

Private Conservation: Hope for Biodiversity Conservation?

A multiple-case study of private protected areas in Ecuador

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Submitted October 1, 2015

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Conservation is a state of harmony between men and land.

~Aldo Leopold

Abstract:

Unlike other environmental threats, the loss of biodiversity is irreversible and the current and rapid loss of species is alarming. Several authors agree the state-owned protected areas are not sufficient to lessen biodiversity loss which is accentuated because most of the biodiversity is on private land. In this thesis, I study private conservation's role as a tool for biodiversity conservation and the constraints they face. I visited five private protected areas (PPA) in Ecuador where I conducted semi-structured interviews with the owners or administrators of the reserves. From my data and previous studies, I conclude PPAs' contribution to the national conservation goals is to work as a supplement by expanding and connecting conservation areas where the state's efforts are not enough. On the other hand, private interest can clash with these conservation goals; PPAs might be tempted, for example, to protect only ecosystems appealing for tourists or keep animals captive as a tourist attraction. The common conflicts the selected PPAs have are illegal logging, poaching and illegal settlements. The interviewees claimed there is not state support either, despite reporting these cases constantly. This situation is exacerbated by the lack of a legal framework to recognize, monitor, evaluate and support private conservation in Ecuador. However, one of the objectives to improve the national systems of protected areas (where PPAs are included) is to develop a legal framework for private conservation. This legal framework should include different actors at different levels, from local stakeholders to national authorities. Human groups and how their livelihoods are affected by the creation of PPAs must be taken into consideration as well. It is imperative to go further state's actions and rescaling out environmental governance while finding a balance between conservation and human needs.

Keywords: Private protected areas, biodiversity conservation, private conservation, Ecuador.

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Abbreviations

CCPA	Span.: Centro de Conservación de Plantas Amazónicas Engl.: Amazon Plants Conservation Center
MAE	Span.: Ministerio de Ambiente del Ecuador Engl.: Ministry of Environment of Ecuador
NPA	National protected area
SB	Span: Socio Bosque Engl: Forest Partner
SNAP	Span: Sistema Nacional de Áreas Protegidas Engl: National System of Protected Areas
PSF	Span: Proyecto de Sostenibilidad Financiera Engl: Financial Sustainability Project
PPA	Private Protected Area
TMCF	Tropical Montane Cloud Forest

1 Introduction

1.1 Problem definition

Ecuador is among the world's 17 mega-diverse countries (R. Mittermeier, Roble Gil, & Mittermeier, 1997) and hosts two of the world's 25 biodiversity hotspots (Tropical Andes and Choco-Darien Forests) which are priorities for conservation (Myers & Mittermeier, 2000). However, Ecuador suffers the highest deforestation rate in South America and the forest loss trend is increasing (FRA, 2010). In the IUCN Red list of threatened species, Ecuador has the highest number of threatened mammals in Latin America, and the second most in the world (Tirira, 2011). Several authors agreed that the state's efforts in establishing and controlling protected areas are not enough to tackle biodiversity loss (Figgis, Humann, & Looker, 2005). Moreover, most of the biodiversity in Ecuador is on private land, making it harder for state led conservation (Knight, 1999).

In this light, I decided to analyze private protected areas (PPAs) as a conservation tool. I study to what extent PPAs protect ecosystems. Furthermore I investigate what kind of conflicts PPAs face that hinder their conservation efforts. Moreover, I look at the role of the State and the legal framework for private conservation in Ecuador. I also decided to look into private conservation because there is little understanding of the drivers, mechanisms and conditions when conservation arises voluntarily with a benefit for people and the environment (Holmes, 2013; Steffen, Crutzen, & McNeill, 2007; Stolton, Redford, & Dudley, 2014). Political Ecology (PE) research has so far overlooked what protected areas can actually accomplished for biodiversity conservation, often leaving this topic as an inquiry for natural sciences (Pasquini, 2007). I adopted a qualitative approach and a multiple case study of five PPAs. My fieldwork was carried out in three provinces in Ecuador during February, 2015.

1.2 Research Questions

This thesis aims to contribute to a better understanding of private efforts in conserving biodiversity, with a focus on privately owned and run conservation areas. Thus, I formulated three research questions:

RQ1. To what extent do PPAs contribute to biodiversity conservation?

RQ2. What kind of conflicts do PPAs face and how do they deal with them?

RQ3. To what extent does the State impede or support private conservation?

In order to find out to what extent PPAs contribute to biodiversity conservation (RQ1), I first need to know what would have happened without the reserve's intervention and the type of

ecosystems they protect and the importance in terms of species biodiversity. In that light, I am able to judge if they are already protecting ecologically valuable habitats. However, biodiversity conservation is more than protecting the forest cover, as it must include an ecosystemic approach (Krause & Zambonino, 2013). Additionally, I will analyze how PPAs set, manage and achieve their conservation goals. I want also to find out what conflicts are and how they affect the PPAs' efforts (RQ2) Finally, I will examine the State's support to overcome these conflicts and the legal status for private conservation in Ecuador (RQ3).

1.3 Linking private Conservation and Sustainability Science

Human activities have brought us into the Anthropocene epoch wherein humans are able to change and dominate entire ecological systems leading to uncertain consequences (Steffen et al., 2007). Biodiversity loss is the most transgressed planetary boundary where land use change is the most significant cause (Rockström et al., 2009). Sustainability aims to bridge social and natural systems and combines critical and problem-solving approaches to complex challenges (Jerneck et al., 2011) . Private conservation is a practical approach where people take action to halt biodiversity loss (Kates, 2011). On that basis, I can situate my research in the sustainability field because I aim to find out to what extent biodiversity loss (a sustainability challenge) can be reduced by private conservation efforts (problem-solving approach) (Jerneck et al., 2011).

2 Methodological Approach

In this section I explain my stance as a researcher. Furthermore, I present the methodology I used to carry out this research. Finally, I reflect on the limitations I encountered.

2.1 Ontological and epistemological considerations

My research is situated in critical realism as I attempt to strive for a common ground between positivism and social constructivism (Carolan, 2005) . The loss of biodiversity is measurable and observable, for example in the number of species threatened (ontological realism). However, the reasons behind this trend and how it affects reality are not straight-forward (epistemological relativism) (Carolan, 2005). Reality is objective but complex and dynamic (HØyer & Naess, 2008). Critical realism acknowledges this and thus it neglects a theory of truth because we will never be able to reveal reality as it is, but some approximations (theories) can explain it better than others (Carolan, 2005). For all these reasons, physical, biological and social levels should be combined and understood in a holistic way (Dickens, 2003). Therefore, an interdisciplinary research approach, in which sustainability is founded, becomes imperative

(Dickens, 2003; Jerneck et al., 2011). Critical realism is also compatible with my qualitative assessment. Due to its recognition of social constructions, I am able to use quotations from my interviewees to bring their perceptions back into the context of my research (Bhaskar, 2010).

2.2 Research design and strategy

I adopted a qualitative approach that uses a multiple case study as a strategy and semi-structured interviews as a method. A case study is commonly used in qualitative research and focus on a particular phenomenon by “providing an in-depth accounts of events, relationship, experiences or processes occurring in that particular instance” (Denscombe, 2007, p. 35) allowing me to have a unique insight into private conservation in Ecuador.

I chose a multiple case study because private conservation is not repetitive and cannot be reduced to a rare or unique case. On the contrary, private conservation is diverse and managed in different ways. It could be a goal or instead the means for livelihoods. In that light, I wanted my evidence to be robust and compelling using a multiple case study by visiting five PPAs (Yin, 2014). My selection criteria were to find different types of PPAs to get a holistic view based on the way they carry out conservation. I also aimed to have a sampling with diverse opinions and perceptions and also identify common patterns among the selected PPAs (Creswell, 2013). Thus, I looked for PPAs that exclude tourism or any other activity besides conservation. In other words, PPAs which are being managed with a bio-centric approach. I also searched for PPAs that offer tourism and other activities like selling products, namely with a more anthropocentric approach (Table 1). In order to make this classification, I visited the web pages of the PPAs. I also sent emails with a short questionnaire asking about the ownership status to make sure the reserves were privately-owned and what the main and side activities were that match with my criteria.

Table 1 Selected PPAs and general information

Reserves	Owned by	Founded in	Ecosystem	Tourism	Field work Visits
Yakusinchi	Natural person (2)	2009	Tropical Montane Cloud Forest	No	17-19 February
Jatun Sacha	NGO	1986	Tropical rain forest	No	20-22 February
Bellavista	Natural person (2)	1991	Tropical Montane Cloud Forest	Yes	23-25 February
Santa Lucia	Community owned (12 families)	2001	Tropical Montane Cloud Forest	Yes	25-26 February
Maquipucuna	NGO	1988	Tropical Montane Cloud Forest	Yes	26-27 February and 2 March in Quito

To collect the data I conducted semi-structured interviews. I consider this method appropriate because it is flexible and let the interviewees express their ideas widely on topics raised by the

researcher and the open-ended answers let them to bring their own points of interest during the interview. (Denscombe, 2007). An example of a topic that I did not know about was the lack of regulation for private conservation.

I prepared an interview guide with three sections: conservation strategy, reserve management and legal framework (See Annex I: Interview Guide). I conducted 10 interviews either with reserve's founders or employees. The interviews lasted from one hour to two hours. I also had an informal interview with a member of UNDP Ecuador who has worked with private protected areas. He provided information regarding the legal framework. Before each interview, I explained the research purpose and my independent and unbiased stance to assure the validity of responses. I also asked for permission to record the interview and take pictures in the reserves.

2.3 Research Limitations

It is the first time that I have carried out field research on this topic. It was challenging to build a network of contacts from scratch especially in the public sector. The communication was only through e-mails since I planned my fieldwork from Sweden, and obtaining replies was often challenging. Fortunately, I managed to have my interviews with the PPAs scheduled before travelling to Ecuador. PPAs and Red de Bosques¹ (as the translation Forests Network) were willing to contribute. However, looking for information, maps and official figures from governmental institutions was difficult. Maps were not available for downloading and some data were not always updated or available. As time is limited, I decided to work with the available information even though it was not up-to date or as detailed as I would have liked it to be.

The sampling was limited to the reserves that are members of Red de Bosques. The organization's database was my starting point to look for PPAs and get basic information of each member. After this, I selected the ones with web pages to have access to more detailed information to match with my criteria. As a result of doing this, I left out of the sample PPAs that are less visible and are not connected to or supported by a network (Red de Bosques). My results therefore are biased towards PPAs that are well-connected and relatively easy to access. However, due to time limitations it was not possible to diversify my sampling more.

¹ Red de Bosques also called National Corporation of Forests and Private Reserves of Ecuador is an organization that brings PPAs together. The objective of Red de Bosque is to represent, support conservation and strengthen conservation incentives from the private sector

3. Context and Concepts

3.1. Ecuador

Ecuador is the smallest Andean nation at 283,560 km², however it is among the world's 17 mega-diverse countries (R. Mittermeier et al., 1997). Moreover it hosts two of the world's 25 biodiversity hotspots including the Tropical Andes and Choco-Darien Forests (Myers & Mittermeier, 2000). A biodiversity hotspot contains a very high degree of biodiversity and suffers loss of habitat thus it should be a priority for conservation (Myers & Mittermeier, 2000). Ecuador's biodiversity richness is due to its geographical position (at the equator), the topographic complexity of the Andes and the influence of sea currents (Tirira, 2011). Yakusinchí, Bellavista, Santa Lucía and Maquipucuna are situated in the Choco-Darien Forest.

Ecuador is divided by four geographic regions: the coast, the Andes, the Amazon and Galapagos Islands. Regarding regional location of the PPAs (figure 1), Jatun Sacha is in the Amazon and the other four PPAs are in the Andes. The region with the highest deforestation rate is the Coast and with an increasing tendency followed by the Amazon and then by the Andes (R. Sierra, 2013). According to Sierra et al. (2002), five of the six most critical ecosystems are along the coast. The main cause for deforestation in Ecuador is the conversion of land for agricultural uses. Between 2000 and 2008, 99.4% of deforested areas were converted to crops and pastures (Sierra, 2013).



Figure 1. Location of the selected PPAs in Ecuador. Source: Google Earth

Ecuador is among the countries with one of the highest deforestation rates and number of endangered species (FRA, 2010; Tirira, 2011). According to the Forest Resource Assessment (2010), Ecuador suffers the highest deforestation rate in South America. Deforestation in Ecuador is also significantly higher than the global rate of change (figure 2). Furthermore, the forest loss trend in Ecuador is increasing. Between 1990 and 2000, there was an increase in the trend of 13% and between 2005 and 2010 an increase of 24%. These figures are high despite the conservative FAO's definition for deforestation:

“Deforestation is the conversion of forest to another land use or the long-term reduction of tree canopy cover below the 10% threshold” (FAO, 2000)

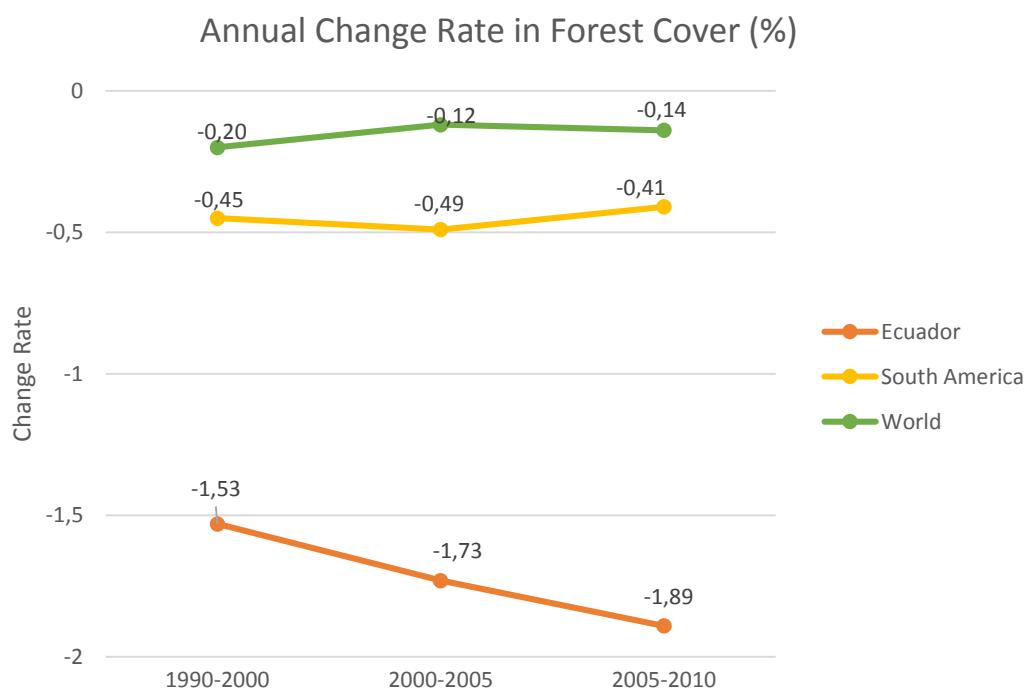


Figure 2. The annual change rate in forest cover in Ecuador, South America and the World from 1990 to 2010. While Ecuador's forest loss has been constantly increasing, the trend is South America and the World is more stable. Source: FAO.

Under FAO's definition, it is not considered deforestation unless an area has a tree canopy of less than 10% or it is expected to recover passively or actively. On that basis, replacement of primary forest by plantations is not included in this definition thus FAO does not include the degradation of forest. Deforestation, therefore, occurs only with a complete clearing of forest cover or the destruction of the forest that compromises its recovery to more than 10% tree canopy cover (Caldwell et al., 2008). Consequently, deforestation in Ecuador could be even higher with a broader definition that includes degradation of forests ecosystem health (Myers, 1994). Moreover, habitat conversion triggers biodiversity loss which is exacerbated due to the category of Ecuador as one of the most biodiverse countries in the world (R. A. Mittermeier,

Myers, Thomsen, Gustavo, & Olivieri, 1998). On the other hand, official figures from the MAE are more optimistic. The MAE uses a similar definition of deforestation but with different methodologies and base lines. For the period 1990-2000, the rate of forest loss was 0.71% and for the period 2000-2008 was 0.66%. Deforestation reached 89.994 ha and 77.647 ha annual average, respectively (MAE, 2012a). The MAE (2012a) predicts the current rate of deforestation and fragmentation of the ecosystems could lead to a critical situation in the provision of environmental goods and services in the medium-term. Therefore, MAE claims is important to “promote sustainable management of forests, strengthen the National System of Protected Areas, incentivize conservation on private lands covered by forest, restore degraded ecosystems,...[and] incentivize the use of adequate soil for agriculture to release areas for restoration and conservation” (MAE, 2014, p. 5).

3.2. Type of forests in the selected PPAs

Yakusinchi, Bellavista, Santa Lucia and Maquipucuna are specifically protected tropical montane cloud forests (TMCF). TMCF on a global scale is composed by distinctive forest ecosystems located in a relatively narrow altitude (2,000-3,000 m inland) with persistent clouds at vegetation level and global precipitation rates between 500 and 10,000 mm/year. Under this condition, TMCF captures water from the clouds, maintains a low evapotranspiration loss and has vegetation with low water use which contributes significantly to the hydrological system (Hamilton, Juvik, & Scatena, 2005).

Jatun Sacha is in the lowland tropical rainforest. This forest is characterized by evergreen vegetation with very diverse life forms at elevations below 1,000 m. A hot (25-30°C range) and humid climate is typical at the Equator with abundant precipitation (over 1,500 mm/year) (Douglas, Huggett, & Robinson, 1996). The Amazon basin is the largest remaining tropical forest in the world (Foley et al., 2007).

3.3. Conservation in Ecuador

State conservation efforts are a recent occurrence in Ecuador. In 1934, conservation efforts started with regulations to protect the Galapagos Islands and some species on the mainland. By 1958, the Galapagos Islands were declared a national park, becoming the first in the country. However, it was not until 1976 that the institutional management of protected areas changed from utilitarian to a conservation approach. The Forestry, Conservation of Protected Areas and Wildlife law was enacted years later. In 1996 the Ministry of Environment (MAE) was created after being part of the Ministry of Agriculture and Livestock (MAE, 2013). Despite its recent conservation history, Ecuador has recognized the rights of nature under the

principles of Good Living (Buen Vivir) or Sumak Kawsay (Constitution of Ecuador, 2008) and has approximately 19% of its territory under national protected areas (MAE, 2013):

Article 71. "Nature, or Pacha Mama, where life is reproduced and occurs, has the right to integral respect for its existence and for the maintenance and regeneration of its life cycles, structure, functions and evolutionary processes." (Translation by Georgetown University, School of Foreign Service)

Article 275. "...The good way of living shall require persons, communities, peoples and nationalities to effectively exercise their rights and fulfill their responsibilities within the framework of interculturalism, respect for their diversity, and harmonious coexistence with nature" (Translation by Georgetown University, School of Foreign Service)

Article 277. "The general duties of the State in order to achieve the good living shall... guarantee the rights of people, communities and nature." (Translation by Georgetown University, School of Foreign Service)

The Constitution of Ecuador highlights the importance conservation of biodiversity and guarantees its protection and State support through the Sistema Nacional de Áreas Protegidas (SNAP) (as the translation Natural System of Protected Areas). Here, PPAs are integrated as a subsystem although the legal framework to implement this article is not promulgated yet. I will discuss this issue further on.

Article 405. "The national system of protected areas shall guarantee the conservation of biodiversity and the maintenance of ecological functions.

The system shall be comprised of State, decentralized autonomous, community and private subsystems, and it shall be directed and regulated by the State. The State shall allocate the financial resources needed to ensure the system's financial sustainability and shall foster the participation of the communities, peoples, and nations who have their ancestral dwelling places in the protected areas in their administration and management." (Translation by Georgetown University, School of Foreign Service)

The National Plan for the so called "Buen Vivir" (Good Living) gives the guidelines to set the constitutional framework through 12 objectives (Senplades, 2013). Objective 7 refers to the rights of nature where among the goals to protect and enhance ecosystems are "to increase the proportion of mainland territory under environmental conservation or management to

35.90%”, “the mainland marine-coastal territory to 817,000 hectares” and “the cumulative area of forest restoration to 500,000 hectares” (Senplades, 2013, p. 71). This shows that Ecuador’s legal framework includes conservation of nature and protected areas as one tool to achieve it.

3.4. Private Conservation

Governments have been the main force in establishing protected areas (Pouzols et al., 2014). However, protected areas have existed for centuries - for example, sites that were kept intact for their sacred condition- before the concept itself was even developed (Stolton et al., 2014, p. 12). Despite its long history and the fact that the greatest proportion of biodiversity lies in private land (Knight, 1999), the international conservation community and governments have paid little attention to private conservation. Furthermore, it is acknowledged that the State’s protected areas are not enough to lessen the increasingly high rates of biodiversity loss (Figgis et al., 2005). No one knows how many PPAs are or where they are on the globe (Stolton et al., 2014). Moreover, there is a lack of agreement of how a PPA should be defined. The International Union for Conservation of Nature (IUCN) developed a definition for PPAs in order to bring recognition and support to their efforts, and to integrate them into national and international policies and global conservation data and mapping (Stolton et al., 2014).

In this thesis, I will use the IUCN’s concept for PPA because there is not an official definition from the Ecuadorian State. Additionally, IUCN is a leading organization in conservation that has highlighted the importance of the private conservation efforts. The definition of PPA is as follows:

‘A privately protected area is a protected area, as defined by IUCN, under private governance (i.e. individuals and groups of individuals; non-governmental organizations (NGOs); corporations – both existing commercial companies and sometimes corporations set up by groups of private owners to manage groups of PPAs; for-profit owners; research entities -e.g. universities, field stations- or religious entities)’ (p. 12)

IUCN defines a protected area as “a clearly defined geographical space, recognized, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values.” (Dudley, 2008, p. 8). This definition is also used by the MAE (MAE, 2013).

Private governance in the context of IUCN excludes governments, indigenous peoples and communities. However, when landowners pass most of the control to the administrators of a

reserve, then private governance could be more appropriate (Stolton et al., 2014). The land of Santa Lucia, for instance, is owned by a community (12 families) under a cooperative of conservation and eco-tourism, but two families effectively run the reserve, due to the lack of participation. These two families are involved in the operation and decision-making. Thus, I decided to consider Santa Lucia as a PPA.

4. Theoretical approach

4.1. Political Ecology and conservation

Private conservation and consequently the opportunity of private land to expand the network of protected areas has been overlooked in research (Stolton et al., 2014). Private conservation broadens the conservation community by taking responsibility over the protection of nature which has been considered as a State duty (Blaikie & Jeanrenaud, 1997). However, PPAs (and other protected areas) must “be suitably designed and adequately implemented” to contribute to conservation objectives (Steffen et al., 2007, p. 34), including appropriate representation of ecosystems and functions, viable population of native species and connectivity between other protected areas (Noss & Cooperrider, 1994; as cited in Pasquini, 2007).

Along with these objectives, conservation initiatives have to be evaluated socially by looking at how the benefits, costs and power relations that determine how the outcomes are distributed (Bidaud, Hrabanski, & Meral, 2015). A thesis from PE that argues that conservation territories are “ecological and socially problematic and inadequate to meet the goals of preservation of wildlife and livelihoods” (Bidaud et al., 2015, p. 179) . The term ‘ecologically problematic’ refers to conservation areas as bounded territories that often do not match ecosystems functions and fluxes in time and space. Rotkin (1990, p. 19) considers this enclosed space as the “imposition of a political geography over an ecological geography” (as cited in Robbins, 2012; p. 181). The term “socially problematic” refers to the fact that conservation areas historically have disenfranchised traditional land managers driving them to the margins and benefited elite communities who have little understanding of the ecosystems and local context (Bidaud et al., 2015) .

Nevertheless, the critics of conservation territories does not mean that PE stands against the protection of nature. Rather PE focuses on the causes for conservation failures and conditions where social actors exploit people and nature for their own benefit at collective cost (Bidaud et al., 2015). In this light Robbins (2012) considers that PE also “explores these social and environmental changes with an understanding that there are better, less coercive, less

exploitative, and more sustainable ways of doing things” (p. 20). Nonetheless, the main focus in PE research remains on human groups and who benefits or suffers due to new conservation regimes, and therefore the examination of conservation itself and what it may achieve for protecting ecosystems is overlooked (Steffen et al., 2007). I will thus examine private conservation as a tool to contribute for the protection of nature (such as enabling connection between protected areas) and to benefit people (such as ecotourism, selling organic products).

5 Results

5.1 Profile of the visited private protected areas

5.1.1 *Yakusinchi Reserve*

Yakusinchi reserve is located in Pujilí canton, Cotopaxi Province. It is near La Maná in the foothills of the Western Andes (Figure 3). Yakusinchi is limited to the north by cattle ranches, to the south with an abandoned parcel of land, to the east with Ilinizas Natural Reserve and to the west with a cattle ranches and cacao plantation. This reserve is managed by a couple. The project started in 2009 when they bought their first parcel of land. Currently, Yakusinchi has 175 ha in the TMCF (D. Recalde, Personal communication, February 17, 2015). Yakusinchi does not receive tourists, however there are accommodations for volunteers and researchers.



Figure 3. Location of Yakusinchi Reserve in Ecuador (a), in Cotopaxi province (b) and view of the TMCF in the reserve (c). Source: Wikimedia Commons and own picture.

Yakusinchi includes 85 ha of primary forest, 50 ha of secondary forest, 15 ha for the installations, an agro-ecological farm and an organic coffee plantation. The rest of the area (25 ha) is under a recovery process from grassland using passive reforestation². Yakusinchi is

² Under this strategy, human land-use pressures are removed partially or totally and secondary succession starts naturally (Morrison & Lindell, 2011). Through passive reforestation, eroded lands can be stabilized and it is also an alternative when resources are limited (Barnes & Chapman, 2014; Silver, Ostertag, & Lugo, 2000).

planning to expand to the south where the abandoned parcel is located because it has areas with primary forest. However, the expansion depends on obtaining necessary funds.

Yakusinchi has an animal rescue center, which is the only one in the area. The reserve provides medical attention and a place for recovering for native animals. They do not take part in the reintroduction processes since the Ministry of Environment is responsible for this activity.

This reserve is also starting an agro-ecological farm to supply part of their own consumption and in the animal rescue center. The farm will grow lemons, bananas, manioc crops, forest fruits, commercial native trees, and medicinal plants among others. Furthermore, three hectares will be used for organic and shade-grown coffee. This coffee will be distributed in nearby cities. The latter activity will support the operation of the reserve.

The communities around the reserve are farmers that either have cattle or monocultures such as manioc crops and coffee. However, due to the weather, low fertility and the type of soil, agriculture needs considerable amount of fertilizers. They also sell hard wood and bush-meat such as big rodents- that is mostly illegal (D. Recalde, Personal communication, February 17, 2015).

5.1.2 *Jatun Sacha Biological Reserve*

Jatun Sacha Biological Reserve is located in Tena canton, Napo Province on the southern bank of the Upper Napo River (figure 4). It is limited to the north by the Napo River, to the south by the Arajuno River, to the east and west by Ñucay Causay and Chicicurimi communities respectively. Jatun Sacha Reserve belongs to the local NGO Jatun Sacha Foundation Ecuador and it became the first out of five reserves in the country owned by this organization.

The reserve was created in 1986 as a research and educational center and started with 200 ha. Further additions in 1993 were possible thanks to International Children's Rainforest Network. Currently Jatun Sacha protects 2,270 ha of tropical rain forest (Jatun Sacha Foundation Ecuador, n.d.). The reserve has small wooden cabins for volunteers, students and researchers. For educational purposes, Jatun Sacha also offers day trips for tourists on a self-guided trail.



Figure 4. Location of Jatun Sacha in Ecuador (a), in Napo Province (b) and entrance of the reserve (c). Source: Wikicommons, La Provincia del Napo Blogspot and own picture.

The reserve has 2,270 ha where 70% is primary forest and 30% secondary growth. There are projects of active reforestation in the reserve and in the communities. However, passive reforestation is mainly used.

Jatun Sacha has several projects. One of them is the Amazon Plants Conservation Center (CCPA, in its Spanish acronym) founded in 1994 in cooperation with the Botanical Garden of Missouri. Ancestral knowledge about plants and their benefits was combined in a botanical garden. Currently the center has also silviculture and agroforestry programs that serves the reserve and communities. There is an organic garden in the reserve for own consumption where they grow manioc, plantain and different vegetables. It also operates as an educational center for growing food. Other activities held by volunteers are English teaching and environmental education in the communities.

The main activities in the communities nearby the reserve are agriculture and small-scale cattle ranching. People also work in Tena, the capital of the province, since it is just one hour away. Hunting and fishing is for own consumption and also for selling in markets (see section 3.2.2). Logging native species is becoming rare in the area due to deforestation. Some people also work for tourism as well (Jonás, Personal communication, February 20, 2015).

5.1.3 Bellavista Cloud Forest Reserve & Lodge

Bellavista is located in Quito Canton, Pichincha Province in the valley of Tandayapa in the Choco region (figure 5). It is limited to the north by cattle ranches, to the south and west by PPAs, to the east by cattle ranches and PPAs. In 1991, a Colombian/British couple initially bought 55 ha for conservation purposes stopping its conversion to grassland. Bellavista is now 700 ha private reserve owned by conservationists and their former founders. The reserve protects TMCF which is in the southern edge of the Choco Andean corridor. Primary forest represents 30%. They have been working mainly with passive reforestation (R. Parson, February 23, 2015).



Figure 5. Location of Bellavista in Ecuador (a), Pichincha Province (b) and entrance of the reserve (c).
Source: Wikicommons and own picture

Bellavista has a lodge as well with accommodation for 45 tourists and a research station for 35 people. The latter hosts researchers, students and also volunteers. The research station also doubles as a budget hostel. They offer several tour packages in collaboration with nearby PPAs.

The reserve has an educational program where schools can visit the reserve and learn about the cloud forest and the importance of conservation. Furthermore, Bellavista welcomes naturalist and birding guides for internships. Communities near Bellavista mostly have cattle ranches. Since the construction of a nearby road that goes to the coast region, people have also started business to cater drivers who stop by.

5.1.4 Santa Lucía Ecuadorian Cloud Forest Reserve

Santa Lucía is situated in Quito Canton, Pichincha Province, 80 km northwest of Quito (figure 6). It is limited to the north by Maquipucuna Reserve and private properties that are not in use, to the south by Yunguilla (a community-owned protected area) and The Cooperative El Golan, to the east by Yunguilla and to the west by Maquipucuna Reserve. In 1976, twelve families formed a cooperative of agriculture and bought land for crop growing and cattle ranching. They used to grow *naranjillas* (*solanum quitoense*), tree tomatoes (*solanum betaceum*) and blackberries at the beginning, but converted those crops to pasture as the soil needed a lot of fertilizers. This type of soil degrades easily when the forest is cleared for cropland (Hamilton et al., 2005). In 1988, Santa Lucia and the surrounding area were declared protected forest making logging and hunting illegal. This declaration was possible thanks to Maquicuna's intervention. The area is part of the Choco-region (Leonardo, Personal communication, February 25, 2015).



Figure 6. Location of Santa Lucía in Ecuador (a), Pichincha Province (b) and view of the main building (c). Source: Wikicommons and own picture

Members of the cooperative together with Maquipucuna started to look for alternatives rather than clearing the forest. They worked with several projects related to pisciculture, apiculture and growing palmetto, among others. Due to the lack of an access road these projects did not have the expected results. (Leonardo, Personal communication, February 25, 2015). By 1999, ecotourism was identified as an alternative to protect the forest and make a living from it. In 2001 the eco-lodge was opened for volunteers and in 2007 for tourists. Santa Lucia has 730 ha in the TMCF where 80% is primary forest and 20% includes common areas, silvopastures and secondary forest. Pasture is used to feed the reserve's mules that are used to transport food and other supplies.

They offer different tour packages and the lodge has capacity for 32 people. Researchers, volunteers and students also visit Santa Lucia to carry out investigations and field courses. The staff is from the nearby communities and it is managed by three members of the 12 families. Santa Lucia grows its own organic coffee, sugar and bananas. They also grow organic vegetables for the high season (July - September).

The economic activities of the surrounding communities are agriculture (naranja [solanum quitoense] and sugar cane) and cattle ranching. The soil is acidic and is at high risk of erosion, low fertility and drainage problems which makes crops and pasture difficult to maintain (Peterson et al., 2013). Yakusinchi, Bellavista and Maquipucuna share the same type of soil. Since it is the same area as Bellavista, communities are also close to the main road which opens an opportunity for small businesses.

5.1.5 Maquipucuna Reserve

Maquipucuna is situated in Quito canton, Pichincha province and is four km from Santa Lucía Reserve (figure 7). It is limited to the north by private properties (mainly cattle ranches), to the south by the Pichán River, to the east by Yunguilla and the Santa Rosa and Pichán Rivers. It is limited to the west by Tulambi and Pichán Rivers. Maquipucuna started with a couple's (Rebeca and Rodrigo) desire to conserve 100 ha thinking that if every Ecuadorian did the same

the forest would be safe. Rodrigo was working in a bank that had 2,500 ha as a collateral from a bankrupt logging company. The bank was planning to divide the area into lots of 80 ha each to sell it to ranchers and farmers. Rebeca and Rodrigo started looking for funds in the United States to buy the land and set up Maquipucuna Foundation. The foundation was established in 1989. The declaration of protected forest came in 1988 which included the reserve and a surrounding area of 13.800 ha. Currently, Maquipucuna has 5.666 ha in the TMCF.



Figure 7. Location of Maquipucuna in Ecuador (a), Pichincha Province (b) and view of the TMCF in the reserve (b). Source: Wikicommons and Torsten Krause’s picture.

Maquipucuna first built a research station to investigate the ecological value of the area. There are around 1,970 species of plant and close to 400 species of birds (Maquipucuna’s co-founder, Personal communication, March 2, 2015) making Maquipucuna and its ecosystem an important area for research and conservation. In 1995, they started offering ecotourism. The lodge has accommodation for around 52 guests. There is also accommodation for budget visitors and volunteers. The staff comes from local communities.

Maquipucuna’s staff have carried out several projects related to sustainable development since its beginnings. They believe conservation is not an isolated project, but rather it has to include people to be successful. With the declaration of protected forest, communities around Maquipucuna had to change their way of living to more sustainable practices. Santa Lucia, as I mentioned in the last section, has moved from timber production to a community-run ecolodge. Yunguilla another nearby community used to produce charcoal. Today, 60 families own a hostel there. Yunguilla also produces orchids, cheese, jams and crafts. However, finding the correct alternative to stop unsustainable practices took lot of efforts, time and trial-and-error processes. This scenario has been the same for Jatun Sacha and their efforts for including communities in their conservation efforts. Maquipucuna is also researching how to grow cacao profitably and in an environmentally-friendly way in an Afro-Ecuadorian communities. Furthermore, they are working to create a label of origin called Chocó-Andes for products and services from the Choco Andean corridor, such us shade-grown coffee and ecotourism.

The communities neighboring Maquipucuna grow coffee (to a lesser extent), sugar cane to produce alcohol and naranjilla (*solanum quitoense*). They also have cattle and pasture on their land.

5.2 Main Findings

In this chapter I present the main findings collected through semi-structured interviews in five PPAs in Ecuador that were described in section 5.1. I interviewed either the founders or people who have worked in the PPAs and therefore know the area and the reserve well (table 2). All these interviews were conducted *in situ* except the interview with Maquipucuna’s co-founder. It took place in Quito, where the reserve has its headquarters.

Table 2. Interviewees per reserve and quote coding

Reserve		Interviewees	
1.	Yakusinchi	a.	Co-founder and director
		b.	Co-founder 2
2.	Jatun Sacha	a.	Director
		b.	Field manager
		c.	Ex-forest ranger (retired at the end of 2014)
3.	Bellavista	a.	Co-founder and director
4.	Santa Lucia	a.	Administrator
		b.	Co-founder (informal interview)
5.	Maquipucuna	a.	Co-founder and director
		b.	Forest coordinator

The following sections correspond to my three research questions. I also use excerpts to exemplify the material I used for my analysis (Kvale & Brinkmann, 2009). The code for the excerpts is a letter for each PPA and a number for each interviewee in the PPA (table 2). Finally, I include an overview of the main points of the interviews in table 3.

5.2.1 To what extent do PPAs contribute to biodiversity conservation?

I decided to analyze the PPAs’ contribution in terms of biodiversity conservation, which is defined as the protection and management of ecosystems, species and habitats (Peterson et al., 2013). In other words, I looked for the PPAs’ contribution in conserving nature including animals, plants and ecosystems as well as their interaction with communities and the State. In this section I mention previous land uses, research efforts and conservation strategy for the selected PPAs. Moreover, I discuss side activities the PPAs carry out and how they manage them to reduce the impact.

During the interviews I asked how the land was previously used and what the scenario would be without the PPAs' intervention. The former owners of all five reserves were farmers, cattle ranchers or loggers with the exception of the first parcel of Maquipucuna's land (2,500 ha) that belonged to a bank. The bank was planning to sell it to either farmers or cattle ranchers. Most forest in all of the reserves would have disappeared if the PPAs had not been established and remains only, as one the Yakusinchi's founder said, "in the inaccessible area" (1a).

In fact, the main activity in the TMCF for farmers is cattle ranching. Most of the time, farmers first clear the forest and sell the wood. After that, they grow food such as blackberries and tree tomatoes until the soil is degraded and needs large amounts of chemicals. At that point farmers convert the area into grassland and the cattle grazing starts (Administrator, Personal communication, February 25, 2015). The soil in TMCF degrades quickly once it is converted to pasture, losing moisture inputs from horizontal precipitation³. This leads to a deterioration of water flow regime and infiltration characteristics that reduce the uptake of nutrients. Furthermore, converting TMCF to pastureland or crops reduces the flow water regime released to populated lowlands (Bruijnzeel & Proctor, 1995).

Regarding Jatun Sacha, located in the Amazon, the scenario of land use without the establishment of the PPA would have been similar as one interviewee argues: "Communities from the other side of the river (Arajuno) cut down all the forest" (2c). The neighboring area is highly degraded and to some extent cleared for agriculture and wood harvesting. Jatun Sancha helps communities and supplies them with seedlings to reforest their land.

None of the five selected reserves measures recovery processes themselves. However, Jatun Sacha and Maquipucuna support scientific investigation mainly focusing on biology, ornithology, entomology and botany although they welcome all fields, as they did with my research. These reserves collaborate with national and international universities and they offer accommodations for researchers. Yakusinchi, Bellavista and Santa Lucia do not receive scientists often, though they are willing to have them. Yakusinchi and Santa Lucía pointed out as one of the reasons, the lack of time and financial resources for building a network for bringing in researchers. The limited access to the internet makes this activity even more difficult. For all of the selected PPAs, research is seen as a contribution to conservation by increasing knowledge about these ecosystems and the life they support, it is easier to explain to people why these areas should be protected. One of the researchers that worked in Maquipucuna mentioned:

³ Horizontal precipitation is "the movements of water onto vegetational surfaces via condensation or by direct contact of cloud droplets" (Bruijnzeel & Proctor, 1995, pp. 39-40)

*“Maquipucuna is the jewel in the crown of the Andes, due to the best inventoried protected area.” Dr. Grady L. Webster, Herbarium – University of California, Davis
USA*

All of the PPAs have 30% to 80% of primary forest cover giving them great importance in terms of biodiversity. Yakusichi, Bellavista, Santa Lucía and Maquipucuna are located in the Choco-Darien Forest, one of the global biodiversity hotspots (Myers & Mittermeier, 2000). On the other hand, Jatun Sacha is in a tropical wilderness area. These areas refer to high-biodiversity tropical ecosystems and they still have largely pristine vegetation and low human population density; however, they are under increasing anthropogenic pressures (R. A. Mittermeier et al., 1998).

Regarding their conservation strategy, all of the PPAs I selected in this study used passive reforestation to restore grassland and agricultural land (figure 8). Interviewees from all five PPAs claimed that passive reforestation or natural restoration is better than active reforestation because the forest is left to recover naturally, and as a result “vegetation is more diverse” (3a). However, passive reforestation is only possible when the top soil is still conserved and the area is adjacent to a forest for seed provision (Bare, 2013).

Yakusichi is planning to start active reforestation with native trees in the secondary forest. Active reforestation means the application of management techniques such as planting seeds or seedlings in order to re-establish the forest (Holl & Aide, 2011). The founders mentioned that colonization by endangered native tree species is rare due to the lack of seeds. They have decided to collect the seeds of the endangered trees, such as *cecropia máxima*, in the primary forest and plant them in the secondary forest. They will not use seedlings because the transportation is difficult due to the topography of the area, but they will monitor the growth of the planted seeds. (Founder 2, Personal communication, February 17, 2015).



Figure 8. Passive reforestation in Yakusinchi. On the right grassland in recovery with some pioneer plants and on the left secondary forest. Source: own picture

One of Maquipucuna's strategies for conservation is the establishment of a biological corridor called the Choco Andean Corridor. Biological corridors provide patches to enable gene flow between forest fragments and provide bigger areas to find food and refuge (Khazan, 2014). In 1988, Maquipucuna's founders started this strategy by pushing for the declaration of the Maquipucuna reserve and its surrounding 14,000 ha as a protected forest. One of Maquipucuna's founders said: *"The declaration gave us time to create projects with the communities. Furthermore, the declaration protected our land from colonization supported by the Agrarian Reform"* (5a). However, they have not had the support from other PPAs and communities to engage in the joint project. Maquipucuna argues that the potential partners might think their recognition as PPAs will be lost in the collective idea of the Choco Andean Corridor. Maquipucuna is still working on the project where not only PPAs are included but also national parks.

There was some resistance from the communities to start working with Maquipucuna since they were the ones who, in a way, brought the declaration to the area. As a result of this declaration, communities had to stop deforesting new land and stop hunting. Maquipucuna took the responsibility of working with the communities to find sustainable alternatives to make a living.

"After the declaration, it was our responsibility to show them alternatives to the unsustainable use of natural resources. We cannot talk about conservation without showing alternatives to make a living. At the beginning they thought we wanted to impede their development" (5a)

Maquicupuna got funds from international organizations and technical knowledge to undertake community projects. Santa Lucía, for example, started as an ecotourism project after the declaration of protected forest and it was supported and funded by Maquipucuna. This project was as well part of the strategy to lower anthropogenic pressure on Maquipucuna's land and to expand the corridor.

All five PPAs use small parcels of the land for other purposes than conservation. With the exception of Bellavista, the selected PPAs grow food for income generation and/or for self-consumption. Agriculture in all the cases is organic. The land used by PPAs for growing food was cleared by former owners. For instance, Maquipucuna sells bird-friendly and organic coffee. They shade their coffee by planting or preserving tropical trees to increase the habitat for birds. The brand is called Choco-Andean Coffee and is produced together with small landowners (Forest Coordinator, Personal communication, February 26, 2015).

Furthermore, all of the PPAs receive volunteers and students for practical courses which provides funds for their operation. Bellavista, Santa Lucía and Maquipucuna also have accommodation for tourists and tour packages. Bellavista and Maquipucuna started with this activity to get funds for their conservation efforts. The reserves that offer tourism have built their facilities mainly with either wood or bamboo. Accommodation for volunteers and researchers is basic. The reserves recycle and use the organic waste as compost. According to them, all of these measures are taken in order to reduce their footprint while still producing financial resources to support their activity because *"conservation is the management of a natural system whereby the impact is diminished as much as possible while still allowing human use"* (3a). These side activities demonstrate their conception of private conservation: it needs to be self-sufficient allowing human use through environmentally-friendly activities, and facilitating scientific research to increase the knowledge and awareness of the forest they protect while protecting nature. One of the interviewees acknowledge that it is necessary *"to create a system that fosters conservation but still provides resources for making a living"* (5a). Another interviewee claimed that *"most of the people think the forest is just source of wood and land for pasture and crops. This is not true. You can make a living out of conservation"* (4a).

5.2.2 What kind of conflicts do PPAs face and how do they deal with them?

The second research question refers to struggles PPAs face. These conflicts can be with neighbors or people who try to take advantage of the natural resources for their own benefit.

The common problems I found in all of the PPAs were illegal logging, poaching and informal settlements. In this section I describe these conflicts per each reserve.

Yakusinchi

When it was first opened, Yakusinchi's founders had to deal with neighbors who were entering to hunt and log because they used to think the land was abandoned since it did not have a 'productive' use. This behavior could be explained in part by the agrarian reform. Starting in the 60s, it was abolished in the early 90s. The agrarian reform encouraged people to occupy new territories. In order to claim ownership, people had to demonstrate a 'productive' use of new land by clearing the forest (Justicia, 2007). Conservation under this legal framework was overlooked. Nowadays, thanks to dialogue with the community they no longer deal with squatters. The founder, regarding relations with communities commented: *"we have developed a good personal relationship with the neighboring communities over the years...thanks to dialogue, especially with elderly people. We have told them they have to respect private land. Although they do not understand what we do...they respect our job"* (1a). However, these conflicts persist in the Ilinizas National Reserve that borders Yakusinchi in the east. I describe this issue in the next section.

Jatun Sacha

Unlike Yakusinchi, logging and poaching are still a concern in Jatun Sacha. Here, the reserve staff, mainly the forest rangers, try to diminish these activities by persuading trespassers to stop their illegal activities. These people (usually forest ranger's acquaintances) mainly come from nearby areas. The retired forest ranger that I interviewed claimed: *"people used to tell me that once I leave Jatun Sacha, they will encroach and hunt"* (2c). Jatun Sacha reports cases of logging and hunting to the MAE. The reserve is aware these pressures will continue if people do not have other activities to support themselves. For this reason Jatun Sacha has managed projects related to community development and micro-business, such as handcraft made with natural fibers and tagua nut carving. They also support the creation of cooperatives for agriculture or credit. They visit schools to give environmental education and English classes which are held by volunteers. Jatun Sacha provides seedlings to increase forest cover in the communities as well. CCPA provides the seedlings and buys seeds from the communities. Nevertheless, the projects have stopped or lessened in frequency due to the lack of financial resources.

Jatun Sacha also works on projects for income generation to meet their own needs and to lessen pressures in the forest. The Director contended, *"conservation is done with resources*

and the sustainable and rational use of the forest generates economic resources we need to support conservation” (2a). To support their conservation efforts, the reserve is planning to produce essential oils from native trees while respecting their biological processes. Another project is the management of a center for the reintroduction of Amazonian animal species (i.e., capybaras) that have been hunted intensely. Moreover, this center would function as a pilot project to raise Amazonian animals in captivity for meat consumption such as peccaries, agoutis and capybaras. The objective of this activity would be to reduce the pressure on wild animals and give communities an alternative to hunting. However, due to the lack of funds neither of these projects have been implemented.

Jatun Sancha has not experienced illegal settlements, but population growth exerts great pressure on conservation areas as new families look for new land to settle down and look for food (Field Manager, Personal communication, February 20, 2015).

Bellavista

Bellavista has experienced few cases of logging and hunting since it is located far from the main roads. However, the forest is constantly at risk according to Bellavista’s founder because they have commercial tree species with a high value in the market. However neighboring PPAs help each other with these issues. The interviewee mentioned that, "Pahuma, a neighboring reserve, works actively to avoid hunting, which benefits Bellavista" (3a) (Co-founder, Personal communication, February 24, 2015).

Regarding informal settlements, Bellavista and another five properties were affected. They went together to a trial to prove their legal ownership. The legal process was long and complicated according to its co-founder, but ultimately successful. He claimed that *“the neighbors and I had to fight really hard to prove we have legal ownership of our own land. Everything regarding land is complicated” (3a)*

Santa Lucía

In Santa Lucía, the members of the cooperative stopped logging and hunting once the eco-tourism project started. However, outside the reserve these pressures continue even though the declaration of protected forest has been in place since 1988. Santa Lucía reports all the illegal activities to the MAE. They have not experienced illegal settlements.

Another conflict is that some members of Santa Lucía do not agree with the eco-tourism project due to the low profits it currently generates. This situation can put the area in danger once again of being converted into crops or pasture. They argue that the low profits are due to

the lack of access road to the lodge (Co-founder, Personal communication, February 25, 2015). The current road goes up to the foot of the mountain. From that point, visitors walk up for about 1.5 hours to reach the lodge.

Maquipucuna

Hunting persists in Maquipucuna, which is reported to the MAE. Hunting is a cheap option for families who struggle to cover their basic needs for food. Besides reporting, Maquipucuna staff approach the poachers to explain the activity is illegal since it is private property, and furthermore the area was declared a protected forest. Still, the interviewee reported that *"hunting and logging persist. These activities are hard to uproot. Bush meat is cheap for the communities"* (5a). Logging has affected mainly the southern part of the reserve because illegal settlements are situated there. Squatter invasions started in 1989 when a road was built in the area. In that year, Maquipucuna reported them to the authorities. In turn, they were sued by the squatters. Illegal settlements will be analyzed in the next section.

For Maquipucuna *"protecting the forest does not mean having armed guards. It means creating a system that fosters conservation. Conservation in that sense has to generate financial resources to support livelihoods"* (5a). Therefore, to reduce the conflicts mentioned above, the reserve collaborates with the communities to run projects such as growing organic cacao and shade-grown organic coffee. Maquipucuna has also helped to carry out eco-tourism projects. This is the case of Santa Lucía and a community-owned reserve called Yunguilla. The projects started after the declaration of protected forest as an alternative to logging and charcoal production (see section 5.1.9 and 5.2.4)

5.2.3 To what extent does the State impede or support private conservation?

Lack of State support for private conservation

The general perception among the interviewees is that State support is not enough to overcome issues that hinder conservation efforts, such as illegal logging, poaching and informal settlements. Although reports are sent to the MAE by all selected PPAs, no actions are taken to find or punish those people entering the reserve.

Yakusinchi's founders know the importance of connectivity with the Ilinizas national reserve. Therefore, they constantly report any illegal activity in Ilinizas to the MAE. The founders lamented that *"the MAE depends on us. If we don't show them illegal logging and hunting cases, they do not even know what is going on. We are only two people here, we cannot be running through the mountains. Nobody respects Ilinizas Reserve. We are tired of reporting"*

(1a). They have even been threatened by loggers due to their advocacy: "*we stopped the construction of a logging road twice. We feel frustrated, no one can stop these people (commercial loggers). It is really dangerous to report illegal loggers since they threaten to kill us. Authorities are not that honest either. Timber is a big business*" (1a). Yakusinchi does not have illegal settlements. However Ilinizas has squatter invasions in flank that limits to Yakusinchi, which is exacerbate since the Ilinzas's borders are not well defined by the State.

Lack of state support also affects the paperwork with the MAE to bring native animals to the Yakusinchi's rescue center which is the only one in the area. This process can take months (and the same happens when they are ready to be released) despite the health conditions of the animals. Medicine and medical attention are only covered by the founders. The State does not give any kind of support to run the rescue center (Co-founder, Personal communication, February 17, 2015).

Jatun Sancha claims that being an NGO is difficult due to the political situation, which has led to a decrease of international aid. During the interview, one of the points highlighted was the lack of access to credit or seed capital⁴ making it difficult to sustain the organization and community projects. Jatun Sacha's director suggests the introduction of green credits in the financial system in Ecuador. Green credits support specifically environmental friendly projects (IDB, n.d.). Another method of State support referred to by Jatun Sacha's director is to allow the donation of the income tax to environmental and social projects. However, according to him, private conservation is not in the agenda of either the private or public sector.

Regarding illegal settlements, Maquipucuna's co-founder argues that they "have spent lot of resources in this 25 year-trial instead of investing in conservation projects" (5a). The squatters are organized under a cooperative of agriculture. They use this legal figure to sell Maquipucuna's land with false documents alleging legal ownership. Meanwhile, deforestation and hunting persist despite the declaration of the protected forest. The trial has been full of irregularities and delays

An example of illegal commercialization of bush-meat in the Amazon

The lack of State support to lessen illegal hunting was also pointed out by Wildlife Conservation Society (2007). In its study of urban commercialization of the bush-meat from Yasuní National Reserve, they found out it has been exacerbated by the construction of roads and the transportation subsidy offered to indigenous communities by oil companies.

⁴ Seed Capital refers to a small amount of money to start up a business ("Seed capital," 2007)

The reduction on transportation costs has enabled trading in markets. Although it is illegal, there are neither inspections in urban markets (where the meat is openly sold) nor education programs to reduce bush-meat demand in Amazonian urban centers (as cited in Poats, 2011). Poats (2011) also suggest solely 'command and control' approach including decommissions, fines and inspections are not enough to stop commercial bush-meat hunting. The PPAs also agree on this issue. One interviewee acknowledge *"illegal logging and hunting will continue unless people have other alternatives for making a living"* (2a). Bush-meat hunting and commercialization needs to be understood in terms of social drivers and communities have to be included in policies to reduce commercial bush-meat consumption.

Lack of a legal framework for private conservation

The Constitution of Ecuador (2008) includes PPAs as a subsystem within SNAP, guaranteeing the conservation of biodiversity and financial resources to achieve it (see section 3.2). Nevertheless, the regulation to back up article 405 has not been promulgated yet. Initially, the regulation was prepared by Red de Bosques with the support of the GIZ (Deutsche Gesellschaft für Internationale Zusammenarbeit). After three years the MAE has not enacted it. Opinions are divided about the regulation among the selected PPAs. Yakusinchi and Maquipucuna do not think the regulation will be able to bring positive changes to private conservation:

"Regarding the regulation, I do not have hope on the legal framework" (1a)

"I do not care about the PPA regulation, the legal framework has not helped us in any mean" (5a)

In contrast, the other reserves believe a clear and well-structured legal framework is needed. However Bellavista's co-founder argues the rules (visiting times, allowable activities such as camping or to taking samples for research) must be set by the owners since it is private land:

"In one of the meeting, they (MAE) were talking about having rules in our reserves. This needs to be done under a conservation agreement. It is important to have the regulation however we are the ones who set the rules. The MAE has to understand this is private land." (3a)

Therefore, Bellavista and Jatun Sacha demand a participatory process. They want to have a regulation that enhances and sets standards to facilitate private conservation but at the same time gives independence to landowners to make their own decisions without compromising the main goal of conservation.

State incentives and Private Conservation efforts

Despite the lack of support for private conservation, there are incentives for conservation that benefits PPAs indirectly. In this section I will analyze three State programs to support conservation: the Proyecto de Sostenibilidad Financiera (PSF) (as the translation Financial Sustainability Project), Socio Bosque (SB) (as the translation Forest Partner) and the spectacled bear corridor.

Financial Sustainability Project

The financial sustainability project (PSF) is a Ministry of Environment's initiative for the SNAP with the technical and financial support from the UNDP (United Nation Development Program) and the GEF (Global Environmental Facility). PSF's aims are to improve the legal framework that facilitates financial sustainability, strength the national and local institutions, and provide financial and technical support (UNDP, 2010). The promulgation and revision of the regulation for PPAs was included as part of the goals. Moreover, funds were allocated to support projects related to conservation within the SNAP. PPAs can send their proposals to enter a competition to get financial support. Bellavista, Maquipucuna and Santa Lucía together with 19 other PPAs in the Pichincha province were awarded support. They will build an interpretation center to promote conservation among the visitors, eco-tourism services and products from these 22 PPAs. This project is the pre-feasibility state and it is funded by GEF. The manager of this project is Red de Bosques (Red de Bosques, 2015).

Socio Bosque Program

Another State-driven conservation incentive program is SB created in 2008. SB focuses on the financial reward for private and collective landowners with valid land titles for conserving the forest in the past. Landowners who decide to participate in the program sign a contract where they agree to conserve the vegetation cover for 20 years. (MAE, 2012b). Yakusinchi, Bellavista and Santa Lucía are part of SB. Jatun Sacha and Maquipucuna cannot participate in the program because they are NGOs. SB targets only private individuals and communities (MAE, 2008). SB objectives include reduction of deforestation and protection of biodiversity (MAE, 2008). This program clearly specifies that any land used-change is prohibited. Remote monitoring is carried out and SB has the right to send staff to verify the land under the program still remains conserved (MAE, 2012). Under that basis, it is assumed that deforestation will be reduced, although there currently does not exist evidence showing a reduction of deforestation because of SB.

On the other hand, there is a conservation gap in SB that makes conservation of biodiversity questionable (Krause & Zambonino, 2013). SB leaves animal species diversity out despite of being an important component to measure biodiversity conservation success. (Krause & Zambonino, 2013). The presence of forest cover does not directly imply the abundance of animal species. Redford (1992) argues “although satellites passing overhead may reassuringly register them as forest...an empty forest is a doomed forest” (p. 421). Banning commercial hunting and maintaining the forest cover are not enough to achieve biodiversity conservation. This depends as well on the alternatives that the communities have to make a living, the tipping point of the ecosystem to maintain subsistence hunting and also the engagement of the communities in conserving which they know best: their own land (Krause & Zambonino, 2013). Unfortunately, Ecuador’s figures regarding the number of threatened species are not encouraging (Tirira, 2011). This is another reason to pay more attention to tackling biodiversity loss with clear objectives.

The spectacled bear corridor

Within Latin America, Ecuador has the most species of mammals on the IUCN Red list of threatened species⁵ and the second most globally after Indonesia (Tirira, 2011). In Ecuador, 101 out of the 405 species of mammals are threatened. Including the IUCN categories of extinction, near threatened and data deficient, this figure goes up to 214 mammals facing problems with their conservation status or scientific knowledge. This represents 52.9% of mammals in Ecuador (Tirira, 2011).

One of the endangered species in Ecuador is the spectacled bear (*tremarctos ornatus*) which is classified as vulnerable by the IUCN (Tirira, 2011). They are distributed along the Andes and in high lands in the Amazon region. (Tirira, 2007; as cited in Tirira, 2011). Habitat loss, ecosystems fragmentation and poaching are the main reasons for the low population estimated to be less than 2,500 individuals in Ecuador (Goldstein et al 2006; as cited in Tirira, 2011). They are hunted because of their commercial value (skin, meat and fat), and also due to crop raiding and killing cattle. The latter two are the most common reasons to kill the bears despite its status as protected species (Tirira, 2011). One of Tirira’s suggestions (2011) to protect the bear is the establishment of biological corridors. The suggestion is also supported actively by Maquipucuna with the Choco Andean Corridor.

⁵ The categories for the IUCN Red list of threatened species are extinct (EX), extinct in the wild (EW), critically endangered (CR), endangered (EN), vulnerable (VU), near threatened (NT), least concern (LC), data deficient (DD) and not evaluated (NE). Threatened species include critically endangered (CR), endangered (EN) and vulnerable (VU).

Quito Metropolitan District joined the initiative of the creation of the corridor. On May 20th 2013, it was publicized through Resolution N° C431 which called for the creation of a biological corridor for the spectacled bear in a territory of 65,000 ha:

“Create a biological corridor for the spectacled bear in the northwestern part of Metropolitan District of Quito as a mechanism to protect and conserve the habitat of this emblematic species in danger, and other species of fauna and flora found in the Andean forest; as well to promote a model that enhances sustainable use of natural resources to generate opportunities to the local communities for Buen Vivir (living well)” (p. 4) (Own translation)

This declaration aims to foster connectivity between different bear populations to assure diversity in the gene pool. It also provides more space to look for food and thus decreasing the number of bears that are forced to look for sustenance from cattle and farms. Here, PPAs become key players offering a safe connecting space for bears.

Some of the activities with the communities to promote the corridor are ecotourism, agro ecology, inclusion in the SB program and elimination of rural land tax. The construction of tunnels and bridges among the high ways are also part of the project (Alvarado, 2014, January). However, the selected area for the corridor has only one national protected area. Pululahua National Reserve is highly fragmented where just a small area is suitable for the bear. Thus, the areas constituting the corridor are mainly owned by private agents. Some landlords have not even allowed the presence of researchers and the placement of cameras in their properties for tracking the bears. (Alvarado, 2014, January). Nevertheless, Maquipucuna, Santa Lucía and other PPAs provide secure space in primary and secondary forests for the bears.

Three years after the declaration, 45 bears were identified in the corridor (figure 9) (2014, March 4). Quito Metropolitan District also placed signs along the road to alert the population about the presence of bears. I did not find further efforts besides the identification of bears and socialization of the project by placing signs along the roads. This situation was highlighted by the selected PPAs claiming that these types of initiatives are needed but poorly implemented or not implemented at all.



Figure 9. Location of the spectacled bear corridor. Red points show presence of bears taken by cameras and yellow points show no presence of bears. Source: Environmental Authority of Quito Metropolitan District (2014) and El Comercio Newspaper (2014).

5.2.4 Overview of the main findings

In this section, in order to give a general overview of findings, I present in a table with the main points and quotes from the interviews according to the research questions.

Table 3. General overview from interviews divided into research questions and questioner

Research questions		Yakusinchi	Jatun Sacha	Bellavista	Santa Lucia	Maquipucuna
1.	What would be the scenario without the PPAs?					
	Primary Forest	49%	70%	30%	80%	70% aprox.
	How	The area was owned by farmers.	The area was owned by indigenous and colonials who were logging, hunting or growing food.	The area was owned by farmers and rangers.	The area would be used for pasture. Thanks to the declaration of protected forest and Maquipucuna's support they decide to conserve.	The area was owned by a bank that was planning to sell the area for small farms. The rest of the land was bought from farmers.
	Quotes Arguments	"Remained forest would be in the inaccessible area" Founder. "The neighbors only focus on logging and having grasslands as much as possible. They do not understand what we do" Founder. "During the summer I take my cattle to one of the streams that comes from Yakusinchi since there is always water there" Neighbour.	"Communities from the other side of the river (Arajuno), cut down all the forest" Ex forest ranger. "The indigenous communities have been idealized regarding their relation with nature. Logging will continue unless they have alternatives" Director.	"There is so little environmental awareness in people's hearts". "In 2001 during a drought, some people finally understood the connection between the forest and the provision of water".	"The whole forest would have disappeared without the project" Co-founder.	In the past, we had Guaiacums. Now they are found just in the reserves" Driver from nearby town.
	Observation	The surrounding are either pasture or plantations Small areas with trees are used when needed. Ex: the beginning of the school year.	The surrounding areas do not have primary forest due to logging from the communities.	The area is surrounded by other PPA's. The rest is either pasture or plantations.		
1.2.	What is the importance of the land in terms of biodiversity?	Biodiversity hot spots and wilderness area				
1.3.	Performance Assessment	PPAs do not carry out recovery assessment themselves however they support research				
	Quotes Arguments	They are willing to accept researchers.	Jatun Sacha and Maquipucuna cooperate with universities for research projects and fieldwork courses.	They are willing to accept researchers. University fieldwork courses take place in the reserve.	Jatun Sacha and Maquipucuna cooperate with universities for research projects and fieldwork courses. Maquipucuna is the best inventoried reserve for forestry diversity in South America" Co-founder.	

Research questions Questioner		Yakusinchi	Jatun Sacha	Bellavista	Santa Lucia	Maquipucuna
1.4.	Reforestation	✓				
		They do passive reforestation mainly since it is more affective according to their experience (trial and error)				
Quotes Arguments		"We have seen grassland recovers better by itself. However with passive reforestation, big native trees don't grow since there are very few trees to produce seeds. We are planning to collect them to plant these trees" Founder.	Active reforestation in the communities through the Centro de Conservacion de Plantas Amazonicas (CCPA).	"We do passive reforestation, active just a little. Studies show with passive reforestation, vegetation is more diverse" Co-founder.	Passive reforestation to restore grassland and agricultural land.	Passive reforestation to restore grassland and agricultural land.
1.5.	What types and what is the purpose and impact?	✓				
Tourism		X	X	✓	✓	✓
What kind?		Only researchers, volunteers and students		Tourists, researchers, volunteers and students		
Why?		"Now animals are getting closer. We have not seen this before. This gives us the idea that for doing real conservation, we cannot have humans around" Founder.	"We have very basic accommodation. Tourists need comfort, we do not have money for that. However, we have thought about it without getting an agreement. It could be a source of funding for conservation" Director.	To get funds.	Started as an eco-tourism project after the declaration of protected forest.	To get funds "We need to create a system that fosters conservation". Conservation has to be profitable.
Agriculture		✓	✓	X	✓	✓
What do they grow? Purposes?		Agroforestry - self consumption Organic coffee, study phase - selling.	Organic garden. Chicken keeping. Self-consumption.	Nothing.	Organic garden, coffee and sugar cane. Self-consumption.	Shade-grown organic coffee for selling.

Research questions Questioner	Yakusinchi	Jatun Sacha	Bellavista	Santa Lucia	Maquipucuna
2. What kind of conflicts do PPAs face and how do they deal with them?					
Common opinion	There is not environmental awareness in Ecuador-				
Logging	✓	✓	At risk	At risk	✓
Quotes Arguments	"During the first years, people kept entering to our area for logging and hunting. Thanks to dialogue, especially with elderly people, we don't have those problems anymore" Founder.	"We have logging and hunting in the reserve however we avoid any confrontation in cases of logging and hunting. We use persuasion". Once a logger's family opened fire to impede logger's detention. One of the rangers was almost killed (Interview with ex ranger).	"We have not faced that problem since we are far from the roads" Co-founder.	There is not logging since the project started (Interview with Administrator). "Some of the families do not agree with the project" Co-founder.	"People still log specially in the south where the informal settlement is" Co-founder.
Hunting	✓	✓	✓	X	✓
Quotes Arguments	"During the first years, people kept entering to our area for logging and hunting. Thanks to dialogue, especially with elderly, we don't have those problems anymore" Founder.	"We have logging and hunting in the reserve however we avoid any confrontation in cases of logging and hunting. We use persuasion" Director.	"Pahuma, a neighboring reserve, works actively to avoid hunting which benefits Bellavista" Co Founder.	There is not hunting since the project started. (Interview with Administrator).	"Hunting and logging persist. These activities are hard to uproot. Bush meat is cheap for the communities" Co-founder.
Informal settlements	✓	At risk	✓	X	✓
Quotes Arguments	"A neighbour was growing in Yakusinchi claiming he was not aware of that. The problem was solve with dialogue" Founder.	"New families look for new land to settle down. They have logging and hunting as their main activities" Ex forest ranger. "People used to tell me that once I leave Jatun Sacha, they will encroach" Ex forest ranger .	"There was an informal settlement in six properties, six years ago. The neighbors and I had to fight really hard to prove we have legal ownership of our land. Everything regarding to land is complicated" Co-founder.	People from the cooperative have not had informal settlements. They came to area with the Agrarian reform without knowing that the area had an owner. Finally, they bought the land.	In the southern since 1989. Land traffickers are selling parcel of land using a false document to prove their ownership. Maquipucuna has face corruption and bureaucracy.

Research questions Questioner		Yakusinchi	Jatun Sacha	Bellavista	Santa Lucia	Maquipucuna
3.	To what extent does the state support/impece private conservation?					
<u>Common opinion</u>		They report hunting and logging however nothing happens.				
Quotes Arguments	<p>"The Ministry of Environment depends on us. If we don't show them illegal logging and hunting cases, they do not even know what is going on. We are only two people here, we cannot be running through the mountains" (1a).</p> <p>"There are illegal settlements in Ilinizas, they argue they came first".</p> <p>"Nobody respect Ilinizas National Reserve. We are tired of reporting".</p>	<p>Limited international support due to the current political situation. Director.</p> <p>"NGOs do not have access to credit. Giving green credit to NGOs must be mandatory by the State. Donate income tax is another idea of support us. Trees do not take care of themselves nowadays. We have to do it and that costs money" Director.</p> <p>"Nowadays, being a NGO is difficult due to the political situation" Director.</p>	<p>"I am sick and tired of doing paperwork".</p> <p>"There is not regulation for PPAs" Co-founder.</p>	<p>"We have reported but nothing happens" Manager.</p> <p>They feel the cloud forest is excluded in the current Government's advertising campaign.</p>	<p>Limited international support due to the current political situation</p> <p>"We do not have environmental authority. Cities are full of smog, rivers are polluted, people are cutting down the forest and speculating with the wood and so on" (5a).</p>	
	<p>"It is really dangerous to report illegal loggers since they threaten to kill us. Authorities are not that honest. Timber is a big business".</p> <p>"Retailers openly sell wood from the forest, not from plantations".</p> <p>"We stopped the construction of a loggers 'road twice. We feel frustrated, no one can stop these people" (1a).</p> <p>"Regarding to the regulation. I do not have hope regarding the people outside".</p>	<p>"We need a legal framework however we have been waiting tree for the regulation to be promulgated".</p> <p>"Conservation is done with resources. The sustainable and rational use of the forest generates economic resources that we need to support conservation".</p>	<p>"In one of the meeting, they (MAE) were talking about having rules in our reserves. However, this needs to be done under a conservation agreement. It is important to have the regulation however we are the ones who set the rules. The MAE have has to understand this is private land." Co-founder</p>	<p>"Being part of Socio Bosque was a very tiring process" Manager.</p>	<p>I do not care about the PPA regulation, the legal framework has not helped us in any mean" Co-founder.</p> <p>"We have spent lot of resources in this trial instead of investing in conservation projects" Co-founder.</p>	
<p>✓ Yes</p> <p>✗ No</p>						

6 Discussion

6.1 Connecting and expanding conservation

PPAs can enable connection with other natural areas such as NPAs (Stolton et al., 2014). PPAs make an important contribution to biodiversity conservation by allowing spatial connectivity which facilitates species' movements where State-owned reserves cannot be expanded (J. Langholz, 2010). There are three types of connectivity. First, a PPA can act as a buffer zone when lies adjacent to other protected area. Second, when a PPA is located between two protected areas it acts as a corridor. Finally, PPAs can also provide connection within the limits of a protected area (J. Langholz, 2010). Kruger National park in South Africa, for example, has more than 70 PPAs adjacent to its western flank. In some areas the fences were taken down due to the high quality of protection allowing free movement of wildlife (J. Langholz, 2010).

However, private interest can hinder cooperation toward conservation goals. Maquipucuna found difficulties and lack of interest among other PPAs in the establishment of the Chocó Andean corridor. The other PPAs feel threatened because their name could get lost under the figure of a corridor or even under Maquipucuna's name as a project driver and competitor in the ecotourism market. These private interests might be lessen with the municipality of Quito implementing the spectacled bear corridor mentioned in the last section. This corridor includes different types of landowners where PPAs offer a safe space, free of the main dangers for bears: agriculture and cattle ranching. In Maquipucuna and Santa Lucía feeding and resting sites has been identified where bears come back year after year (Maquipucuna's co-founder, Personal communication, March 2, 2015).

Although it is difficult to generalize the efficacy of corridors due to the species-specific nature of the problem and economic aspects, evidence from several studies supports the utility of corridors to conserve biodiversity (Beier & Noss, 1998, p. 1949). Natural landscapes are connected and corridors enhance this natural connectivity in fragmented ecosystems. (Beier & Noss, 1998). The selected PPAs do not have studies that specifically prove that biodiversity has been enhanced, maintained or deteriorated due to their intervention. However, this underlines that there is insufficient knowledge about the role of private conservation in general (J. A. Langholz & J. P. Lassoie, 2001).

The majority of PPAs, due to their small size, cannot protect megafauna or an entire ecosystem by themselves (J. A. Langholz & J. P. Lassoie, 2001). Studies in Latin America showed that 75% of PPAs protected fewer than 2,500 ha each (J. A. Langholz & J. P. Lassoie, 2001). Still, small

PPAs might be useful to protect specific plants, small animals, individual habitats (i.e. wetlands) or temporary habitats (i.e. transitory homes for migratory birds). Therefore, it is imperative to have connectivity in order to mitigate the negatives effects of small size and increase the overall importance of PPA for biodiversity conservation (J. A. Langholz & J. P. Lassoie, 2001).

Connectivity has other benefits as seen in the following example. Apart from being a buffer zone for Ilinizas National Reserve (figure 11), Yakusinchi monitors the flank bordering with this national park to inform the MAE about illegal activities. This flank is hardly ever monitored and is thus susceptible to poaching and illegal logging. This information is free of charge for the National Park. In that sense PPAs benefit the State in terms of avoided cost. That costs can include augmentation of protected areas, valuable information related to any illegal activity and community-related problems (J. A. Langholz & Krug, 2004). Yakusinchi also has the only rescue center for wildlife in the area. Animals used to be transported to Quito and some, due to their poor condition, died before getting any medical attention. The State does not have any rescue center for wildlife. In this case, Yakusinchi takes an active role where the State has failed.

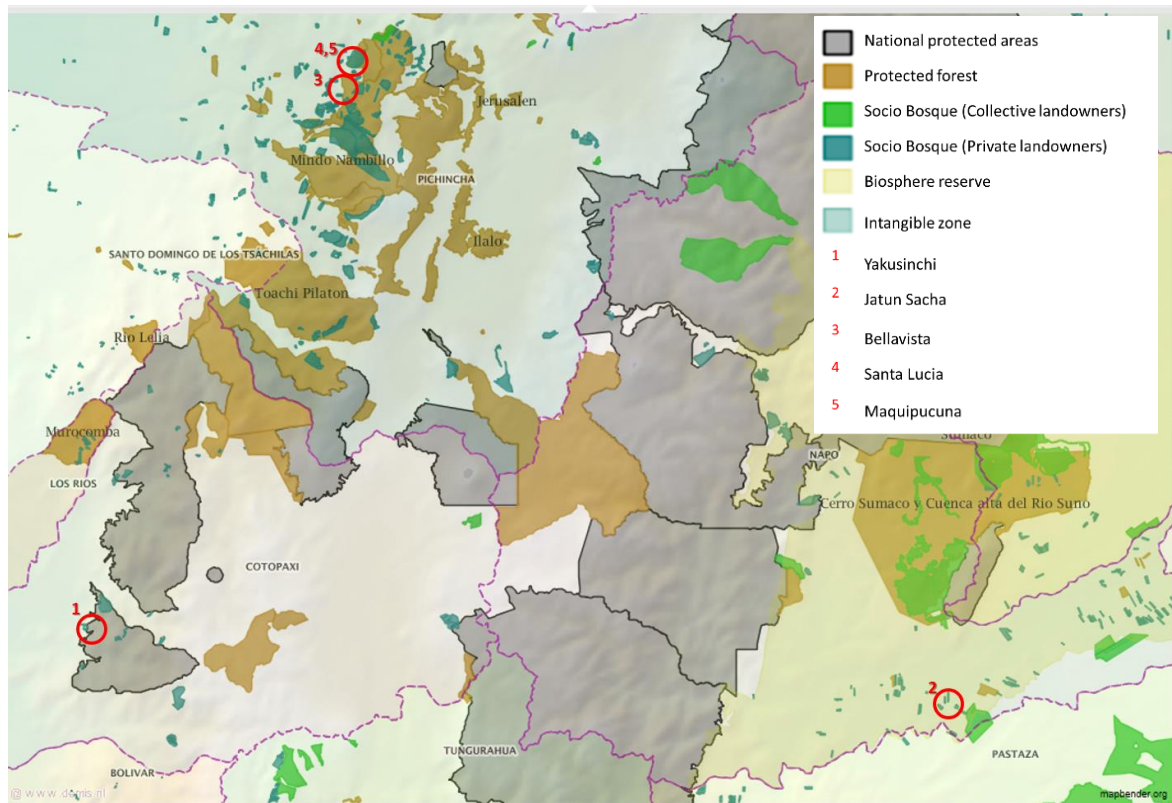


Figure 10. Selected PPAs and their potential as connecting areas. Source: Sistema Nacional de Información.

Even though Jatun Sacha is not adjacent to any conservation areas, it functions as a biological station. Jatun Sacha, however, has potential to be a connecting tool because is located in the Amazon region that accounts for 84.27% of the hectares under SB (MAE, 2012c). The reserve is nearby several land parcels under SB which increases its overall importance for biodiversity conservation due to their potential as a corridor or buffer zone (figure 11).

Bellavista, Santa Lucía and Maquipucuna (figure 11) have the advantage of being in an area declared as protected forest. They are also part of the spectacled bear corridor and surrounded by several other PPAs. Being physically adjacent to other protected areas could have economic advantages (J. Langholz, 2010), which is the case with the interpretation center. These reserves also work together by offering joint tourist packages and monitoring the area to impede the entrance of poachers and illegal loggers (section 5.2.6).

PPAs have an important function in expanding and maintaining conservation by preventing other land uses such as extraction, logging, or agriculture (Holmes, 2013). Private agents can buy land more quickly than the State, which is critical when degradation or conversion is taking place faster (that is the case of TMCF) than the establishment of a NPA. (Stolton et al., 2014). In all cases, the selected PPAs stopped conversion into crops and grazing land (see section 5.2.5). PPAs can thus supplement or even replace State roles (Holmes, 2013; J. Langholz & J. Lassoie, 2001). Nevertheless, more State responsibility is needed to meet conservation goals where governance is held by multi-actors at different scale (Reed & Bruyneel, 2010).

Regarding social dimensions of conservation, the interviewees commented that the reserves were established through a voluntary sales agreement between the previous landowner(s) and the new ones, thus there were not displacements. Still, land rights acquired through voluntary processes should not be taken as the ultimate proof to demonstrate the creation of the reserves caused no impacts on human groups. Displacement is not only the physical removal of people from their lands, it also has to be understood in a wider context (Visseren-Hamakers, Leroy, & Glasbergen, 2012). Setting aside areas for conservation leads to social and economic impacts such as agricultural benefits foregone, crop raiding from wild animals, involuntary displacement (restriction of access to natural resources without physical removal of people), and fear of hazard from wild animals (Visseren-Hamakers et al., 2012). Excluding humans from conservation territories has its roots on the ontological separation between people and nature (Bidaud et al., 2015; Visseren-Hamakers et al., 2012). PE claims the natural wilderness without humans is a construction with no empirical support since humans are implicated in the creation and modification of many ecosystems whose influence reach the most remote areas

in the planet (Bidaud et al., 2015). Scott (1985) claims that due to this separation from nature, often marginalized local people from development initiatives (such as conservation areas) in order to meet their immediate needs, they resist interventions through what he calls the “weapons of the weak” (as cited in Hansen, 2014). Weapons of the weak can be understood as informal or clandestine and includes passive non-compliance forms of resistance such as subtle sabotage and quiet evasion (Logan & Wekerle, 2008). Poaching and logging done by the local communities in the PPAs can be an example on this issue. Regarding illegal settlements, Maquipucuna’s founder said the squatters are actually land traffickers who deceive people in order to make money. In that case, I do not consider this as resistance (or weapons of the weak) from local communities to the conservation area. Social science-trained-critics and natural science-trained-advocates thus have to join forces to find a realistic balance at conservation and use of natural resources, and to address social and environmental changes they recognized as deleterious (Bennett & Dearden, 2014; Visseren-Hamakers et al., 2012).

Despite the alienation of communities from land in order to conserve nature claimed by political ecology, PPAs in this case study became a new source of jobs for some families which is a tangible link to community development (J. Langholz, 1996). The selected PPAs also work on developing meaningful links with communities, each of them to a different extent. Jatun Sancha and Maquipucuna work more actively with locals to improve livelihoods while preserving nature. As well, all selected PPAs have side activities apart from conservation to generate funds to maintain themselves (see section 5.2.5). On the basis of these facts, the thesis from PE about the notions of natural wilderness without humans that conservation agents seek to conserve (Bidaud et al., 2015) attempts to be replaced by a conservation model where humans are included.

6.2 Standing alone: struggles and dangers

In Ecuador there is not a specific legal framework for private conservation despite having a constitution where nature is given rights and private reserves are part of the SNAP. There is no definition or criteria to identify PPAs. Data of who and where they are, what and why they protect, and how they do it, does not exist. Apart from SB, Red de Bosque is the only organization that has information on PPAs, but it is limited to its members.

With no regulation to support, monitor and control the quality of protection and social outcomes, private interests between profits and ecology could clash (J. A. Langholz & J. P. Lassoie, 2001). For example, when the reserves depend on tourism, they may be tempted to provide food to wild animals nearby the accommodation areas to get the tourists to see them

or keep animals captive as a tourist attraction. The reserve might also protect only emblematic species or appealing ecosystems for tourism (J. A. Langholz & J. P. Lassoie, 2001). Other related problems also include excessive visitation, protecting only the areas around the trails and inappropriate infrastructure for conservation purposes (J. A. Langholz & J. P. Lassoie, 2001; Yu, Hendrickson, & Castillo, 1997). State monitoring and evaluation is therefore critical to maintain conservation goals. This lack of recognition and procedures for PPAs (among other factors such as insufficient State funds) hinders private conservation efforts in other ways. This is reflected in the lack of action when it comes to common threats such as illegal logging, poaching and squatter invasions (see section 5.2.6). PPAs by themselves do not have the resources or the authority to stop these conflicts in their land. That is responsibility of the environmental authority (Constitution of Ecuador, 2008)

In fact, private conservation is finally in the agenda of policy makers. The goal of the PSF is to be the best conserved system for protected areas in Latin America by the end of 2018 (MAE, 2015). One of the main objectives is to develop a legal framework to manage the SNAP. Particularly, for the three SNAP' subsystems (see section 3.2). Other objectives are to define MAE's role, allocate funds, and establish coordination and planning mechanisms. Currently, competitive funds are available for organizations and communities nearby NPAs to undertake projects with an integrated conservation and development approach - which is the case of the interpretation center (see section 5.2.7). Red de Bosques is following this process closely and constantly advocates for private conservation as a tool for protecting nature and for a legal framework that fosters it.

6.3 Broadening the conservation community: rescaling environmental governance

From my interviews, I conclude the general perception of the selected PPAs is that they stand-alone although they share the same goal as the MAE, to conserve biodiversity. I draw this conclusion based on private conservation's invisibility in the political agenda. Moreover, there is a lack of response when it comes to illegal logging, poaching and squatter invasions in their properties. Apart from the threat these problems represent for conservation, legitimate rights of private land must be also recognized (Thomas, 2014).

In that sense, Norton (2000) suggests to put emphasis on non-regulatory instruments (namely incentives that persuade rather than force) while leaving room for some regulation. This is consistent with interviewees' opinion on setting a legal framework in accordance with their rights as landowners and conservation objectives. The regulation draft was developed by Red de Bosques in collaboration with the MAE three years ago (section 5.2.7). With the PSF, it is

expected to be enacted it, but the question here is how much of the regulation draft will be actually maintained. Knight (1999, p. 224) argues that “the hard things are done on the land, with honest conversations among stakeholders and property owners. These are not the easy things, but they are the things worth doing”. PPAs’ owners and managers know their land and surroundings intimately. Therefore, scientists, decision makers, activists and donors need to work together with private landowners rather than in isolation from them (Knight, 1999; Stolton et al., 2014).

The future of private conservation in Ecuador sounds promising but has a long way to go. The legal framework needs to be developed and criteria established to recognize formally what private conservation is and how it can contribute to biodiversity conservation. Notwithstanding, developing a legal framework for private conservation from the start may be an opportunity to adopt an open dialogue to meet consensus with a wide array of actors from the four subsystems: State, private agents, communities and municipalities where conservation NGOs also play an important role as donors or advisors (Norton, 2000; Pouzols et al., 2014). Although, I did not analyze the social dimensions in detail, it is worth saying that the resulting dialogues have to incorporate social justice in their agreements and consensus for a fair enforcement (Brechin, Wilshusen, Fortwangler, & West, 2002). Therefore, it is imperative to broaden the conservation community by rescaling out environmental governance and to go further than only the State’s actions (Reed & Bruyneel, 2010). Several studies suggest that social and environmental conflicts are minimized where strong institutions are present. This includes stable entitlements, flexible and adaptive policies and incentives to promote conservation in areas of high biodiversity and strong (local) organizations to take it into practice. These conditions are central strategies for conservation initiatives (Brechin et al., 2002; Gibson, McKean, & Ostrom, 2000; Mansbridge, 2010; McKean, 1992).

7. Further Research

In this case study, I focused on PPAs’ role and their constraints such as lack of state support, illegal logging, poaching and illegal settlements. However, this study can be extended to the PPAs’ effects on human groups. Communities are diverse thus it would be interesting to find out how private property rights used to conserve nature influence different groups. These groups can be communities depending on subsistence agriculture and hunting, wealthy individuals, and communities with (or without) a cultural or religious attached to the land. Another issue to investigate is how the social capital within the PPAs network influences their own performance and policies at local or national level. Particularly, the role of Red de

Bosques in private conservation in Ecuador. Finally, private conservation can be also analyzed at national policy level and how power relations could shape the legal framework for conservation territories that is about to be developed.

8. Conclusion

Ecuador has the highest deforestation rate in South America (FRA, 2010) and the highest number of threatened mammals in Latin America (Tirira, 2011). The country is mega-diverse and most of this biodiversity is on private land (Knight, 1999; R. Mittermeier et al., 1997). Private conservation thus has a great potential as a conservation tool. Private conservation also provides an opportunity for private agents (individuals, group of individuals, NGOs and companies) to play a direct role in conserving their country's own natural resources through the acquisition and management of land. The establishment of PPAs is usually quicker than NPAs when the State's efforts are insufficient due to lack of funds, willingness or bureaucracy. Private reserves can be a great alternative when it comes to territories under imminent risk of land conversion (Stolton et al., 2014). All of the selected PPAs stopped land conversion to pastureland or agriculture either in the TCMF or the Amazon basin - areas of great biodiversity importance.

On the other hand, there are conflicts with the creation of PPAs. Some may focus on making profits at the expense of conservation goals. For instance, PPAs might be tempted to protect just emblematic species, keep animals captive or buy land only in ecosystems appealing for tourists (J. A. Langholz & J. P. Lassoie, 2001; Yu et al., 1997). Outside monitoring and evaluation thus can keep the balance between income-generating activities and conservation goals (J. A. Langholz & J. P. Lassoie, 2001). The common conflicts they face are illegal logging, poaching and illegal settlements. The PPAs constantly report these cases to the MAE even when they take place in adjacent NPAs. Nonetheless, there is a lack of support to lessen the conflicts. For example, Yakusinchí's founders were threatened with death by timber traffickers for impeding the harvest of logs and the construction of a road to transport them out of the Ilinizas National Reserve. Maquipucuna has been in a trial with land traffickers for 25 years without any verdict meanwhile the squatters keep selling Maquipucuna's land with false documents. These conflicts are exacerbated by the lack of a legal framework for recognizing, monitoring and fostering private conservation. However, it is worth highlighting that there are incentives that support private conservation indirectly such Socio Bosque, the financial sustainability project and the spectacled bear corridor.

Fortunately, private conservation is finally on the political agenda in Ecuador. PSF's aim is to have the best conserved system for protected areas in Latin America by 2018 in which PPAs are included as a subsystem. This goal is challenging, but it shows the State's willingness to protect nature through protected areas. One of the objectives is to set the legal framework for private conservation. This legal framework should provide a roadmap for decisions makers to create incentives, procedures, rights and obligations for private conservation. It also needs to include different actors with different approaches to conservation. It is vital also to take into account human groups and how conservation territories will change their livelihoods as clearly one of the interviewees stated "*there is no conservation without involving the communities*" (3a). Social and natural scientists have to join forces to find a balance between conservation and the use of natural resources.

I conclude from my data and in agreement with previous studies that the selected PPAs contribute to biodiversity conservation as a supplement to State's efforts. They can expand and connect conservation areas or protect individual habitats, but they cannot operate in isolation. The State thus should develop incentive programs targeting areas with these characteristics to foster biodiversity conservation. At the same time, PPAs will contribute to national conservation goals such as objective 7 in the National Plan for Good Living, which is to increase conservation territories from 19% to 35.9%. It is therefore imperative to widen the conservation community by rescaling out environmental governance and to go further than State's actions (Reed & Bruyneel, 2010).

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10. Appendix

I . Interview Guide

General information

Name of the interviewee:

Position in the reserve:

Name of the PPA:

Location:

Ecosystem:

Ha:

Limits:

Owner:

Private conservation: concept and strategies

1. Definition of private conservation
2. Conservation knowledge
 - a. Hints: self-taught, experience, academia, local (international) institutions
3. Conservation strategy
 - a. What/Why do you conserve?
 - b. Do you work in cooperation?
 - i. Hints: State, NGOs, universities, other PPAs, local institutions, Red de Bosques
4. Scientific research in the reserve
5. Do you keep records of flora and fauna?

Reserve Management

6. Why did you decide to have a private reserve?
7. Why did you choose this area for the reserve? How did you buy it?
8. How do you describe the management of the reserve?
 - a. Hints: Objectives, mission, vision
Short-term, mid-term, long term objectives
9. Do you carry out any other activity beside conservation?
 - a. If Yes, What kind of activities? What are the reasons (hint: profits)?
 - b. If no, why?
10. What is your relation with the communities?
 - a. Hints: conflicts, community projects.

Legal framework, policies and incentives

11. Did you experience any obstacles that could have stopped the creation of the reserve?
12. Do you consider there are conflicts/obstacles undermining your conservation efforts?
Hints:
 - a. Communities
 - b. State
 - c. Pollution (nearby)
 - d. Financial resources
13. What is your opinion about the legal framework for private conservation in Ecuador?
Hints:
 - a. Hints: enhance conservation?
 - b. Would you change/add something? How would you improve it?
 - c. Desired incentives
 - d. Buen Vivir
14. Do you know any state conservation program?
Hints:
 - a. Socio Bosque, PSF
 - b. If yes, why did (not) you join?