growing pressures, bird, mammal and amphibian species maintain their populations. However, protection and management continue to be constrained by the relatively low level of human and financial resources available and the increasing threats will require increasing levels of investment and effective planning instruments in the future to manage the expected impacts. At the same time, the Park is vulnerable to climate change and more research is required into this.

Current state and trend of VALUES

Low Concern
Trend: Stable

The outstanding natural beauty and the geological features of the site remain relatively intact. Relative to the large area and isolation of the Park, human impacts from agriculture, livestock, hunting and roads, although increasing, are still minor and have only localized effects on biological diversity and threatened species. Recent and historical inventories and registers are evidencing that despite of the growing pressures, bird, mammal and amphibian species maintain their populations. Despite the growing population and resource use, there is no evidence of significant transformation or landscape fragmentation and therefore the outstanding natural beauty of the site continues to be maintained.

Overall THREATS

High Threat

Given the large size of the site, current threats from agriculture, grazing, hunting and plant extraction are relatively minor in extent. The impacts of road construction and hydroelectric dams in the vicinity of the park, both existing and new, are of considerable concern on the other hand. Together, these projects are providing first-ever access to many areas of the park. Climate change is becoming an increasingly more significant threat in light of the current and potential effects on the park’s paramo ecosystem.

Overall PROTECTION and MANAGEMENT

Some Concern

Protection and management is constrained by the relatively low level of human and financial resources available, together with the lack of clear management instruments and strategies available to address current and potential threats. There is no clear long-term financial strategy. Some aspects, such as for example research and monitoring have been largely project-based and dependent on individual project funding, with no overarching strategy.

FULL ASSESSMENT

Description of values

Values

World Heritage values

► Outstanding natural beauty

Criterion:(vii)

With its outstanding natural beauty and two active volcanoes, the Park illustrates the entire spectrum of ecosystems ranging from tropical rainforests to glaciers, with striking contrasts between the snowcapped peaks and the verdant forests of the plains. Spectacular glaciers, waterfalls, and lakes complement the natural beauty of this striking landscape that plunges from the heights of the Andes down to the plains of the Amazon Basin (World Heritage Centre Website, retrieved February 2014)

► Outstanding examples of on-going geological processes characterized by volcanic activity

Criterion:(viii)

The currently active Sangay and Tungurahua volcanoes are some of the highest volcanoes in the world and provide outstanding examples of on-going geological processes characterized by explosions of steam and ash, and occasional lava flows. The Altar volcano exhibits the characteristics of an extinct volcano with a heavily eroded and glaciated caldera that contains a crater lake. The complex of geomorphic features, from the plains of the Upper Amazon Basin – including large rivers draining into it-to the glaciers of the highest summits, show the entire complex of geomorphic features of the eastern tropical Andes. (World Heritage Centre Website, retrieved February

2014, SoUV, 2016).

► High diversity of vegetation types with altitudinal variations
Criterion:(ix)

The large size and altitudinal variations of the Park provide the natural landscapes for the maintenance of on-going ecological processes typical of the eastern tropical Andes. A high diversity of extensive and extraordinarily well preserved vegetation types are present, ranging from alpine zones of the high paramo to the subtropical rain and wet forests of the upper Amazon Basin. Fauna species distributions correspond with vegetation zones and there is a distinct altitudinal zonation. The principal physical factors influencing vegetation are altitude and rainfall, with more luxuriant vegetation growing on the wetter eastern slopes. Subpáramo has formed at the highest levels below the snowline, and is dominated by lichens and bryophytes. A subalpine rain Páramo zone occurs below this. Montane wet forest is found in valleys to the west. At lower elevations, there is a greater variety of small trees and shrubs. Montane rainforest has developed on the wetter eastern slopes and occurs below 3,750 m. The vegetation of the upper half of this zone attains approximately 5 m. Below 3,000 m, the vegetation develops into forest up to 12 m high; between 2,000 m and 3,000 m lower montane rainforest occurs on steep-sided valleys. Subtropical rainforest occurs below 2,000 m where temperatures range from 18 °C to 24 °C and rainfall may reach 5,000 mm annually. (World Heritage Centre website, retrieved February 2014).

► High species diversity and important habitats of endangered species
Criterion:(x)

As a consequence of its relative isolation and pronounced altitudinal variation, species diversity is very high, and many species which are threatened elsewhere are found in abundance. Of particular importance are the endangered mountain tapir (Tapirus pinchaque), spectacled bear (Tremactus Ornatus), Andean Condor (Vultur gryphus) and jaguar (Pantera Onca). At least 3,000 species of flowering plants are expected to occur in the park and recent reports describe 107 mammal, 430 bird, 33 amphibian, 14 reptile and 17 fish species (SoUV, 2016).

Other important biodiversity values

► Other international designations

The Park lies within a C.I.-designated Conservation Hotspot, is a WWF Global 200, Freshwater Eco-region, a WWF/IUCN Centre of Plant Diversity, a Vavilov Center of Plants Origin and lies in one of the world’s Endemic Bird Areas.

Assessment information

Threats

Current Threats

High Threat

Current threats from agriculture, grazing, hunting and plant extraction are relatively minor in extent, however the trend is that of expansion. Of greater concern are the impacts of the road construction and hydroelectric dams in the vicinity of the park, associated with higher access control needs and transformation of the entire ecosystem.

► Dams/ Water Management or Use

High Threat
Outside site

CELEC EP is the national and public company that is responsible for most of the dams and water capture for power generation. In southern Sangay National Park, CELEC EP has constructed the Paute-Integral system of dams on the Paute River (2 dams with generation) and 2 separate generation sites. (See CELEC EP, 2010). None of these projects are inside the park, but all are located 50 to 100 meters from park boundaries. Four power plants in cascade (Mazar, Molino, Sopladora and Cardenillo) will use water from the Paute River watershed for power generation. Currently two (Mazar and

Molino) are already in operation and another one (Sopladora) is being constructed (CELEC, 2017); (Vicepresidencia de la República, 2017).

► Crops, Livestock Farming / Grazing

Low Threat
Inside site, scattered(5-15%)

Local communities on occasion invade a few sectors of the original Park, and are resident in the southern addition to the Park since 1992, when the park was enlarged. They clear native vegetation to establish agricultural plots and graze cattle causing deforestation and degradation of paramo grasslands. The problem is exacerbated by lack of signs or markers to indicate the Park's boundaries.

Given the extent of the park, the effects of land conversion are relatively minor; however encroachment on the park boundary continues to be an issue. (IUCN Consultation Form, 2017)

A large part of the subtropical forest in the lowlands along the eastern border of the park has been converted to grasslands for cattle ranching and agriculture. These represent one of the most significant threat to the property, including the risk of encroachment and livestock entering the property (SoOUV, 2016).

► Livestock Farming / Grazing

Low Threat
Inside site, scattered(5-15%)

Grazing of domestic livestock in the Tungurahua Volcano area is of concern. Cattle grazing occurs both within park boundaries and directly adjacent to Sangay Volcano. An estimate of the area influenced by humanintervention is about 7.40% for Sangay National Park in comparison with 1.67% for El Cajas National Park (SENPLADES, 2010). New roads and land conversion threaten mature habitats– cloud forest between2050 and 3500 mts. (Ojala-Barbour, et al. 2016).

► Hunting (commercial/subsistence), Poaching

Low Threat

Inside site, localised(<5%)

Illegal hunting is a problem in areas near settlements. Considerable progress has been achieved in extending and enhancing patrolling activities within the park and its buffer zone (SOC Report, 2007); however, hunting still occurs in the southern part of the park (IUCN Consultation, 2014). Evidence of poached Tapirus pinchaque were found in 2011 (IUCN Consultation form 2017).

► Roads/ Railroads

High Threat
Inside site, localised(<5%)
Outside site

The Highway of Guamote - Macas crosses the National Park for about 39 km. Of this section, 7.85 km fall within the property and 31.23 km within the widened buffer zone. 1.11% or 3004.82 ha of the World Heritage zone lie within the 2km-radius of the road and that 712.92 ha or 0.26% of the natural vegetation in this area of the property has been modified to become pasture or cropland (SOC report, 2008). Construction of the Guamote-Macas Road has opened the area to potential colonization. There is pressure to build other roads in and around the Park, especially in the southern section, including Zula-Pomacocha-Juval-Huangras-San Francisco road with estimated 20 kilometres inside the park (Cañar and Chimborazo province) which will be the first ever road through the entire southern section of the Park (IUCN Consultation, 2014).

The primary known threat is agricultural land conversion associated with the recent completion of the Riobamba-Macas highway (Ojala-Barbour et al, 2016).

The park was seriously affected by the construction of the road, which now separates the World Heritage site from the southern extension of the park. (SoOUV, 2016). In 2005 the management plan adopted strategies for the restoration of the zones affected by the road, as well as developing participative management of the park in order to reduce conflicts over land use and the relationship between the local population and wildlife. (SoOUV,2016).
The road conecting the Chimborazo de la Sierra with Morona Santiago

provinces was finalized in 2012 (El Universo, 2012).

Potential Threats

High Threat

Climate change is already being felt in the site but is expected to become more pronounced in coming years with effects on the park's paramo ecosystem. The site is also highly threatened by further hydroelectric and water management developments.

► Dams/ Water Management or Use

High Threat
Inside site, extent of threat not known
Outside site

The PUMA - Proyecto Multipropósito de Agua - project includes objectives linked to drinking water management and hydropower generation. Some areas where the project will be implemented are located within the boundaries of the Sangay National Park and its buffer zone. The activities planned in these areas include construction of a dam and a reservoir. Potential impacts would include habitat fragmentation, loss of biodiversity and soil erosion (Hidralia Energia, 2013).

► Temperature extremes

High Threat
Inside site
Outside site

While some effects of climate change are already apparent (increased temperatures, drier dry seasons, wetter wet seasons) the full effects will be more pronounced. However, the large altitudinal differences in the Park will enable the migration of habitat and species, most of which will be to higher elevations. Lowland forest is expected to become much drier and prone to fire, giving way to dry savannahs within the next 100 years. (Vuille, et al, 2003; Urruita, 2009).

Protection and management

Assessing Protection and Management

► Relationships with local people

Some Concern

Local governments, communities, and the private sector are in general open to working with the Park on conservation issues. Local NGOs work with the Park to solve conservation problems. A lack of knowledge of the benefits of the Park among local people makes it difficult to work with communities in the buffer zone. Conflicts over land ownership have soured relationships with local people in key areas.
This is because in 1992 the limits of the Park were extended to the South and leaving inside the Park Shuar and finqueros communities. Today the communities Saant, Tzekeankaz, Los Angeles, Tuna, Kanzas and Diamante continue practicing agriculture inside the park. Although the PNS maintains a strict control and socialization to avoid the expansion of the agricultural frontier, rapid population growth in these communities is a threat with the consequent loss of diversity (Brito, M. et.al, 2016).

In terms of profit distribution, the rangers of the Sangay National Park high area were able to put into effect 4,000 hectares for the conservation in the moors as part of the Socio Bosque-páramo economic incentive program. The communities (Cooperativa Agropecuaria Ichubamba-Yasepan and Azuay) in the buffer zone of Sangay National Park are beneficiaries of this program of the Ministry of the Environment (Ministry of the Environment, s / f).

► Legal framework

Mostly Effective

The Ecuadorian Government recognizes environmental principles in its 2008 Constitution, declaring the State as responsible for the management and administration of its protected areas in order to guarantee biodiversity conservation and to maintain ecosystem ecological functions (SoOUV, 2016). There is the Strategic Plan of the National System of Protected Areas (SNAP) 2007-2016 and the Guidelines for the establishment of state protected areas and subsystems of the Decentralized Autonomous Governments at provincial and municipal levels. With this legislation, at the initiative of the Local

Governments, the constitution allows these instances to declare protected areas and to conserve their territories locally (Redparques, 2016).

▶ Enforcement

Data Deficient

No information is available. However, the general situation of the park does not explicitly indicate the need to reinforce the application of the law since, apart from agricultural activities and the minimum extraction of plants for medicinal purposes, no illegal activities are committed inside, in some cases it is suggested to make a better control of the extraction of species such as endangered birds (Guevara et.al, 2010).

▶ Integration into regional and national planning systems

Some Concern

The park is registered within two ecological corridors: Llantes - Sangay and Sangay - Podocarpus (Redparques, 2016).

An initiative is known for the development of community tourism between UNDP, National Institute of Cultural Heritage and the Ministry of Culture and Heritage of Ecuador.

▶ Management system

Mostly Effective

Management of the Park is divided into three different districts overseen by the national office. The three local coordinators report to a national coordinator who also oversees 5 other parks as well, and is unable to dedicate sufficient time to managing Sangay National Park IUCN Consultation, 2014).

An executive management plan, approved in 2005, has been used as a management tool for the area and is kept updated (SoOUV, 2016).

▶ Management effectiveness

Mostly Effective

Ecuador presents momentous advances in the efficient management of information through the "Biodiversity Information System - SIB" platform,

which provides online information for decision making. (Redparques, 2016).

▶ Implementation of Committee decisions and recommendations

Highly Effective

Committee decisions have had been implemented in the past, which was acknowledged when the Property was taken off the List of World Heritage in Danger (World Heritage Committee, 2005). No Decisions have been taken by the Committee with regards to this property recently.

▶ Boundaries

Mostly Effective

The property was inscribed on the World Heritage List in 1983. In 1992 the Sangay National Park was extended to the south, increasing its area by 245,800 ha, although this extension was not included as part of the World Heritage property. 15,651 ha of park were excluded in May 2004, but the area inscribed as World Heritage was not reduced. Today, the Park covers an area of 502,105 ha of which 271,925 ha is considered as World Heritage (SoOUV, 2016). Pressure to reclaim lands from the Park, and conflicts had been reported in the past (IUCN Consultation, 2012). However, the situation seems to have improved (IUCN Consultation, 2017).

▶ Sustainable finance

Serious Concern

Currently, the main source of funding for Sangay comes from the Government allocations; formerly, the Fondo Ambiental Nacional, a protected area trust fund, operated several projects for the park, but it’s currently not operating(IUCN Consultation, 2017).

Ecuador has a Financial Sustainability Strategy, which results from a gap analysis between needs and sources of financing and the lessons learned from the GEF Financial Sustainability Project of the SNAP, which includes a diagnosis of legal, institutional and diversification needs of sources (UNDP, sf). At the moment, changes and high-level decision-making are expected on how to continue with the different programs (eg Socio Bosque).

▶ Staff training and development

Some Concern

The Aula Verde program (from the Ministry of the Environment) with the Ecofondo Foundation and the Popular Education and Promotion Center aims to strengthen 475 people and develop the capacities of officials working in the country's 50 protected areas to improve management of SNAP and wildlife (Ministry of Environment, 2014).

▶ Sustainable use

Some Concern

It has previously been reported that Park resources It has previously been reported that Park resources although these are not permitted activities within the park limits. Growing population in the surrounding areas will most likely increase pressures on the park (Brito,M. et.al, 2016).

▶ Education and interpretation programs

Mostly Effective

There is an Ecotalleres initiative of the Provincial Environment Directorate of Chimborazo, the Ministry of the Environment and the Small Grants Program, training 13 community environmental promoters within Sangay National Park (El Ciudadano, 2015).

▶ Tourism and visitation management

Some Concern

An agreement was signed in 2016 between the local governments of this area for the development of cultural and community tourism (Andes, 2016).

▶ Monitoring

Serious Concern

Monitoring of different species is taking place mostly through individual research projects.
There is a Condor monitoring program promoted be the Ministerio de Ambiente. The Information System for Biodiversity has been established in Ecuador, where findings of this nature are reported and also monitoring of

volcanic activity by the Geophysical Institute.

There is also a guideline for evaluating the effectiveness of monitoring programs in each area (Ministry of the Environment, 2014) for all areas of the SNAP; it is unknown if the new management plan is contemplated, although it is one of the axes of the management proposal of the Llanganates - Sangay Corridor (F.Natura, 2002).

► Research

Highly Effective

A number of individual projects are undertaken by outside researchers. A project led by WCS in cooperation with national biodiversity officials started in 2014 and aims to monitor Andean bear in corridor between Sangay and Llanganates.
Several researches on population behavior of species exposed in scientific journals (Guevara et al, 2010), Reed Ojala - Barbour, et al (2013), Brito, 2016), Brito and Ojala, 2016, Brito et al. 2017) have contributed to the inventories of birds, mammals and amphibians, as well as the identification of new species or unregistered species of marsupial mouse (Caenolestes sangay), frog (Pristimantis tinguichaca) and arboreal rat (Rhipidomys albujai), justifying the high endemism and diversity by area in the park.

A study was also carried out to determine the water quality in the Ozogoche, Pichahuiña and Pomacoche rivers located within the park, which concluded that the three micro-watersheds present good quality (Coello et al., 2013).

The effects of climate change on the parquet lagoons will be studied to determine the impact on the Ecuadorian Amazon (Ministry of the Environment, 2017).

Overall assessment of protection and management

Some Concern

Protection and management is constrained by the relatively low level of human and financial resources available, together with the lack of clear management instruments and strategies available to address current and potential threats.

There is no clear long-term financial strategy. Some aspects, such as for example research and monitoring have been largely project-based and dependent on individual project funding, with no overarching strategy.

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

Data Deficient

Given the limited human and financial resources for management, there is only limited capacity to address threats outside the site. However, some interinstitutional agreements are enabeling control of activities like tourism.

State and trend of values

Assessing the current state and trend of values

World Heritage values

▶ **Outstanding natural beauty**

Good
Trend:Stable

Despite the growing population and resource use, there is no evidence of significant transformation or landscape fragmentation (IUCN Consultation, 2017).

▶ **Outstanding examples of on-going geological processes characterized by volcanic activity**

Good
Trend:Stable

The geological features of the site are well preserved. (Consultation Form1, 2012)

▶ **High diversity of vegetation types with altitudinal variations**

Low Concern
Trend:Stable

Relative to the large area and isolation of the Park, human impacts from

agriculture, livestock, hunting and roads, although increasing, are still minor and have only localized effects on biological diversity and threatened species (Urrutia, 2009; Ojala-Barbour et al, 2016).

► High species diversity and important habitats of endangered species

Low Concern
Trend:Stable

Recent and historical inventories and registers are evidencing that despite of the growing pressures, bird, mammal and amphibian species maintain their populations and that new species are being found, proving the Sangay National park an exceptional laboratory of scientific research (IUCN Consultation, 2017). Ornithological inventories have registered a populations of at least 127 species belonging to 39 families; findings also suggest that some species considered rare and scarce might be more common when in appropriate habitat, which highlights the importance of these special bird areas; this could be the case of Aburria aburri and Ramphastos ambiguun, both considered endangered.

Summary of the Values

► Assessment of the current state and trend of World Heritage values

Low Concern

Trend: Stable

The outstanding natural beauty and the geological features of the site remain relatively intact. Relative to the large area and isolation of the Park, human impacts from agriculture, livestock, hunting and roads, although increasing, are still minor and have only localized effects on biological diversity and threatened species. Recent and historical inventories and registers are evidencing that despite of the growing pressures, bird, mammal and amphibian species maintain their populations. Despite the growing population and resource use, there is no evidence of significant transformation or landscape fragmentation and therefore the outstanding natural beauty of the site continues to be maintained.

Additional information

Benefits

Understanding Benefits

► Legal subsistence hunting of wild game, Collection of wild plants and mushrooms, Livestock grazing areas

The southern section of the Park includes a population estimated to be between 3,000 and 4,000 people who derive their livelihoods from, livestock grazing and occasional hunting. Many other landowners own sections of southern Sangay National Park, but most of them live outside the park at lower elevations. In the Cañar, Chimborazo and Morona Santiago provinces, occasional incursions into the Park from surrounding settlements also occur from time to time for livestock grazing and hunting.

► Outdoor recreation and tourism

Though tourism to the Park related to mountain climbing, and visits to its many lakes and forests is currently at a low level, the potential is large.

Summary of benefits

Conservation is far and away the largest benefit of the Property. Subsistence farming, livestock grazing, and hunting provide benefits a limited number of families, and tourism, though currently a minor activity, has potential for considerable expansion in the future.

Projects

Compilation of active conservation projects

№	Organization/ individuals	Project duration	Brief description of Active Projects
1	Wildlife Conservation Society, Ecuador		Andean Bear Conservation in the Sangay/Llangantes Corredor
2	Fundación Cordillera Tropical		Research, Environmental Education, Park Delimitation, Cadastre production, park guard training in southern Sangay National Park (Cañar Province)
3	Aves & Conservación		Important Bird Areas, working in the corridor Llanganates - Sangay
4	Tapir Fund		Research on Mountain Tapir
5	Tapir Fund		Research on Mountain Tapir

Compilation of potential site needs

№	Site need title	Brief description of potential site needs	Support needed for following years
1	N.A.	Development of a comprehensive monitoring system for the property.	
2	N.A.	Climate Change related studies	

REFERENCES

№	References
1	Andes (2016) Inicia en Ecuador etapa de socialización del proyecto de turismo comunitario en el Qhapaq Ñan en www.andes.info.ec/es/noticias/inicia-ecuador-etapa-socializ... consultado el 29 de julio de 2017.
2	Brito M., J., R. Ojala-Barbour. 2016. Mamíferos no voladores del Parque Nacional Sangay, Ecuador
3	CELEC (s.f). Información técnica Proyecto Cardenillo en www.celec.gob.ec/hidropaute/proyectos/30-espanol/proyectos/..., consultado el 19 de julio de 2017
4	CELEC EP. 2012. Actualización del estudio de impacto ambiental y plan de manejo ex post de la central Paute Molino. Resumen Ejecutivo.
5	Carlos E. Cerón Martínez (2006). Plantas Medicinales de los Andes ecuatorianos. Botánica Económica de los Andes Centrales, Universidad Mayor de San Andrés, La Paz, pp. 285 -293.
6	Carlos E. Cerón Martínez (2006). Plantas Medicinales de los Andes ecuatorianos. Botánica Económica de los Andes Centrales, Universidad Mayor de San Andrés, La Paz, pp. 285 -293.
7	Consultation Form 1, 2012.
8	Consultation Form 2, 2012.
9	Consultation Form 3, 2012.
10	Consultation form April, 2017 - completed by Reed Ojala-Barbour.
11	El Telégrafo (2016). Tres países impulsan al Qhapac Ñan como un atractivo turístico en http://www.eltelegrafo.com.ec/noticias/regional-centro/1/tr... consultada el 12 de julio de 2017.
12	El Universo (2012). Vía Riobamba – Macas, asfaltada y con atractivos en www.eluniverso.com/2012/04/18/1/1447/via-riobamba-macas-asf...
13	El Universo (2017). Científicos realizarán estudios de cambio climático en el Parque Nacional Sangay en http://www.eluniverso.com/noticias/2017/07/06/nota/6265375/... nacional

№	References
14	Fuille, Mathias, Raymond Bradleu, Martin Werner, and Frank Keimig. 20th Century Climate Change in the Tropical Andes. Observations and Model Results. http://epic.awi.de/18977/1/Vui2003a.pdf
15	Fundación Natura (2002). Plan Preliminar de Manejo del Corredor Ecológico Llanganates – Sangay, Quito, Ecuador.
16	Guevara. E., T. Santander, J. E. Guevara, R. Gualotuña and V. Ortiz. 2010. Birds, Lower Sangay National Park, Morona-Santiago, Ecuador. Check List journal.
17	Hidralia (s.f.). Hidralia abastecerá de agua potable una región de Ecuador en http://hidraes.com/?page_id=2096, consultado el 29 de Julio de 2017.
18	IUCN Consultation, 2014.
19	Ministerio de Ambiente del Ecuador (s.f). Contribuciones a Socio Bosque para comunidades del Parque Nacional Sangay (s/F) enhttp://www.ambiente.gob.ec/4-000-hectareas-ingresaran-a-soc… acceso el 17 de julio de 2017.
20	Ministerio del Ambiente (2014) Evaluación de Efectividad de Manejo del Patrimonio de Áreas Naturales del Estado Guía Metodológica. Ecuador.
21	Ministerio del Ambiente (2015). Estrategia de Sostenibilidad Financiera del Sistema Nacional de Áreas Protegidas (SNAP) del Ecuador. Quito, Ecuador.
22	Ministerio del Ambiente de Ecuador (s.f). Fortalecer las capacidades técnicas de guardaparques es una de las estrategias de conservación del MAE en www.ambiente.gob.ec/fortalecer-las-capacidades-tecnicas-de-…
23	Ministerio del Ambiente de Ecuador (s.f). MAE realiza monitoreo del cóndor en el Parque Nacional Sangay en http://www.ambiente.gob.ec/mae-realiza-monitoreo-del-condor…
24	Ojala-Barbour, R., Brito, D. & Pinto, C. 2016. Caenolestes sangay. The IUCN Red List of Threatened Species 2016
25	PNUD (s.f). Documento de Proyecto Sostenibilidad financier del Sistema Nacional de Áreas Protegidas, Ministerio del Ambiente de Ecuador.
26	Redparques (2016). Informe Regional sobre la Implementación del Programa de Trabajo sobre Áreas Protegidas del Convenio sobre Diversidad Biológica 2011 – 2015 (Convenio de Diversidad Biológica – Décimo Tercera Conferencia de las Partes), Región Bioma Amazónico, Bogotá, Colombia.

№	References
27	SENPLADES. 2010. Documento de Trabajo. Zona de Planificación 6.
28	UNEP-WCMC Sheet, 2011. Sangay National Park.
29	Urrutia, Rocio. Climate change projections for the tropical Andes using a regional climate model: Temperature and precipitation simulations for the end of the 21st century http://www.agu.org/pubs/crossref/2009/2008JD011021.shtml
30	Vicepresidencia de la República del Ecuador (s.f). Hidroeléctrica Sopladora en su fase final de construcción en www.vicepresidencia.gob.ec/hidroelectrica-sopladora-en-su-f..., consultado el 19 de julio de 2017