REFORESTATION WITH NATIVE SPECIES IN THE PACHIJAL AND MIRA RIVER WATERSHEDS FOR CARBON RETENTION

With technical support from

Brian Krohnke, Mindo Cloudforest Foundation

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Great thanks to Tiny Footprint Coffee, the first funders to begin neutralizing their emissions with us.

Many thanks to the Flemish Government for supporting the preliminary work within the framework of the Flemish Fund for Tropical Forests.

1 PROJECT DETAILS

1.1 Summary Description of the Project

This proposed project activity groups together 16 private landowners to reforest 383 hectares of degraded grasslands in the Río Pachijal and Río Mira watersheds in Pichincha and Imbabura provinces of Ecuador, respectively. In the broadest sense, the project is divided into 5 strata, 3 in Pichincha province with generally more favorable, wetter environmental conditions and 2 in Imbabura province with generally more degraded, eroded and dry conditions. These disparate environmental realities are also characterized by greater biotic wealth and diversity in strata 1-3 (Pichincha) contrasted with species absence in strata 4-5 (Imbabura).

So, while the project's geographical range does present some operational challenges, it also affords several unique opportunities to compare and contrast biodiversity recuperation as a result of the project's reforestation efforts. As project proponent, Mindo Cloudforest Foundation, is a group with great expertise in the Ecuadorian avifauna[1], and bird populations are widely used as indicators of habitat health, project will monitor the recuperation of bird species diversity, especially within the project boundary in strata 4-5 as compared to that found in strata 1-3. As a rough baseline, current lists of bird species found on project lands vary radically from the strata located in the Mira watershed with 50 species, and the geographically similar areas with more intact forests near the Pachijal which have over 250 species (Pers. Com. Paul Greenfield, published bird lists and field observations).

Among this project's major goals is obtaining both VCS and CCBA validation to be able to demonstrate our carbon, community and biodiversity claims objectively. To that end, in **Annex 1 "CCB Compliance Key"**, we annotate how this project meets each of the 14 required CCB criteria, and also how we propose meeting optional standard GL3 of the CCB to achieve Gold Standard status. In the monitoring section, along with the GHG monitoring plan, we outline the basic monitoring scheme for the community and biodiversity impacts, and as permitted by the CCB standards, commit to developing and submitting a full monitoring plan for this within six months of project start date.

While the project lands in the two provinces are divergent ecologically, the Pachijal and Mira watersheds conform parts of two parallel altitudinal transects running between six Birdlife International designated Important Bird Areas (IBAs) in Northwestern Ecuador:[2]

Pichincha Province	**Imbabura and Carchi Province**
Caoní River (EC040)	Awa Ethnic Territory and Surroundings (IBA EC002)
Los Bancos – Milpe (EC041)	Cotacachi – Cayapas Ecological Reserve (IBA EC037)
Mindo and the Flanks of Pichincha (EC043)	El Angel – Cerro Golondrinas (IBA EC036)

[1] "La Estrategia Nacional para el Manejo y el Desarrollo Sostenible de Aviturismo en el Ecuador", copyright MCF and CORPEI, 2006, and the "Actualización de la Estrategia Nacional de Avitourism, 2010", author MCF. Both documents published by the Ecuadorian Ministry of Tourism. And, founding member Paul Greenfield is co-author of The Birds of Ecuador, Cornell University Press, Ithaca. Copyright © 2001 by Robert Ridgely and Paul Greenfield.

[2] *Áreas Importantes para la Conservación de las Aves en los Andes Tropicales*, BirdLife International, 2005.

Seen otherwise, these transects also connect the Tropical Andes and Tumbes-Chocó-Magdalena biodiversity "Hotspots" as characterized by Conservation International.[3] In restoring and protecting bird habitat in this highly diverse region of this mega-diverse country this project meets the Vulnerability Criteria of optional standard GL3 of the CCB. The project boundary and immediately adjacent lands provide habitat to 12 IUCN Red List Vulnerable and 3 IUCN Red List Endangered bird species. See **Annex 2** for a species list that includes these High Conservation Values and 58 other endemic bird species.

The main purposes of the proposed project activity are as follows:

- To mitigate global warming by planting trees for sequestration of GHGs;
- To voluntarily neutralize the GHG emissions of project sponsors;
- To convert marginal and degraded grasslands into valuable bird habitat;
- To increase income, provide employment opportunities, and as a result to help alleviate poverty in rural communities.

Project structure has been adopted owing to stakeholder comments and Mindo Cloudforest Foundation´s years of experience in the area. There is an ever growing environmental consciousness in the population, but reforestation is generally seen as a luxury pursuit or limited to forestry companies that can project their need for economic returns over longer periods. The only way the project participants can afford to reforest is via carbon financing which will permit all project activities including third-party monitoring and help to cover other unavoidable property management costs. While the different stages of this project have been in development since 2008, with confirmation of project funding in 2010 and 2011, work for project implementation has begun.

In Pichincha Province, Cantons Quito, San Miguel de Los Bancos and Pedro Vicente Maldonado: Project strata 1-3 are made up of 30+ year old grasslands near to areas of eco-tourism development and will constitute buffer habitat to Protected Forests and private forest reserves. Clearing of these lands by early colonists was exacerbated by the Ecuadorian Agrarian Reform Laws of the late 1960s which required the deforestation "improvement" of 50% of a given parcel for newcomers to obtain land title. Since forest clearing soils have lost their original fertility and in many cases are now compacted and eroded due to grazing pressure and the effects of the non-native grasses planted on them, principally 'Pasto Miel' (Setaria sphacelata), above 900 meters altitude & Panicum maximun Jacq, called 'Saboya', in the lower foothills.

Picture 1

[3] http://www.conservation.org/explore/south_america/ecuador/pages/ecuador.aspx

Picture 2

Picture 1shows a patch of 'Kikuyo' (Pennisetum clandestinum). Project strata in this area are characterized by high average annual rainfall (2000-4000 mm), extreme topographical relief and shallow top-soils, and are not sustainable for long-term cattle ranching. As in the above photograph taken at project participant Grecia Flores´ property, each of these farms do have select flat areas where soils and grasses remain in decent condition, however the majority of these lands are steep and more akin to Picture 2 also taken at Grecia Flores´ property.

Project strata 1-3 are all adjacent to native forest remnants and have been selected following landowner wishes and zoning of their properties. Plant species have been selected in accordance with the various microclimates of the different parcels, relative soil degradation, and other local factors. Tree species are > 90% native, and in the case of the two adjacent properties that make up stratum 3, 100% native and produced on site from local seed sources. In strata 1-2 the exception to this native species rule will be the use of Alnus nepalense as less than 9% of project trees in these strata and less than 3% of total project trees.

Stratum 3 deserves special mention in regard to project biodiversity claims to meet optional standard GL3 of the CCB standards. Rancho Suamox and Mindo Cloudforest Foundation's Rio Silanche Bird Sanctuary are neighbors and with the reforestation of Rancho Suamox the two properties will nearly create a forest corridor between the Caoní and Silanche Rivers, all within the Birdlife International designated Rio Caoní Important Bird Area (IBA EC040). Project developer together with the owners of Rancho Suamox and Puerto Quito Municipal Councilman Edwin Bustamante, have created a project profile to complete and protect this future forest corridor, and have begun efforts to locate funding for implementing this project. Project profile is located in **Annex 3** to current document.

Both in Pichincha and Imbabura, project will plant a total of more than 45 native species, with the aim always to maximize diversity. The following list compiles tree species to be planted in the different strata. In PDD section 1.8 Project Description this is treated again in more detail by stratum:

1	Annona purpúrea	18	Machura tinctoria	35	Cedrela montana
2	Bactris gasipaes	19	Sysygium malaccense	36	Cedrela odorata
3	Gliricidia sepium	20	Triplaris cuminngiana	37	Jacaranda copaiba
4	Iriiartea deltoida	21	Borojoa patinoi	38	acacia macracantha
5	Cordia allidora	22	Chysophyllum caimit(	39	Juglans neotropica
6	Brownea hertae	23	Trema micrantha	40	Caesalpinia spinosa
7	Cecropia sp. (>3)	24	Trema integérrima	41	Shinus Molle
10	Mamea Americana	25	Carapa guianensis	42	Tecoma stans
11	Vismia obtusa	26	Ochroma pyramidale	43	Erythrina poepigiana
12	Hyeroina chocoensis	27	Symphonia globulifer:	44	Simarouba amara
13	Inga sp. (>3)	28	Croton lecheri	45	Anacardium excelsa
16	Brosimum utile	29	Clusia crenata		
17	Castilla elastica	30	Melastomatacea sp (>5)		

In Imbabura Province, Canton Ibarra: The project area covers a transitional zone running from Salinas parish in the inter-Andean valley at ca. 1750 meters altitude to La Carolina parish on the sub-tropical western slopes of the Andes around 900 meters and is made up of two strata, one in each parish. Salinas, dry pre-montane forest, has average rainfall between (500-1000 mm), and La Carolina parish between dry pre-montane forest and wet tropical forest receives some 1500 mm average rainfall (Cantonal Development Plan Municipality of Ibarra, May 2006 Ch. 1.2)[4].

Picture 3

In Salinas there has been intensive agriculture and deforestation since colonial times while in La Carolina early deforestation was accelerated and compounded after greater homesteading following the Ecuadorian Agrarian Reform Laws of the late 1960s (see above). Especially around the settlement San Gerónimo in La Carolina parish, deforestation has been extreme or near complete with pioneering balsa trees or the occasional palm being some of the only things standing (Picture 3). This situation is aggravated by the cultural practice of burning off grasses and scrub to 'improve' soil fertility and to 'call the rains' as is believed by many area residents (Pers. Com. Peter Ramos, school teacher, San Gerónimo, 2009 shown in Picture 4, and Environmental Plan Canton Ibarra, 2006, Ch. 1.1.)

Picture 4

[4] *Plan de Desarrollo Cantón Ibarra: Ambiente, 2006.*

Project will use all native trees selected due to various factors including ease of reproduction, growth rates, resistance to fire and wind and participating landowners´ desires as expressed during planning stage of this project.—The exception to this rule will be windbreaks created with casuarinas (Casuarina equisetifolia) as 40% of trees in stratum 4 Salinas (11% project total).; chosen for their rapid growth, local availability and their ability to grow in and dominate the aggressive, non-native grasses found in project area.

Project will also use various native species that will provide economic incentives to project participants: Guabo (*Inga spectabilis),* Guayaba (*Psidium guajava) and Guarango or Tara* (Caesalpinia spinosa). Harvest of forest products from these plants will provide tangible economic returns for participants and create demand for local labor. Guabos and guayabas are common throughout the neo-tropics but Tara tannins are less-well known. This product has unmet demand on the international market for dyeing leather and other applications in the wine industry, etc., and local company Puyaburo S.A. has installed the necessary processing machinery in Ibarra, Imbabura. Representatives of Puyaburo S.A. have indicated that as of August, 2009, they had exported one 20 foot shipping container to a client in Europe and that their main barrier to growth is greater supply of raw material. This bean can be harvested without affecting tree growth or otherwise reducing sequestered carbon in project areas. (Pers. Com. Dr. Rodolfo Chacón, 2009-2011 and Ramiro Chacón, 2010).

1.2 Sectoral Scope and Project Type

Sectoral Scope 14: Agriculture Forestry and Other Land Use.
Project Type: Afforestation, Reforestation and Revegetation (ARR).
Pursuant definitions in VCS Standard: VCS Version 3, section 3.4, this is a grouped project.

1.3 Project Proponent

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1.4 Other Entities Involved in the Project

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1.5 Project Start Date

November 1st, 2011

1.6 Project Crediting Period

20 year crediting period beginning November 1st, 2011 and ending October 31th, 2031 and minimum 10 year renewal with landowners.

1.7 Project Scale and Estimated GHG Emission Reductions or Removals

Project	X
Mega-project	

Years	Estimated GHG emission reductions or removals (tCO2e)
2011	0.00
2012	1684.32
2013	3378.52
2014	5072.71
2015	6766.91
2016	7614.01
2017	8461.11
2018	8461.11
2019	9308.21

2020	9308.21
2021	9731.76
2022	9731.76
2023	9816.47
2024	9816.47
2025	9985.89
2026	10155.31
2027	9985.89
2028	9985.89
2029	9985.89
2030	9985.89
2031	9985.89
Total estimated ERs	**169222**
Total number of crediting years	**20**
Average annual ERs	**8461**

1.8 Description of the Project Activity

Project involves the planting of native tree species on 383 hectares of unproductive and degraded grasslands on 16 discrete properties in 4 cantons in 2 provinces: Cantons Quito, San Miguel de Los Bancos and Pedro Vicente Maldonado in Pichincha Province and Canton Ibarra in Imbabura.

The establishment of native forests on current grasslands will capture atmospheric CO_2 creating net GHG removals by sinks. The 20 year crediting period will also be augmented as most participants plan to manage their forests for habitat conservation on a permanent basis.

In the 5 strata identified, *ex ante*, there will be many similarities in planting techniques but also many differences as each individual case requires. The similarities include:

- Native species trees from local, private nurseries; [5]
- Planting on contour lines;
- 25 cm 25 cm x 30 plant hole with 50 cm X 50 cm plant crown;
- Use of 250 g of organic fertilizer in each planting hole;
- 1,000 project trees per hectare;
- Where project spacing coincides with existing tree, a 1.5 meter buffer will be given to existing tree to permit accurate baseline calculation and successful monitoring: In accordance with Annex 16 “GUIDANCE ON CONDITIONS UNDER WHICH THE CHANGE IN CARBON STOCKS IN EXISTING LIVE WOODY VEGETATION ARE INSIGNIFICANT.

[5] More complete species lists are included as Annex 4 to the current document. As acquiring seed and saplings for some native tree species is difficult, some deviation from the list and stated percentages of species is expected.

- Local work crews hired temporarily for site preparation and planting with a remainder crew hired full-time for 2 plus years of plantation maintenance to guarantee the successful establishment of trees;
- 25% mortality calculation for replanting in the second year.

The differences or individual characteristics of each stratum will be discussed separately beginning with **Stratum 1** in Santa Rosa de Mindo, where the properties are of project director Brian Krohnke, Grecia Flores and Marcelo Vásconez, total 51 hectares. This is the highest elevation stratum between 2,000-2,250 meters, and the species that will be planted here are: *Alnus nepalense, Inga Sp, Croton lecheri, Clusia crenata, Carapa guianensis*, various *Melastomatacea sp*, *Cedrela montana* and several other hardwoods depending on seed availability on a 3m X 3m grid. Seeds are being collected from forests adjacent to the project boundary with the exception of the exotic Alnus which is being sourced in nearby Intag valley of Imbabura province where it has been present and shown to be non-invasive for more than 20 years.

Stratum 2 of Ramiro Salazar, Pietro Salvestroni and La Yumbada S.A. will use essentially the same plant species as Stratum 1, but is located slightly lower in altitude and should have better growth rates with its 57 hectares at ca. 1,700-1,900 meters.

The saplings for **Stratum 3** of Rafael Ferro and Giovanni Vallejo will be produced in temporary nurseries on site from local seed sources. Forestry strategy will include the use of many pioneer species that help dominate the grass, create shade and a forest soil as quickly as possible. At 350-400 meters altitude this happens in a matter of only a few years. fast. Along with *Carapa guianensis*, various *Melastomatacea sp, Inga Sp, Swietenia macrophylla* plantation will include *Virola dixonii o Virola sp* (Caracha Coco), *Tabebuia crysantha* (Guayacán), *Symphonia globulifera* (Azufre), *Gliricidia sepium* and local favorites Sapán de Paloma, Uvita de Monte, Clavellín.

Stratum 4, the properties of the three Enríquez sisters in Salinas parish, is radically different ecologically, but will also employ *Inga sp* as well as *Shinus molle*, *Acacia macracantha, Cedrela montana*, *Juglans neotropica* (Nogal), *Psidium guajava* (Guayabo), *Caesalpinia spinosa* (Guarango or Tara), *Tecoma stans* and windbreaks every 25 meters with *Casuarina equisetifolia* at 1 meter distance between plants. This use of casuarina is one of two uses of exotic species by the project, and casuarinas have been present in Salinas for decades and have shown themselves highly useful in creating windbreaks and growing to great size, helping to create favorable micro-climates and to establish the rest of the plantation, capturing atmospheric CO_2 at the same time.

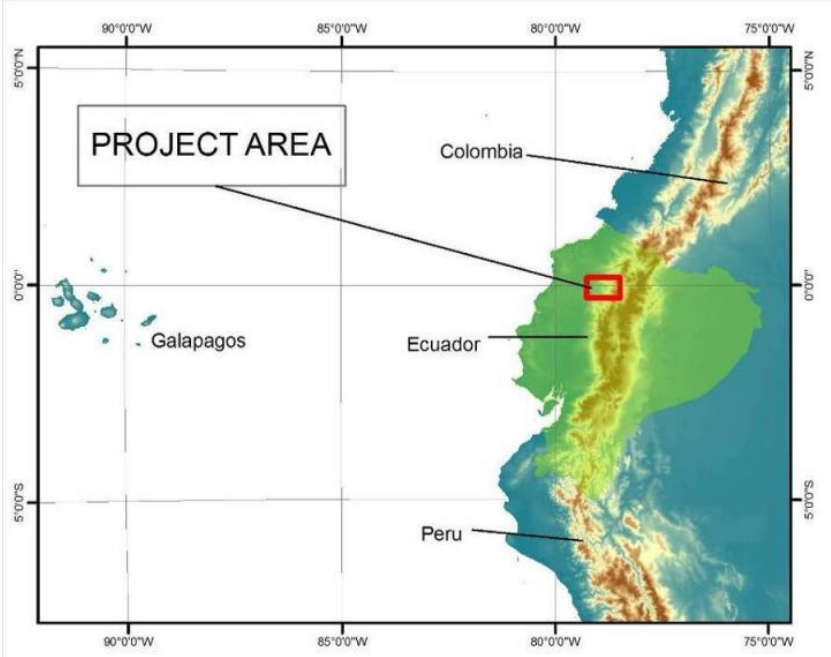
This seasonally arid stratum will also require the use of humidity retaining gels and drip irrigation. Project proponent is currently designing the irrigation system with help of a local expert. In essence, project monies not invested in grass clearing and maintaining plant-crowns will be invested in watering project plants.

Stratum 5, San Gerónimo and surrounding areas in La Carolina parish at 900-1200 meters altitude will be planted with *Inga sp, Shinus molle, Cordia alliodora, Cedrela montana & odorata, Psidium guajava*, *Gliricidia sepium, Samanea Saman, Jacaranda copaiba, Anacardia excelsa* and *Simarouba amara*. This stratum while very wet in winter or rainy-season months, usually has a prolonged and windy dry-season, and humidity retaining polymer gels will also be employed. This grassland will not be cleared but only the area sufficient for plant crowns and their maintenance. Five meter wide firebreaks will be created at plantation borders and community outreach will include Municipality, Parish Board (Junta Parroquial) local fire department, special anti-narcotics police and Ministry of Environment officials to get true community support for this project that will change the face of the community.

Picture 5

It's important to mention that in 2009 a new fire station was built in San Gerónimo, and it began to operate in 2010. Local residents report that there has been only very limited burning of grasslands in the last couple years contrasting with earlier experience and contrasting greatly with grasslands in neighboring Carchi province where extensive burns are still common during dry months. Picture 4 of Peter Ramos on page 8 shows hillsides in Carchi burning while Peter is standing next to the public school in San Gerónimo. This reduction in the use of fire demonstrates a moment of social change and also represents an opportunity for this project.

1.9 Project Location



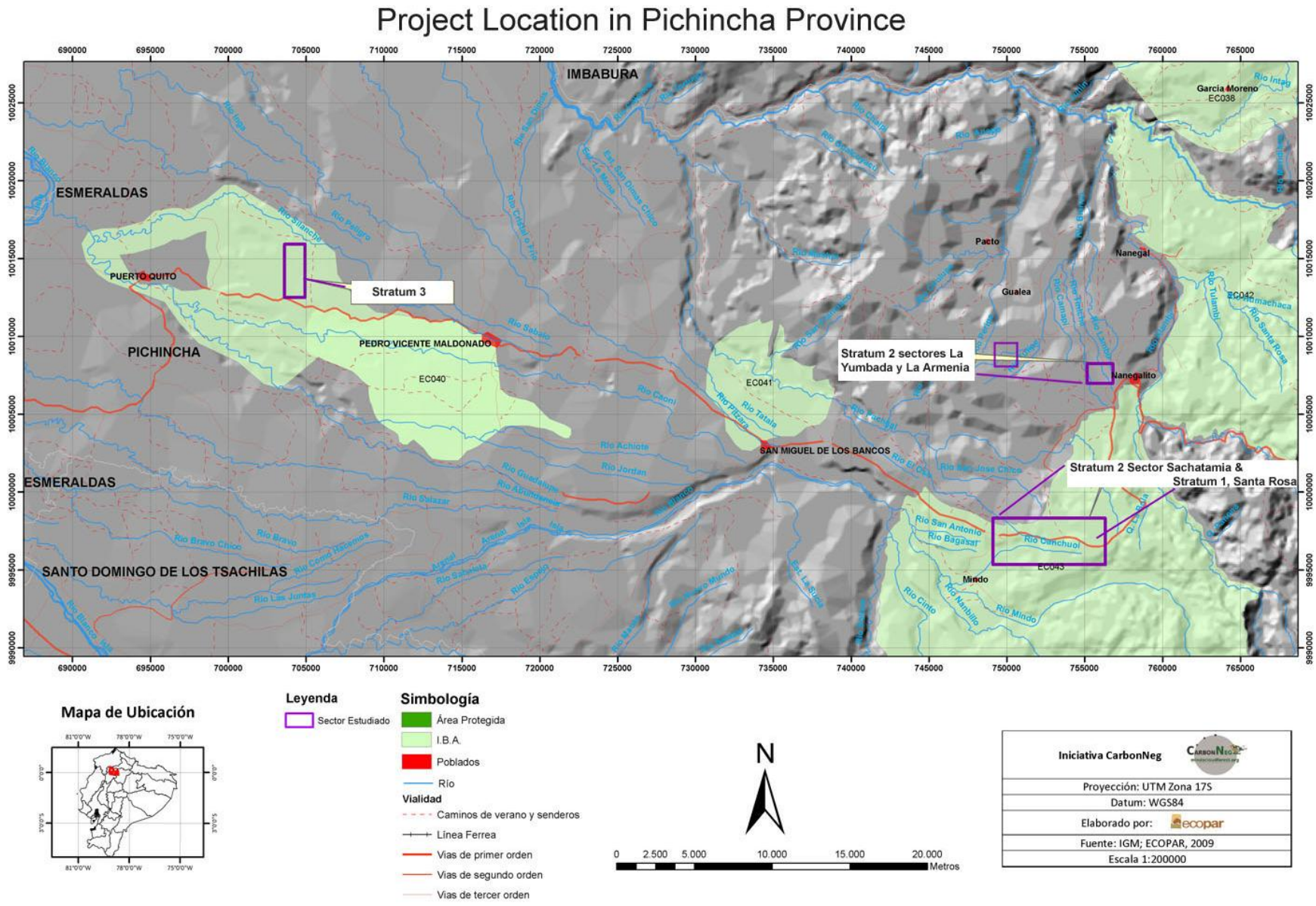
Map 1

Project areas are shown on a larger scale on following pages with their respective Important Bird Areas represented in green. Note that the IBAs are approximate as they have undergone various revisions since 2009, and in some cases, like the IBA Río Caoní, discussions are still being carried out with the Municipality of Puerto Quito and other interested parties (Com. Per. Tatiana Santander, Aves y Conservación, Ecuador).

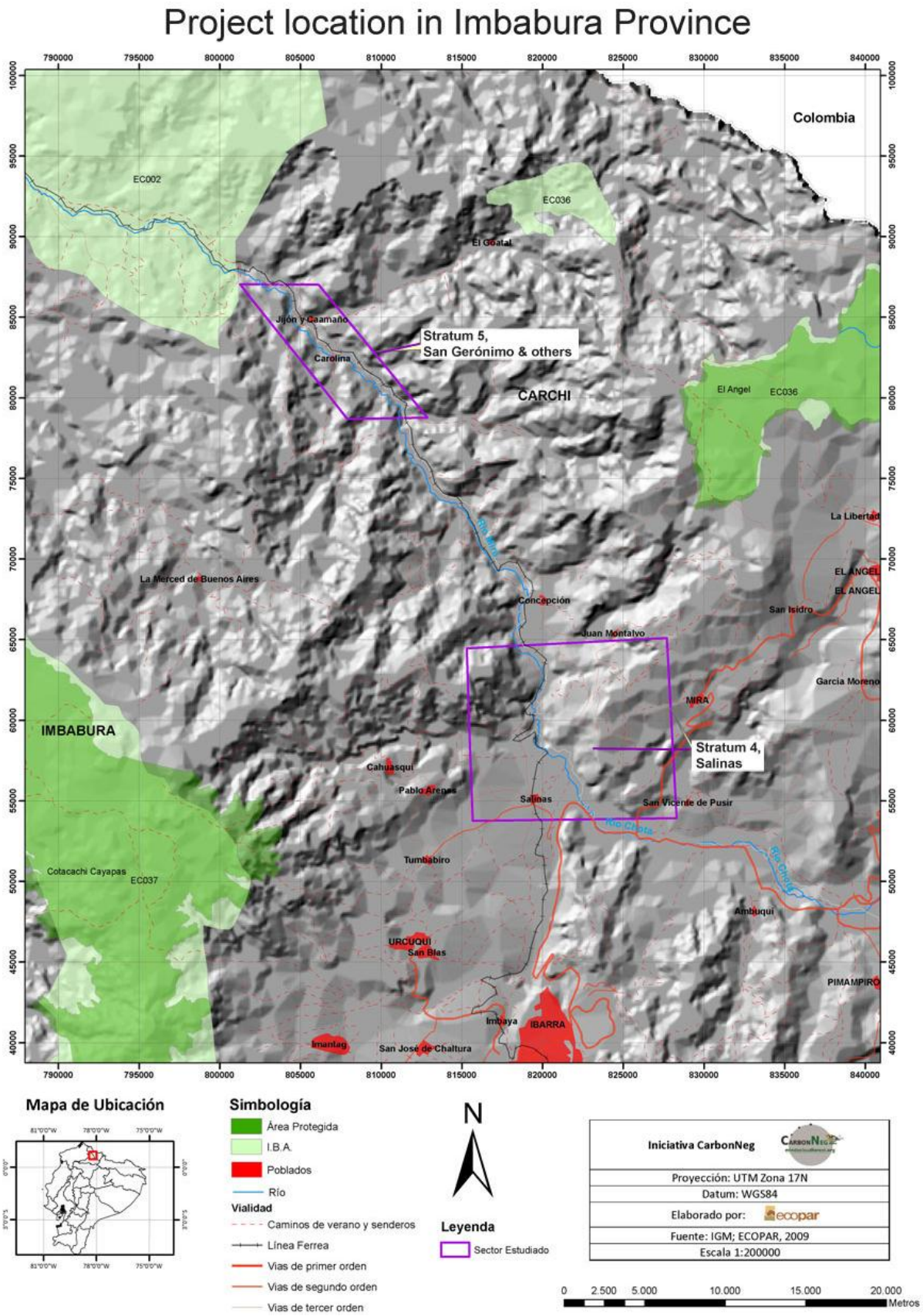
Generally, **Pichincha province** straddles the equator and both the Eastern and Western cordilleras of the Andes. All project lands in Pichincha are on the Western slope of the Andes. As shown in Map 2. Pichincha is also home to Quito, the capital of Ecuador.

Imbabura province is immediately adjacent to Pichincha going north. All project lands in Imbabura are either at the Western edge of the Inter-Andean valley or on the Western slope of the Andes.

Map 2


Project Location in Pichincha Province
IMBABURA
ESMERALDAS
PUERTO QUITO
PICHINCHA
ESMERALDAS
SANTO DOMINGO DE LOS TSACHILAS
Stratum 3
PEDRO VICENTE MALDONADO
EC040
EC041
SAN MIGUEL DE LOS BANCOS
Stratum 2 sectores La Yumbada y La Armenia
Nanegalito
Pacto
Nanegal
Gualea
Garcia Moreno
EC038
EC042
Stratum 2 Sector Sachatamia & Stratum 1, Santa Rosa
EC043
Mindo
Mapa de Ubicación
Leyenda
Sector Estudiado
Simbología
Área Protegida
I.B.A.
Poblados
Río
Vialidad
Caminos de verano y senderos
Línea Ferrea
Vias de primer orden
Vias de segundo orden
Vias de tercer orden
N
0 2.500 5.000 10.000 15.000 20.000
Metros
Iniciativa CarbonNeg
Proyección: UTM Zona 17S
Datum: WGS84
Elaborado por: ecopar
Fuente: IGM; ECOPAR, 2009
Escala 1:200000

Map 3


Project location in Imbabura Province
Colombia
EC002
EC036
El Goatal
Jijón y Caamaño
Carolina
Stratum 5,
San Gerónimo & others
CARCHI
El Angel
EC036
La Libertad
La Merced de Buenos Aires
EL ANGEL
EL ANGEL
San Isidro
Concepción
Juan Montalvo
Garcia Moreno
MIRA
IMBABURA
Stratum 4,
Salinas
Cahuasqui
Pablo Arenas
Salinas
San Vicente de Pusir
Río Chota
Río Chota
Tumbabiro
Cotacachi Cayapas
EC037
Ambuquí
URCUQUI
San Blas
PIMAMPIRO
Imbaya
IBARRA
Imantag
San Jose de Chaltura
790000
795000
800000
805000
810000
815000
820000
825000
830000
835000
840000
100000
95000
90000
85000
80000
75000
70000
65000
60000
55000
50000
45000
40000
Mapa de Ubicación
Simbología
Área Protegida
I.B.A.
Poblados
Río
Vialidad
Caminos de verano y senderos
Línea Ferrea
Vias de primer orden
Vias de segundo orden
Vias de tercer orden
N
Leyenda
Sector Estudiado
Iniciativa CarbonNeg
Proyección: UTM Zona 17N
Datum: WGS84
Elaborado por: ecopar
Fuente: IGM; ECOPAR, 2009
Escala 1:200000
0 2.500 5.000 10.000 15.000 20.000
Metros

Map 4

1.10 Conditions Prior to Project Initiation

Project Lands in Pichincha Province

As summarized in section 1.1 of this PDD, this region holds extraordinary avian diversity, and the project activity will take place in and around Important Bird Areas that meet objective criteria established by Birdlife International. Bird lists of the 500+ species found in the project area can be downloaded at www.mindocloudforest.org. Remarkably enough, these lists were compiled from sightings at only two properties in the area, the Milpe and Río Silanche Bird Santuaries owned by MCF. Of particular conservation relevance it can be mentioned that these lists contain: 72 endemic; 12 vulnerable; and 3 endangered species as categorized by Birdlife International and the IUCN. This impressive avifauna is but one example of the extremely high biodiversity found in the project area, and more reference material is available on the vascular plants, insects and other biota. However, project proponent has chosen to focus on the well known and representative avifauna as an indicator of the area's overall biological wealth. Different suites of bird species and their frequency in different areas serve as indicators of a habitat's relative well-being. The project monitoring plan described in chapter 4 will quantify bird species present in the project boundary over time and contribute to scientific understanding of the relation between bird populations and habitat quality. Annex 2 contains a list of the birds of particular conservation relevance.[6]

Picture 6

The great avian wealth and generally high biodiversity of this area of Pichincha does not mean that there are not also environmental problems such as the expansion of the agricultural frontier and fracturing of forest corridors. As shown in multi-temporal maps in section 2.3 Project

[6] This photo of the endemic and extremely odd Club-winged Manakin (*Machaeropterus deliciosus*) taken by Nick Athanas in 2009 at the Milpe Bird Sanctuary, HQ of Mindo Cloudforest Foundation. In a fortuitous example of sexual-selection driven convergent evolution, this bird slaps and rubs its wings together to chirp like a cricket!

Boundary, the area is characterized by the consolidation of grasslands in some zones and forest re-growth in others. However, it must be kept in mind that the current colonization of the area has occurred in only the last 50 years, and has accelerated greatly since the completion of the paved Calacalí-La Independencia highway in the 1980s. While the avifauna populations are still relatively healthy and investment in tourism and conservation is growing, so is anthropogenic pressure on all natural resources. More worrisome even still, the Ecuadorian government has recently announced the creation and sale of new mining concessions in the region , and it is simple common sense to realize that new large scale mining in the region can only have negative impacts on bird populations and forest integrity.[7]

In the Pichincha portion of the project we find essentially three forest types: Montane cloud forest, Pre-montane evergreen forest and Coastal foothills evergreen forest and these are described as following in descending altitudinal order and also in agreement with project strata 1-3.

Stratum 1: Montane cloud forest: Altitude: 1800 – 3000 meters; average rainfall above 2000 mm; average temperature 15-17 °C;[8] Canopy height between 20-25 meters; No drought occurrence although some years can be considerably drier than others; No flood occurrence due to pronounced topography of area; No frost occurrence; Damaging winds occasional during storms but no tornados or hurricanes. The forests of Santa Rosa de Mindo, our stratum 1 are the best places in the world to find the rare and IUCN Red List Vulnerable Tanager Finch (Oreothraupis arremonops).

Picture 7

Trees are covered with abundant epiphytic mosses, orchids, bromeliads and ferns. Bamboo species are also numerous. Characteristic flora include: *Bomarea* spp. (Amaryllidaceae): *Anthurium mindense*, A. *gualeanum*, A. *nanegalense*, A. *clorugatum* and A. sp. (Araceae); *Blechnum monomorphum* (Blechnaceae); *Begonia* sp. (Begoniaceae); *Agnus acuminata* (Betulaceae); *Brunelia tomentosa* and B. sp. (Brunelliaceae); *Cecropia maxima* (Cecropiaceae) *Weinmania pinnata* (Cunoniaceae); *Cyathea caracasana* (Cyatheaceae); *Dennstaedtia tryoniana* (Dennstaedtiaceae); *Escallonia paniculada* (Escalloniaceae); *Gunnera brepoghea* and G. colombiana (Gunneraceae); *Boconia integrifolia* (Papaveraceae); *Piper carpunya*, P. *sodiro*i and P.sp., *Peperomia* sp. (Piperaceae). *Palicourea* sp. (Rubiaceae); *Nectandra* sp. (Lauraceae); *Miconia corazonica*, M. *creocea*, M. *theazans* and M.sp., *Brachyotum ledifolium* (Melastomataceae); *Cedrela montana* (Meliaceae); *Siparuna guajalitensis* and S. sp. (Monimiaceae); *Myrcianthes allí* and M. sp. (Myrtaceae) *Fuchsia pilalensis* and F.sp.

[7] http://www.elcomercio.com/negocios/contratos-mineros-agosto_0_521348014.html#
[8] Plan de Manejo del Bosque Protector Tandayapa-San Tadeo p. 17

(Onagraceae); numerous species of *Orchidaceae*; *Pasiflora mixta*, P. *alnifolia* and P. coactilis (Passifloraceae); *Chasquea scandens* y Ch.sp. (Poaceae); *Elaegia utilis* (Rubiaceae); *Freziera verrucosa* and *F*.sp. (Theaceae); *Aegiphila* sp. (Verbenaceae).

Stratum 2: Pre-montane evergreen forest: Altitude: 1300 - 1800 meters; Canopy height between 20-25 meters; average rainfall above 2000 millimeters; average temperature 17-18 °C; No drought occurrence although some years can be considerably drier than others; No flood occurrence due to pronounced topography of area; No frost occurrence; Damaging winds occasional during storms but no tornados or hurricanes.

Picture 8

The Sachatamia property of Ramiro Salazar has a lek of the Long-wattled Umbrellabird (*Cephalopterus penduliger*), also an IUCN Red List Vulnerable species.

As compared to the coastal lowlands, woody vines diminish both in number of species and individuals while epiphytic plant life becomes more abundant. Characteristic flora: *Anthurium ovatifolium*, *A*.sp. (Araceae); *Cerowylon alpinum*, *Socratea exhorriza* (Arecaceae); *Buddleja americana* (Budlejaceae); *Cecropia bullata, C. monostachya* and *C* .sp. (Cecropiaceae); *Cyathea* sp. (Cyatheaceae); *Heliconia* sp. (Heliconiaceae); *Nectandra menbranacea* (Lauráceas); *Carapa guianensis* (Meliaceae); *Siparuna guajalitensis*, *S.eggersii, S.laurifolia* S.sp. (Monimiaceae); *Fucsia macrostigma* (Onagraceae); *Pipe*r sp. (Piperaceae); hemi-epiphytic species of *Picus* sp. (Moraceae).

Stratum 3: Coastal foothills evergreen forest: Altitude: 300 - 1300 meters; Canopy height 30 or more meters; average rainfall greater than 2000 millimeters; average temperature 25 °C;[9] No drought occurrence although some years can be considerably drier than others; No flood occurrence due to pronounced topography of area; No frost occurrence; Damaging winds occasional during storms but no tornados or hurricanes.

Picture 9

The Chocó endemic Guayaquil Woodpecker (*Campephilus guayaquilensis*) taken by Sam Woods near Rafael Ferro´s Rancho Suamox.

Arboreal species predominate, especially palms, and herbaceous coverage is dense. Orchids, ferns, bromeliads and aroids are common on tree trunks. Characteristic flora: Palms: *Wettinia quinaria, Pholidostachys dactyloides, Iriartea deltoidea* (Arecaceae); *Virola dixonii, Otoba gordoniifolia*

[9] Caracterización Cantonal y Parroquial, Gobierno Provincial de Pichincha pdf p. 166 and Estudio Exploratorio: “Problemática y Conflictos sobre los Recursos Hídricos por efectos del cambio Climático” (Senagua_capt-2_eje recursos hdricos.pdf p. 2.7)

(Myristicaceae); *Guarea cartaguenya* (Meliaceae), *Protium ocidentalis* (Burseraceae); *Vitex gigantea* (Verbenaceae); *Caryodaphnopsis theobromifolia* (Lauraceae); *Swartzia haughtii* (Fabaceae). Among herbaceous species: *Irbachia alata* (Gentianaceae); *Begonia glabra* (Begoniaceae) and *Costus lavéis* (Costaceae).

Project Lands in Imbabura Province

As stated in section **1.1** this area is part of an altitudinal transect running between three Birdlife International designated Important Bird Areas (IBAs) in Northwestern Ecuador: Awa Ethnic Territory and Surroundings (IBA EC002); Cotacachi – Cayapas Ecological Reserve (IBA EC037); and El Angel – Cerro Golondrinas (IBA EC036). Seen otherwise, this transect follows the Mira river watershed which forms the northwest corner of Ecuador. However, the specific project area has been affected by intense deforestation and depredation of wildlife since the mid 1900s and a current list of bird species on project lands is 50 species. It is a stated goal of several project participants to once again see on their lands some of the bird and other animal life they remember from their youth.

Stratum 4: Salinas found at the upper end of the altitudinal transect, ca. 1750 meters, is Dry Forest with annual average precipitation between 500-1000 millimeters.[10] Andesitic soils in Salinas are easily eroded, fine, fragile and superficial, however they are quite fertile when well cultivated and provide excellent drainage.[11] However reality shows that the majority of soils has been exhausted because of not having applied good land management practices in the past. The typical vegetation found in the area includes *Acacia macracanta, Shinus molle, Tecoma stans, Cassi sp., Caesalpinia spinosa, Juglans neotropical, Jacaranda copaia, Cassia tormentosa, Dodonea visosa, Sida sp.,* and the dominant scrubland grass *Melinis minutiflora*, and commonly *Gynerium sagittatum* near streams and other wet areas.

Stratum 5: San Gerónimo in La Carolina parish is lower in elevation, 900-1300 meters and enjoys higher average temperatures and annual rainfall around 1500 millimeters. This is a severely deforested area that once had habitat somewhere on a line between Coastal foothills evergreen forest and Pre-montane evergreen forest and shared more ecological similarities with the Very Wet pre-Montane Forests twenty kilometers and 400 meters altitude further down the road in Lita. In essence, this area is a transitional zone between the dry Interandean valley and tropical rainforest, a man made seasonally dry grassland, or as commented by project developer, “like a sub-tropical paramo”, an ecological oxymoron.

The typical vegetation in this stratum shares much with that of Salinas, but includes Wet Forest species such as *Cordia alliodora* and pioneers like *Ochroma pyramidale* and a greater number of epiphytic plants, orchids, bromelias and ferns typical of sub-tropical cloud forests. Area residents

[10] Information in this section taken from *Plan de Desarrollo Cantón Ibarra: Ambiente, 2006,* which follows system of dividing life zones of Ecuador by various authors including Cañadas, Leslie R. Holdridge and Joseph Tosi.
[11] Com. Per. Carlos Enríquez, area farmer and project supporter.

speak of seeing White-fronted Capuchin monkeys, parrots, varied tanagers and other stalwarts of the Ecuadorian sub-tropics, 30 years ago.[12]

1.11 Compliance with Laws, Statutes and Other Regulatory Frameworks

By legal charter and statute, MCF is an Ecuadorian non-profit foundation dedicated to forest and bird conservation in Northwestern Ecuador. The foundation's objectives include the implementation of reforestation projects for climate change mitigation. This statute is approved by and registered with the Ecuadorian Ministry of Environment who also certify MCF's Directors on a bi-annual basis. Planting native trees on degraded lands with private land-owners is an activity with no doubt as to its legality and desirability from a land-management perspective as also project hopes to certify in a Letter of Approval from the Designated National Authority. Formal request for this Letter of Approval was made on June 10, 2011 and the legal procedure with control number MAE-SG-2011-8851 remains in the hands of the Ministry of Environment of Ecuador. This step was taken after numerous conversations with Carola Borja Osorio, *Directora Nacional de Desarrollo Sostenible y Herramientas de Conservación* and after a formal meeting with Marco Chiu, Sub-secretary for Climate Change.

1.12 Ownership and Other Programs

1.12.1 Proof of Title

MCF has signed and notarized contracts with all project participants indicating the spirit and purpose of the reforestation as well as different clauses for project management over the 20 year renewable crediting period. All land owners involved have clear title to their lands, as established by certificates from the respective property registries and/or municipal tax roles.

1.12.2 Emissions Trading Programs and Other Binding Limits

Not applicable.

1.12.3 Participation under Other GHG Programs

This project has not applied for nor is seeking registration under any other GHG program.

1.12.4 Other Forms of Environmental Credit

While under development since 2008, this project has not applied for or received credit, support or payments of any kind from other entities. With this 3rd version of this project description document, we are only now in 2011 beginning planting.

1.12.5 Projects Rejected by Other GHG Programs

This project has not applied to nor been rejected by other GHG programs.

[12] Com. Per. Joselo Mina and spouse long term residents and restaurant owners in San Gerónimo.

1.13 Additional Information Relevant to the Project

1.13.1 Eligibility Criteria

This project only has one activity, reforestation of degraded grasslands with native species, and future instances of this activity will only be performed on eligible—as according to the 'Procedures to define the eligibility of lands for afforestation and reforestation project activities' (EB 35 report Annex 18, vs. 01, 19 October, 2007)—lands in the following areas: parts of cantons Quito, Pedro Vicente Maldonado and San Miguel de Los Bancos in Pichincha province, immediately adjacent to or in the vicinity of current project strata 1-3. In Imbabura province the same will hold true where potential future participants will be sought in the transect formed between Salinas parish and the communities of San Gerónimo, El Limonal-Guallupe and Rocafuerte, all very similar in baseline conditions to current project strata and also in the watershed of the Mira river.

Further, expanding the geographic boundary to the north, project developer is actively looking for opportunities in neighboring Carchi province, essentially in the other half of the Mira river watershed, as it is the Mira that forms the provincial boundary. The story bears telling: the original organization and multi-temporal analysis for the Mira river watershed component of current PDD was performed in the summer of 2009 with the help of Forestry Engineer Leila T. López, who at present is the Director of the Carchi office of the Ecuadorian Ministry of Environment. As *la ingeniera* López is well apprised of all project details and methodology, she is convinced that it would be positive for landowners in her province to be involved. To that end MCF and the Ministry of Environment, Carchi, have signed an agreement to help each other identify 170 hectares that match the project profile in the ample sense of the word:

- Land title documents and municipal taxes in order
- Degraded grasslands that are either currently unproductive or only minimally grazed
- Baseline carbon stocks similar to those found on current project lands
- Within the Mira watershed, canton Mira, Carchi province

According to the Ecuadorian I.G.M. the Canton Mira´s limits are the following: http://www.mira.ec/paginas/Geografia/Geografia.aspx	
North:	0º 56' North Latitude & 78º 25' Western Longitude
South:	0º 29' North Latitude & 78º 04' Western Longitude
East:	0º 34' North Latitude & 77º 59' Western Longitude
West:	0º 53' North Latitude & 78º 28' Western Longitude

This plan to include at least 170 more hectares obeys the current contract obligations and funding from companies in Belgium and the USA who aim to neutralize their CO2 and equivalent emissions with this project. In operational terms this means that while project has contracted trees with various nurseries beginning in May, 2011, and will plant the 383 hectares described in this design document during the rainy season December-April 2011-2012, it will also continue until it reaches a total of approximately 550 hectares of plantings during the period 2012-2014.

1.13.2 Leakage Management

Not applicable.

1.13.3 Commercially Sensitive Information

There is no commercially sensitive information withheld from this version of the project description.

1.13.4 Further Information

Picture 10

During the elaboration of this PDD, project developer has met with both the school teacher at San Gerónimo (Peter Ramos shown in photograph on page 7) and with the head of the Salinas parish board (*Junta Parroquial de Salinas*) Raúl Maldonado. Both men agree that a simple educational and community outreach program directed at area school children will help win community support for the project goals and will help make concrete and knowable what are sometimes nebulous concepts regarding anthropogenic climate change and the challenges and opportunities it presents. With participation of all project staff, we will design a program to include the donation of trees to every school we can contact in our areas of influence. These trees will be part of an educational presentation and the elaboration of a system for responsibilities and rewards where the children perform basic care and maintenance for their saplings over a one year period, and then at the end of the school year are presented with a certificate for their effort as well as a group field trip and educational opportunity somewhere outside of their immediate community. In above picture, two of Peter´s students are posing in their schoolyard.

Picture 11

Project participant Gerardo Cuasapaz is also president of his local farmers´ association directly working to end the burning of area grasslands. As a result, he has first-hand knowledge of the different outreach and incentive strategies tried in the area over the last 15 years. We will continue to consult with Gerardo to develop an outreach strategy that is fresh and effective. Gerardo will also be active in the planting and plantation maintenance phase of project in stratum 5. He has long experience in organizing local work crews to do everything from farm plantation and management to roadside brush clearing, cleaning and maintenance.

2 APPLICATION OF METHODOLOGY

2.1 Title and Reference of Methodology

CDM Executive Board AR-AMS0007 / Version 01, EB 56, Annex 10, 17 September 2010

2.2 Applicability of Methodology

According to AR-AMS0007 / Version 01 all project lands must meet applicability conditions beginning with the definition of project lands as: “Grassland. Rangeland/pasture-land subjected to any kind of anthropogenic exploitation that may include systems with woody vegetation that does not impair eligibility of the land for A/R CDM project activities.” All parcels belonging to the 16 participating landowners in the project boundary meet this definition nor do they contain organic soils or wetlands as defined in the Good Practice Guidance for Land Use, Land-use Change and Forestry (IPCC, 2003). Also, during project crediting period forest litter will remain on site and is not removed as part of the project activity.

Pursuant to the applicability criteria in AR-AMS0007 / Version 01 regarding ploughing/ripping/scarification of project lands, the planned activity also qualifies. Project design calls for clearing of .25m^2 of grass and scrub per tree planted and project will plant 1000 trees per hectare in project boundary. Thus, a total of 250 m^2 (less than 3%) of soil area in project boundary will be disturbed during the first year of crediting period, and this will be done following land contours. Estimated replanting of 25% of project trees during subsequent two year period, to account for plant mortality, will only disturb less than 1% of topsoil in project boundary and then not be repeated during the 20 year crediting period, thus meeting conditions (i-iii) listed in methodology.

2.3 Project Boundary

While the geographic range of the project is extensive, the participating properties are neatly grouped in 5 strata defined by physical proximity and by their altitudinal and ecological similarity. The 16 participating properties are shown in the table on following page, including information regarding their location, name of property owner, number of hectares in the project and general habitat type. Precision maps of the distinct project boundaries in each stratum follow the table.

This PDD compiles work done in 2008 in Pichincha province and in 2009 in Imbabura province. Originally this work was conceived of as two separate PDDs that have now been merged to meet project funders’ needs. This resulting document is considered the 3rd version of the project whose earlier iterations had been prepared on the CDM PROJECT DESIGN DOCUMENT FORM (CDM-SSC-AR-PDD) - Version 02 and methodology AR-AMS0001, Version 05. In original documents there were several more properties and project hectares. Now, after revisiting all lands and re-contacting all participants we have in essence narrowed the field (no pun intended). In both 2008 and 2009 the non-profit Ecopar Corporation assisted MCF with multi-temporal analysis of project land and that procedure followed the same two steps, pre-selection and multi-temporal analysis, which are described and documented below to define the Project Boundary.

Definition for Project Boundary follows CDM EB 44 Report Annex 16 "GUIDANCE ON APPLICATION OF THE DEFINITION OF THE PROJECT BOUNDARY TO A/R CDM PROJECT ACTIVITIES" (Version 01).

Pichincha Province **						Total ha. Strata	Habitat Type
Canton	Parish	Sector	Name	Stratum	Hectares		
SM Los Bancos	Mindo	Sta. Rosa	Brian Krohnke	1	10.2		Montane rainforest
SM Los Bancos	Mindo	Sta. Rosa	Grecia Flores	1	20.3		
SM Los Bancos	Mindo	Sta. Rosa	Marcelo Vasconez	1	20.9	51.4	
SM Los Bancos	Mindo	San Tadeo	Ramiro Salazar	2	8.2		Subtropical rainforest
SM Los Bancos	Mindo	San Tadeo	Piedras Negras	2	28.9		
Quito	Gualea	Las Tolas	La Yumbada	2	14.3		
Quito	Nanegalito	La Armenia	Pietro Salvestroni	2	10.2	61.7	
Pedro Vicente Maldonado	PVM	Marianitas	Rafael Ferro	3	42.7		Lowlands rainforest
Pedro Vicente Maldonado	PVM	Marianitas	Geovanny Vallejo	3	1.8	44.5	
					TOTAL PICHINCHA	157.5	
Imbabura Province						Total ha. Strata	Habitat Type
Canton	Parish	Sector	Name	Stratum	Hectares		
Ibarra	Salinas	Salinas	Fanny Enríquez	4	28.0		Arid with seasonal rains
Ibarra	Salinas	Salinas	Ximena Enríquez	4	67.0		
Ibarra	Salinas	Salinas	Grace Enríquez	4	15.0	110.0	
Ibarra	La Carolina	San Gerónimo	Richard Wheeler	5	77.0		Subtropical rainforest with prolonged dry season
Ibarra	La Carolina	San Gerónimo	Thelmo Grijalva	5	17.0		
Ibarra	La Carolina	San Gerónimo	Eduardo Moreno	5	9.0		
Ibarra	La Carolina	San Gerónimo	Gerardo Cuasapaz	5	13.0	116.0	
					TOTAL IMBABURA	226.0	
					TOTAL TWO PROVINCES	383.5	
** Participant Eduardo Goetschel shown on stratum 1 eligibility map may rejoin in the future.							

All project lands are currently grasslands and their eligibility is demonstrated using the 'Procedures to define the eligibility of lands for afforestation and reforestation project activities' (EB 35 report Annex 18, vs. 01, 19 October, 2007). This is demonstrated following a two step process. And while, as mentioned, this process was carried out at different times in the two provinces, the first step is essentially the same for both and the second step had important differences as there were different maps, images and technologies used. For this reason, in this combined PDD the first step is described for the entire project boundary and the second separated by province.

First Step: All selected lands were visually assessed against the Ecuadorian forest definition by trained MCF personnel and Ecopar technicians. All lands classified as forests have been omitted to include only eligible grasslands. None of the selected grasslands contain young natural stands or plantations nor are they temporarily unstocked forest lands. Natural regeneration on selected degraded grasslands is not occurring due to grazing, pasture management and exotic and aggressive grasses. Especially in strata 1-3, pasture management includes the periodic clearing with machetes of pioneering trees and other woody vegetation that appear. Below are representative photographs of project lands in each of the 5 project strata.

STRATUM ONE: Brian Krohnke

Picture 12

STRATUM ONE: Marcelo Vásconez

Picture 13

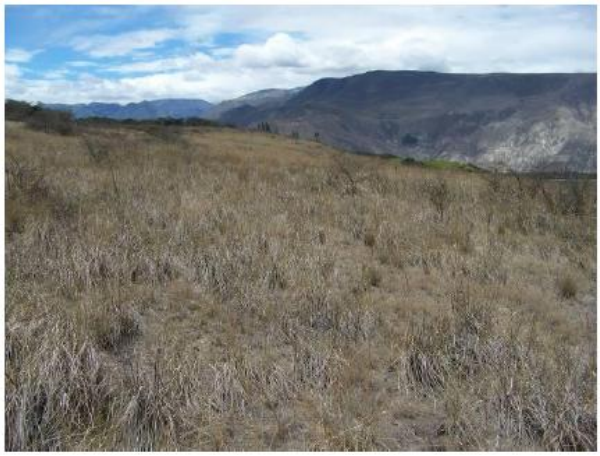
STRATUM TWO: Ramiro Salazar

Picture 14

STRATUM THREE: Rafael Ferro

Picture 15

STRATUM FOUR: Grace Enríquez



Picture 16

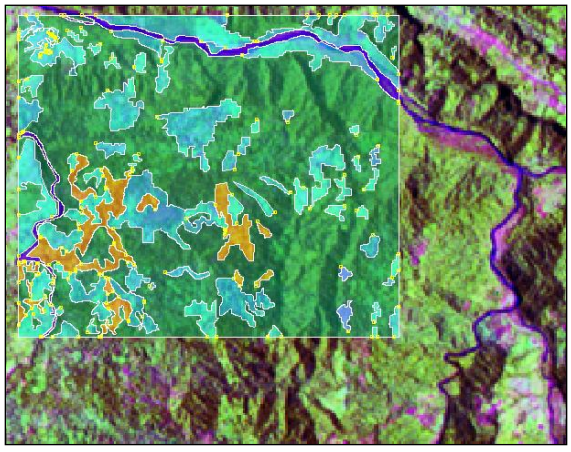
STRATUM FIVE: Telmo Grijalva

Picture 17

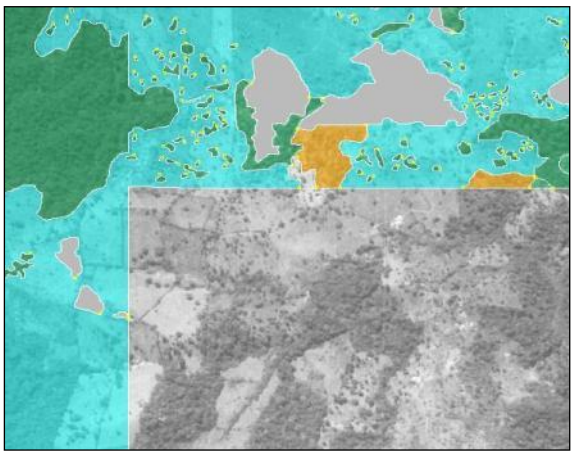
STEP TWO, in Pichincha, Strata 1-3:

For the Pichincha province areas once the general pre-eligibility was determined through field visits as described in Step One, and a review of reference points taken with GPS was performed, the eligibility of each work area polygon was established by their location on cartography created for this analysis based on geo-referenced aerial photography from 1983 & 1990 and satellite imagery from 1991.

After geo-referencing the Landsat imagery with the UTM coordinates zone 17 south, Datum WGS 84, they were assigned colors for interpretation. After scanning the aerial photographs they were imported to the software TNT MIPS version 6.9, then geo-referenced and critically visually interpreted according to basic land use categories. Each type of land coverage thus interpreted was assigned an attribute for its identification.



Picture 19: coverage with satellite image



Picture 18: coverage over aerial photograph

This procedure was integrally realized with ArcView 3.2 GIS software. Before comparing the different land use changes by work area polygon, the total area by land use and type of vegetative cover was calculated for each year that imagery was available. Once completed, this information was cross referenced at the same scale allowing the detection of changes and the type of changes between one date and the other.

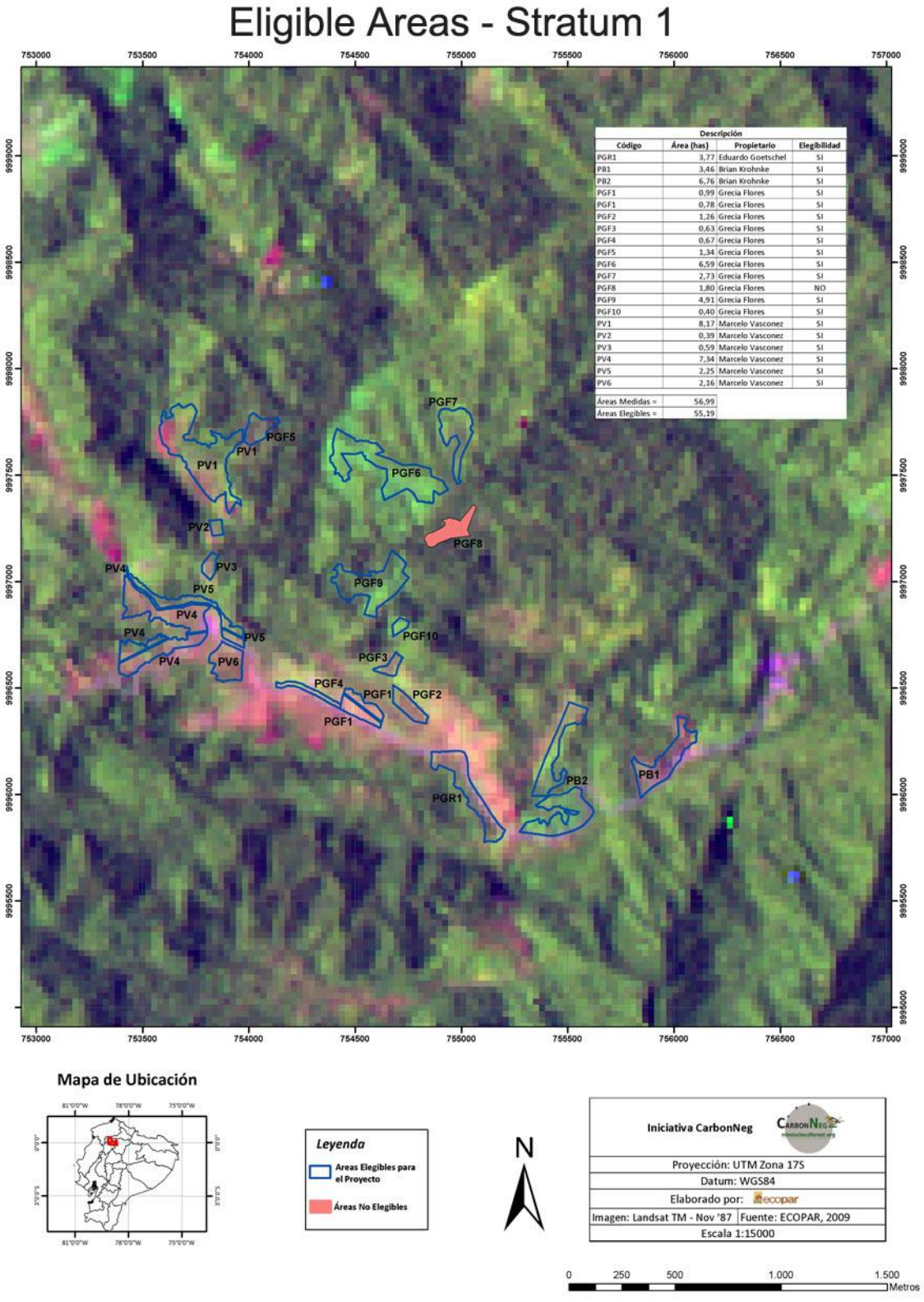
The series of GIS procedures summarized here resulted in the creation of the following eligibility maps, which follow the simple numerical sequence 1-5 in agreement with project *ex ante* stratification. These eligibility maps are in sum, the project boundary, each with total hectares which will be planted. Following the eligibility maps, in section 2.4 Baseline Scenario there is another series of multi-temporal maps following the same logical strata sequence and objectively demonstrating project compliance with the 'Procedures to define the eligibility of lands for afforestation and reforestation project activities' (EB 35 report Annex 18, vs. 01, 19 October, 2007).

SECOND STEP, in Imbabura, Strata 4-5: The activity is a reforestation project activity because all participating grasslands were deforested before 31 December 1989. The majority of deforestation in this region came after the Agrarian Reform Laws of the late 1960s and early 1970s. Once the general pre-eligibility of project areas was determined through field visits as described in Step One, a review of reference points was conducted. These points were taken with GPS in datum set WGS 84, 17 South, and were located on Landsat images from September and November, 1987, two years prior to pre-1990 limit established as CDM eligibility requirement.

To complete the multi-temporal analysis, Aster satellite images from 2007 were also used to compare current vegetative land cover with 1987 land cover. As in pre-eligibility points taken above, this work was divided into two sectors: the first around the Enríquez sisters´ properties in Salinas; and the second around San Gerónimo. These two work areas or strata are signaled on the Project Location map (p. 14) and in the Eligibility and Multi-temporal Analysis maps in coming pages.

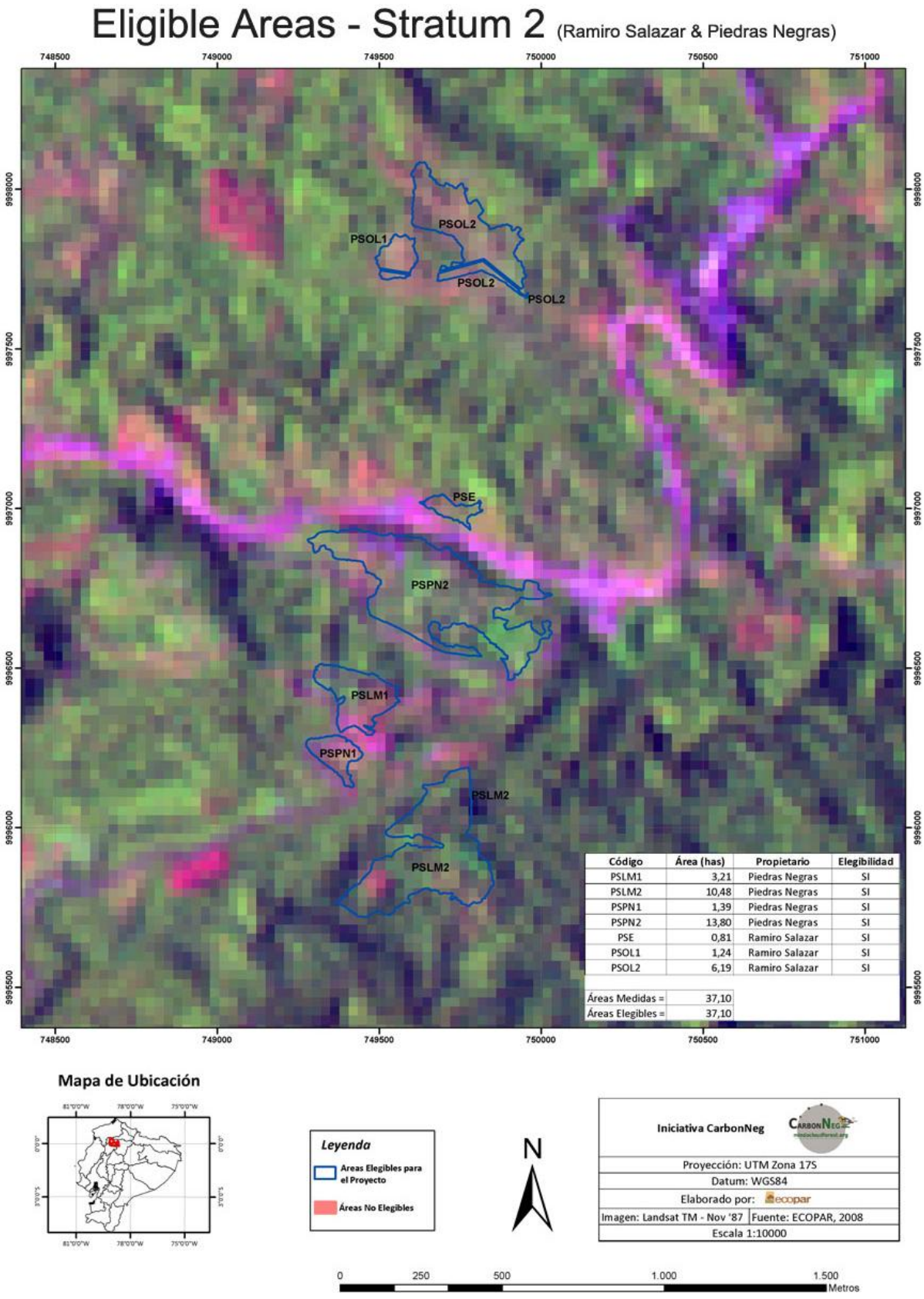
Once the pre-eligibility of each sector was established, each participating land area was mapped with Thales Mobile Mapper GPS units, one acting as base unit for differential calculations and one as roving field unit. The calculation of measurement differentials with information obtained with reports from REGME (Network GNSS of Continuous Monitoring of Ecuador run by the Military Geographic Institute) allows for accuracy within 50 centimeters for each point taken, assuring that project land area totals are precise. (Information on actual percentage error for each sector is archived with project documents for third party verification.)

The work area polygons, 'project boundary', thus created were plotted on the multi-temporal maps described above to arrive at final project work areas and hectare totals.

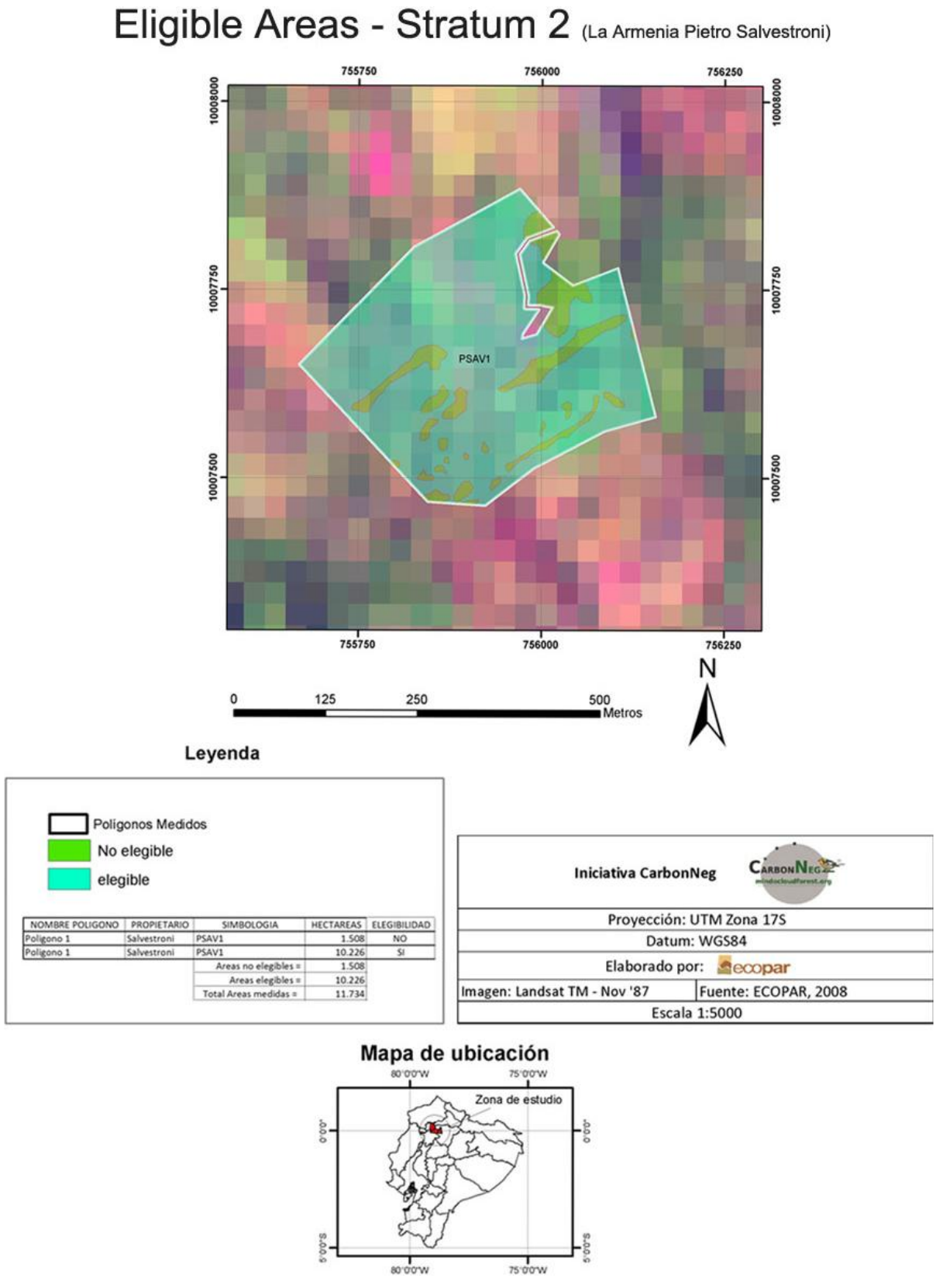


Descripción			
Código	Área (has)	Propietario	Elegibilidad
PGR1	3,77	Eduardo Goetschel	SI
PB1	3,46	Brian Krohnke	SI
PB2	6,76	Brian Krohnke	SI
PGF1	0,99	Grecia Flores	SI
PGF1	0,78	Grecia Flores	SI
PGF2	1,26	Grecia Flores	SI
PGF3	0,63	Grecia Flores	SI
PGF4	0,67	Grecia Flores	SI
PGF5	1,34	Grecia Flores	SI
PGF6	6,59	Grecia Flores	SI
PGF7	2,73	Grecia Flores	SI
PGF8	1,80	Grecia Flores	NO
PGF9	4,91	Grecia Flores	SI
PGF10	0,40	Grecia Flores	SI
PV1	8,17	Marcelo Vasconez	SI
PV2	0,39	Marcelo Vasconez	SI
PV3	0,59	Marcelo Vasconez	SI
PV4	7,34	Marcelo Vasconez	SI
PV5	2,25	Marcelo Vasconez	SI
PV6	2,16	Marcelo Vasconez	SI
Áreas Medidas =	56,99		
Áreas Elegibles =	55,19		

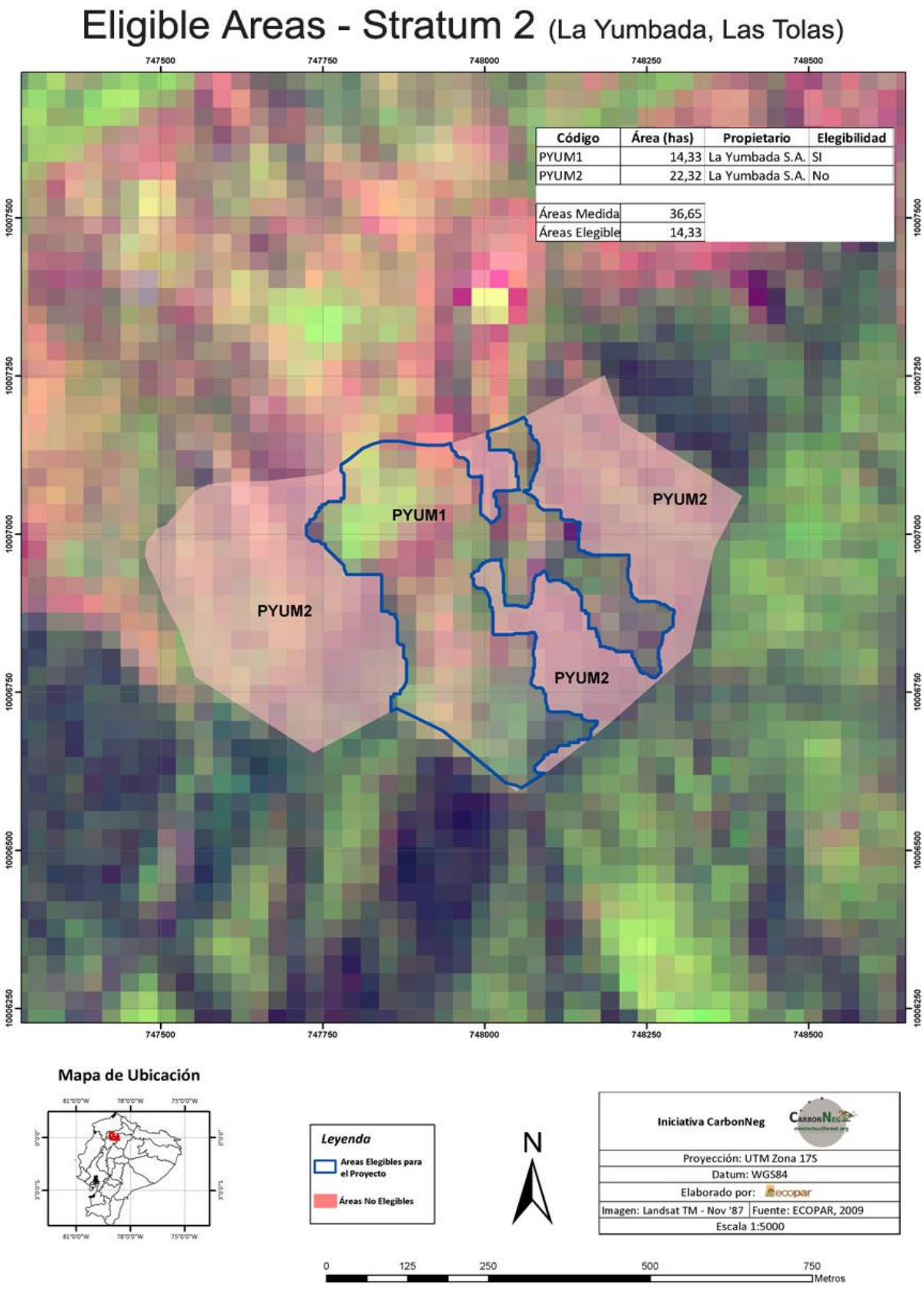
Map 5


Eligible Areas - Stratum 2 (Ramiro Salazar & Piedras Negras)
748500
749000
749500
750000
750500
751000
9998000
9997500
9997000
9996500
9996000
9995500
PSOL1
PSOL2
PSOL2
PSOL2
PSE
PSPN2
PSLM1
PSPN1
PSLM2
PSLM2
Código | Área (has) | Propietario | Elegibilidad
PSLM1 | 3,21 | Piedras Negras | SI
PSLM2 | 10,48 | Piedras Negras | SI
PSPN1 | 1,39 | Piedras Negras | SI
PSPN2 | 13,80 | Piedras Negras | SI
PSE | 0,81 | Ramiro Salazar | SI
PSOL1 | 1,24 | Ramiro Salazar | SI
PSOL2 | 6,19 | Ramiro Salazar | SI
Áreas Medidas = 37,10
Áreas Elegibles = 37,10
Mapa de Ubicación
Leyenda
Areas Elegibles para el Proyecto
Áreas No Elegibles
N
Iniciativa CarbonNeg
Proyección: UTM Zona 17S
Datum: WGS84
Elaborado por: ecopar
Imagen: Landsat TM - Nov '87
Fuente: ECOPAR, 2008
Escala 1:10000
0
250
500
1.000
1.500
Metros

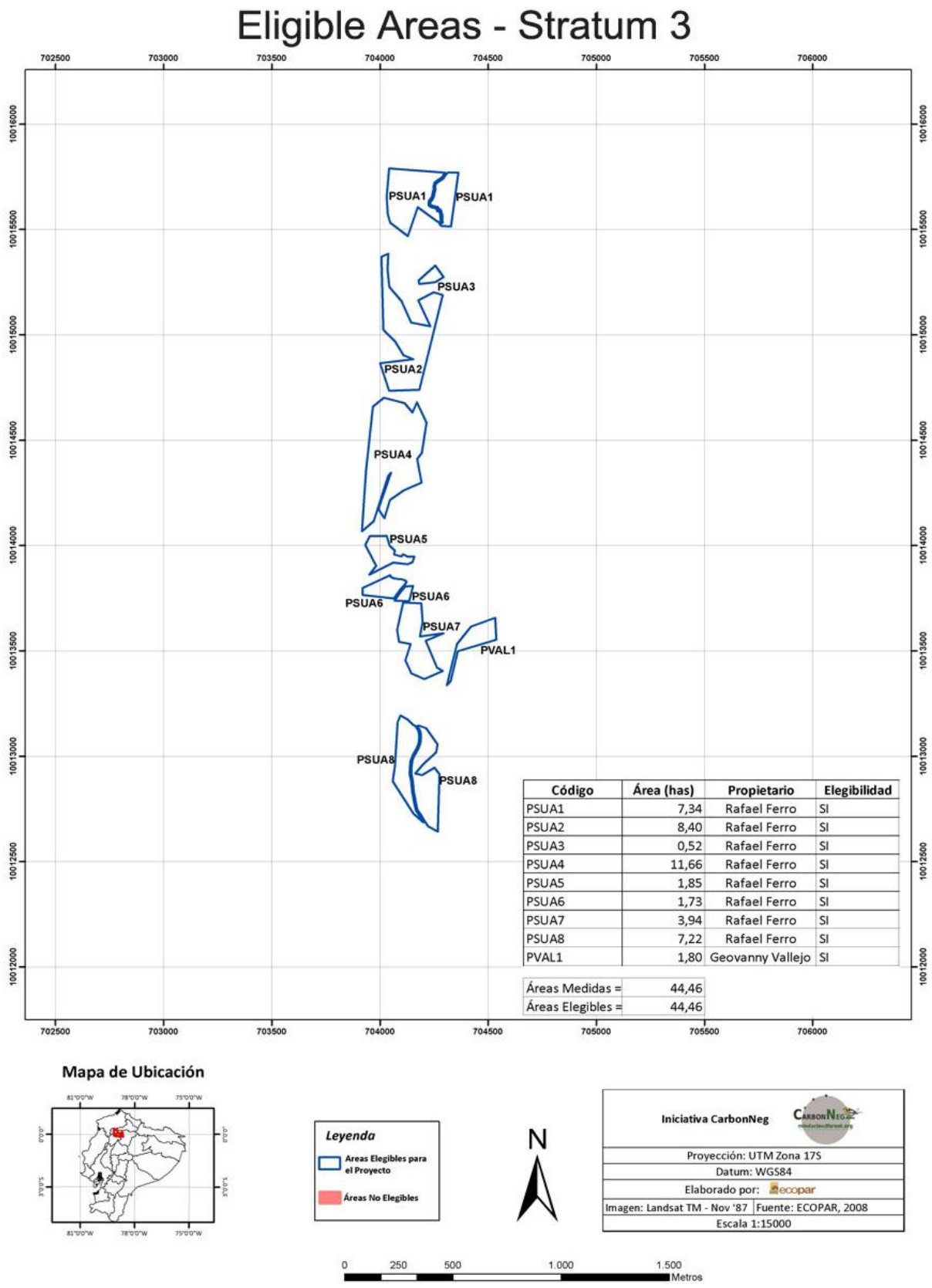
Map 6


Eligible Areas - Stratum 2 (La Armenia Pietro Salvestroni)
755750
756000
756250
10008000
10007750
10007500
PSAV1
0
125
250
500
Metros
N
Leyenda
Polígonos Medidos
No elegible
elegible
NOMBRE POLIGONO | PROPIETARIO | SIMBOLOGIA | HECTAREAS | ELEGIBILIDAD
Poligono 1 | Salvestroni | PSAV1 | 1.508 | NO
Poligono 1 | Salvestroni | PSAV1 | 10.226 | SI
Areas no elegibles = 1.508
Areas elegibles = 10.226
Total Areas medidas = 11.734
Iniciativa CarbonNeg
Proyección: UTM Zona 17S
Datum: WGS84
Elaborado por: ecopar
Imagen: Landsat TM - Nov '87
Fuente: ECOPAR, 2008
Escala 1:5000
Mapa de ubicación
80°0'0"W
75°0'0"W
Zona de estudio
0°0'0"
5°0'0"S

Map 7


Eligible Areas - Stratum 2 (La Yumbada, Las Tolas)
747500
747750
748000
748250
748500
10007500
10007250
10007000
10006750
10006500
10006250
Código | Área (has) | Propietario | Elegibilidad
PYUM1 | 14,33 | La Yumbada S.A. | SI
PYUM2 | 22,32 | La Yumbada S.A. | No
Áreas Medida | 36,65
Áreas Elegible | 14,33
PYUM1
PYUM2
PYUM2
PYUM2
Mapa de Ubicación
Leyenda
Areas Elegibles para el Proyecto
Áreas No Elegibles
N
Iniciativa CarbonNeg
Proyección: UTM Zona 17S
Datum: WGS84
Elaborado por: ecopar
Imagen: Landsat TM - Nov '87 | Fuente: ECOPAR, 2009
Escala 1:5000
0
125
250
500
750
Metros

Map 8

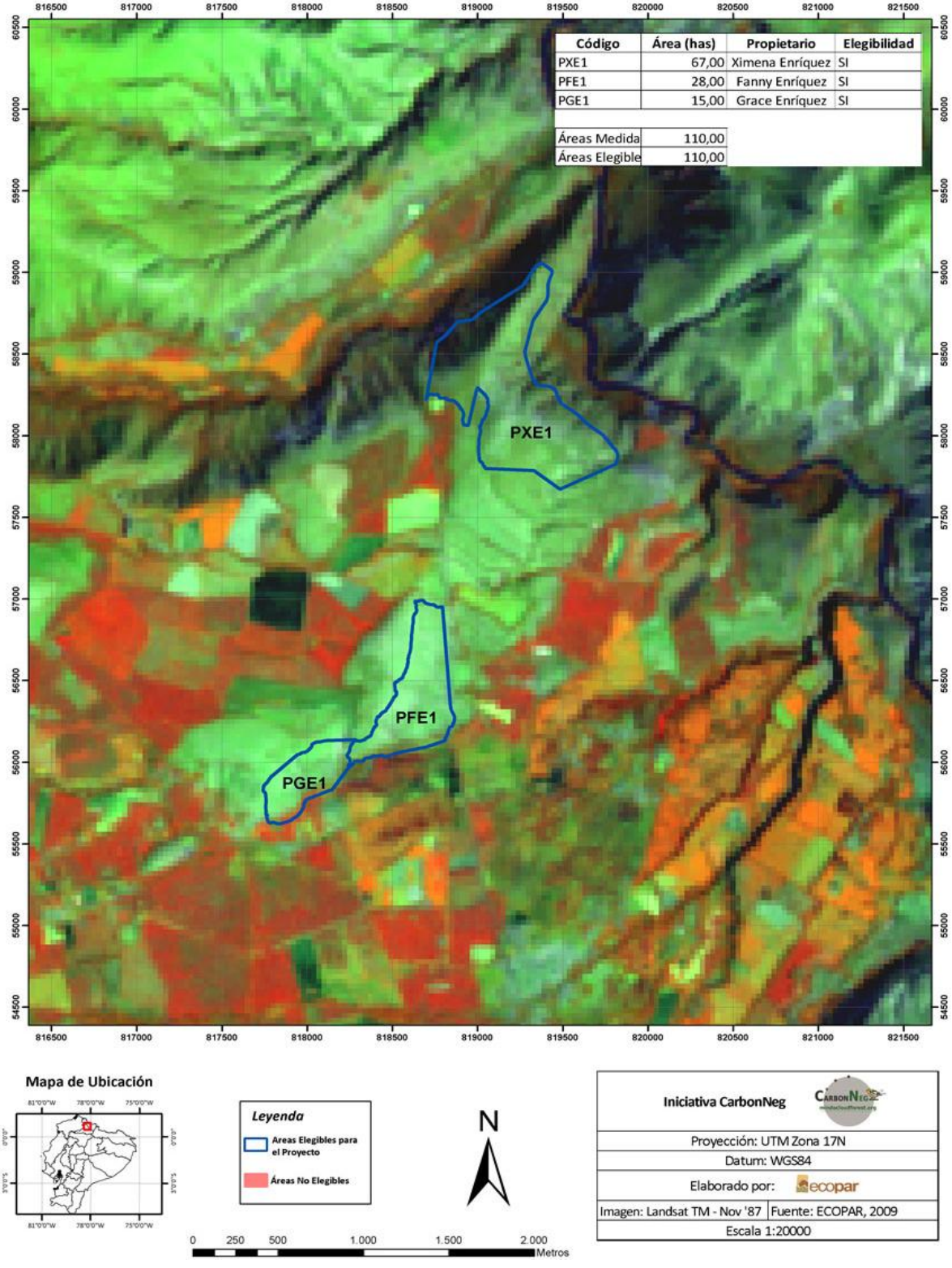


Código	Área (has)	Propietario	Elegibilidad
PSUA1	7,34	Rafael Ferro	SI
PSUA2	8,40	Rafael Ferro	SI
PSUA3	0,52	Rafael Ferro	SI
PSUA4	11,66	Rafael Ferro	SI
PSUA5	1,85	Rafael Ferro	SI
PSUA6	1,73	Rafael Ferro	SI
PSUA7	3,94	Rafael Ferro	SI
PSUA8	7,22	Rafael Ferro	SI
PVAL1	1,80	Geovanny Vallejo	SI

Áreas Medidas =	44,46
Áreas Elegibles =	44,46

Map 9

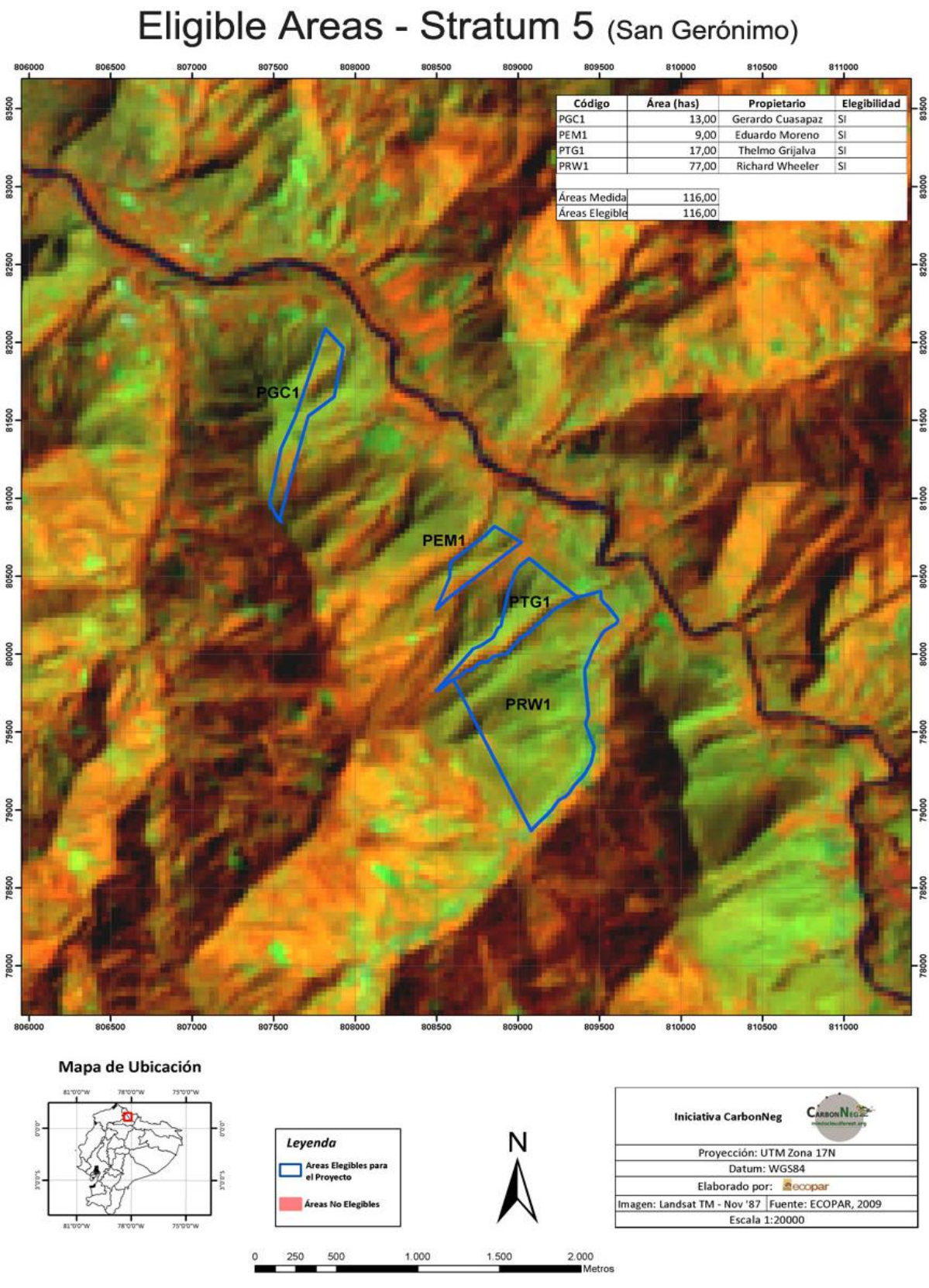
Eligible Areas - Stratum 4 (Salinas de Ibarra)



Código	Área (has)	Propietario	Elegibilidad
PXE1	67,00	Ximena Enríquez	SI
PFE1	28,00	Fanny Enríquez	SI
PGE1	15,00	Grace Enríquez	SI

Áreas Medida	110,00
Áreas Elegible	110,00

Map 10


Eligible Areas - Stratum 5 (San Gerónimo)
Código | Área (has) | Propietario | Elegibilidad
PGC1 | 13,00 | Gerardo Cuasapaz | SI
PEM1 | 9,00 | Eduardo Moreno | SI
PTG1 | 17,00 | Thelmo Grijalva | SI
PRW1 | 77,00 | Richard Wheeler | SI
Áreas Medida | 116,00
Áreas Elegible | 116,00
PGC1
PEM1
PTG1
PRW1
Mapa de Ubicación
Leyenda
Areas Elegibles para el Proyecto
Áreas No Elegibles
N
Iniciativa CarbonNeg
Proyección: UTM Zona 17N
Datum: WGS84
Elaborado por: ecopar
Imagen: Landsat TM - Nov '87
Fuente: ECOPAR, 2009
Escala 1:20000
0 250 500 1.000 1.500 2.000
Metros

Map 11

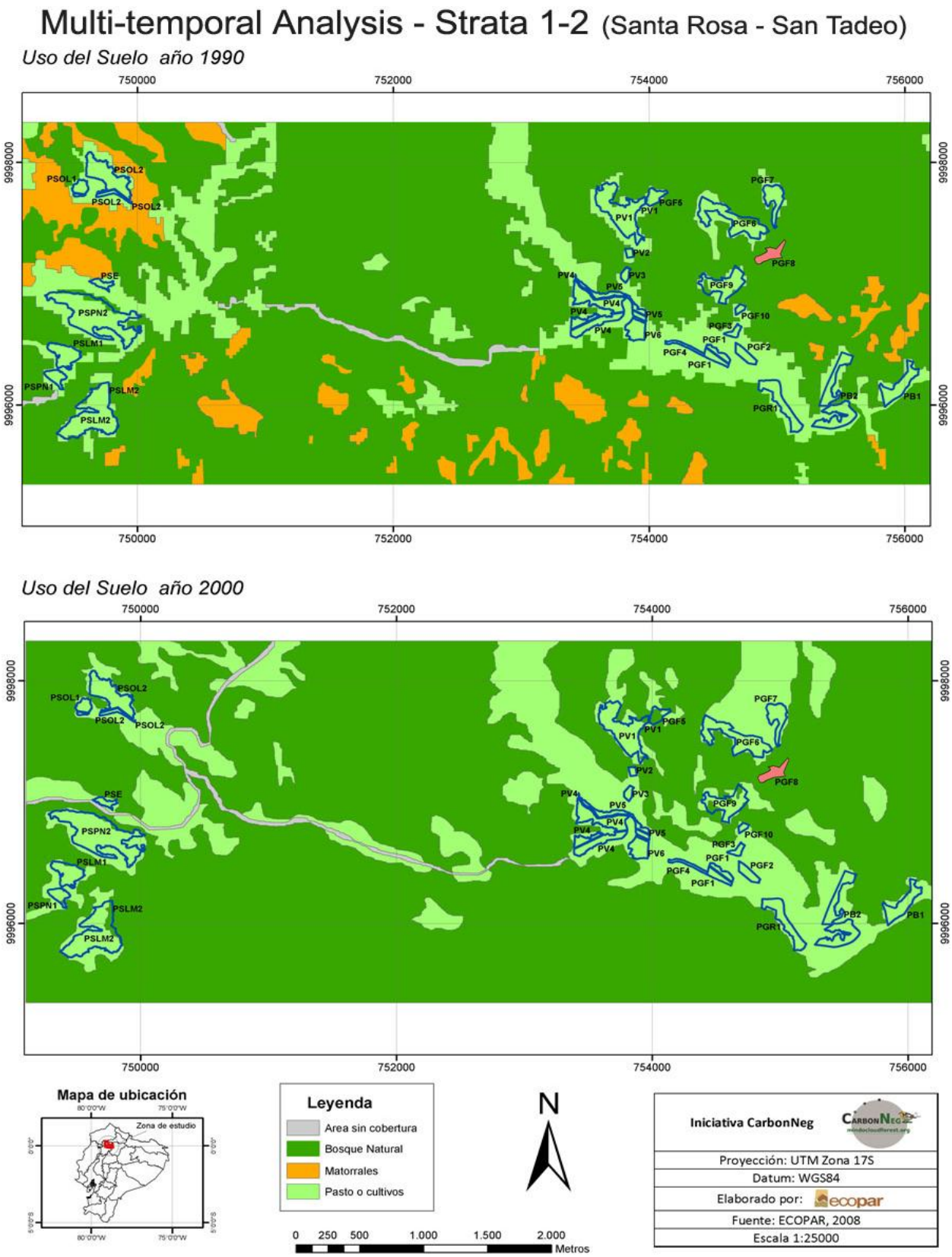
Table of GHG Pools that will be considered in the Project Boundary

Source		Gas	Included?	Justification/Explanation
Baseline	Living Biomass Pool	CO_2	Yes	Major carbon pool affected by the project activity*
		CH_4	No	Beyond means of project
		N_2O	No	Beyond means of project
		Other	No	
	Organic Soil Carbon	CO_2	Yes	Carbon stock in this pool can possibly decrease initially because of soil disturbance during site preparation. Hence accounting of this pool is required*
		CH_4	No	Beyond means of project
		N_2O	No	Beyond means of project
		Other	No	
Project	Living Biomass Pool	CO_2	Yes	Major carbon pool affected by the project activity*
		CH_4	No	Beyond means of project
		N_2O	No	Beyond means of project
		Other	No	
	Organic Soil Carbon	CO_2	Yes	Carbon stock in this pool can possibly decrease initially because of soil disturbance during site preparation. Hence accounting of this pool is required*
		CH_4	No	Beyond means of project
		N_2O	No	Beyond means of project
		Other	No	

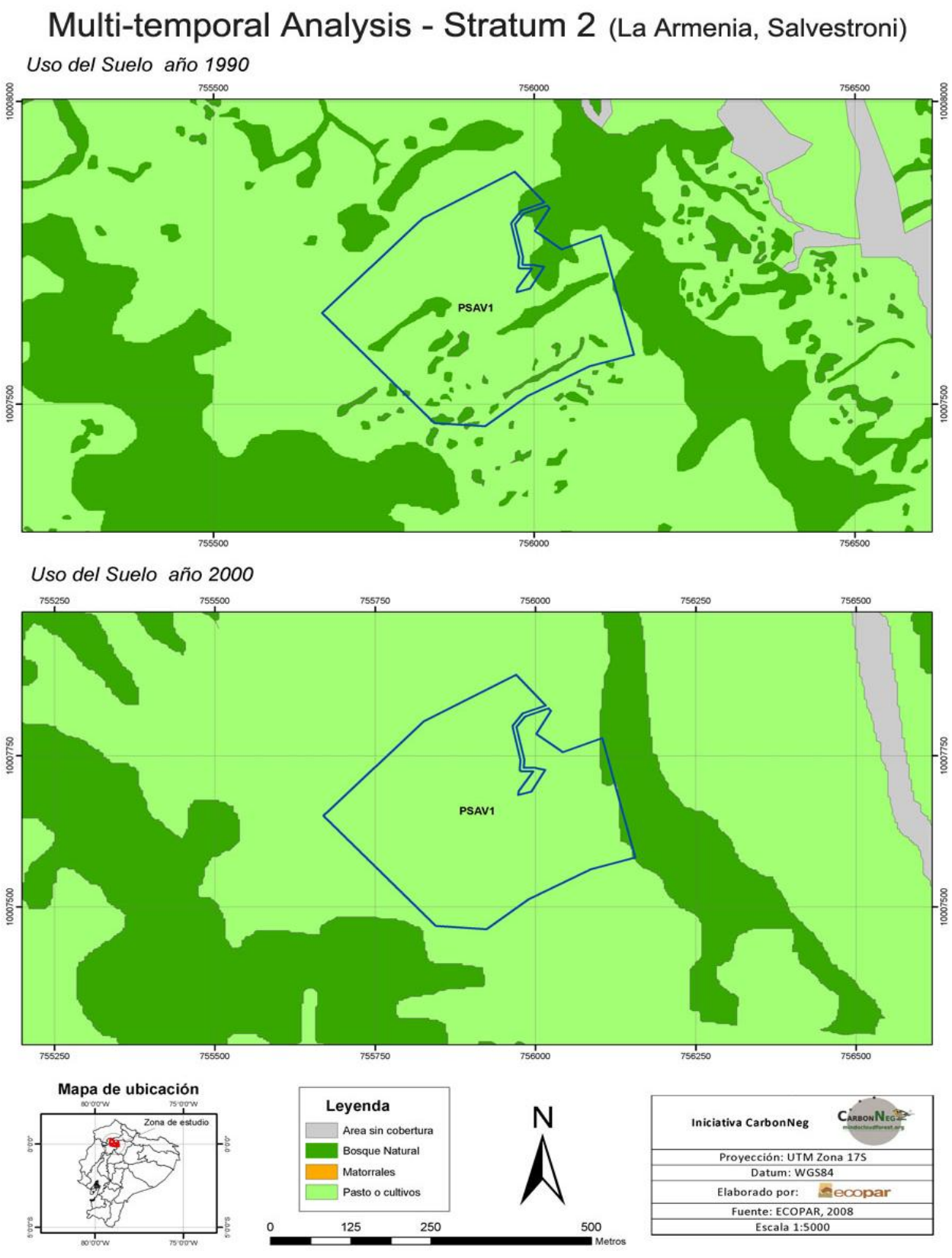
* Following Methodology AR-AMS0007 / Version 01

2.4 Baseline Scenario

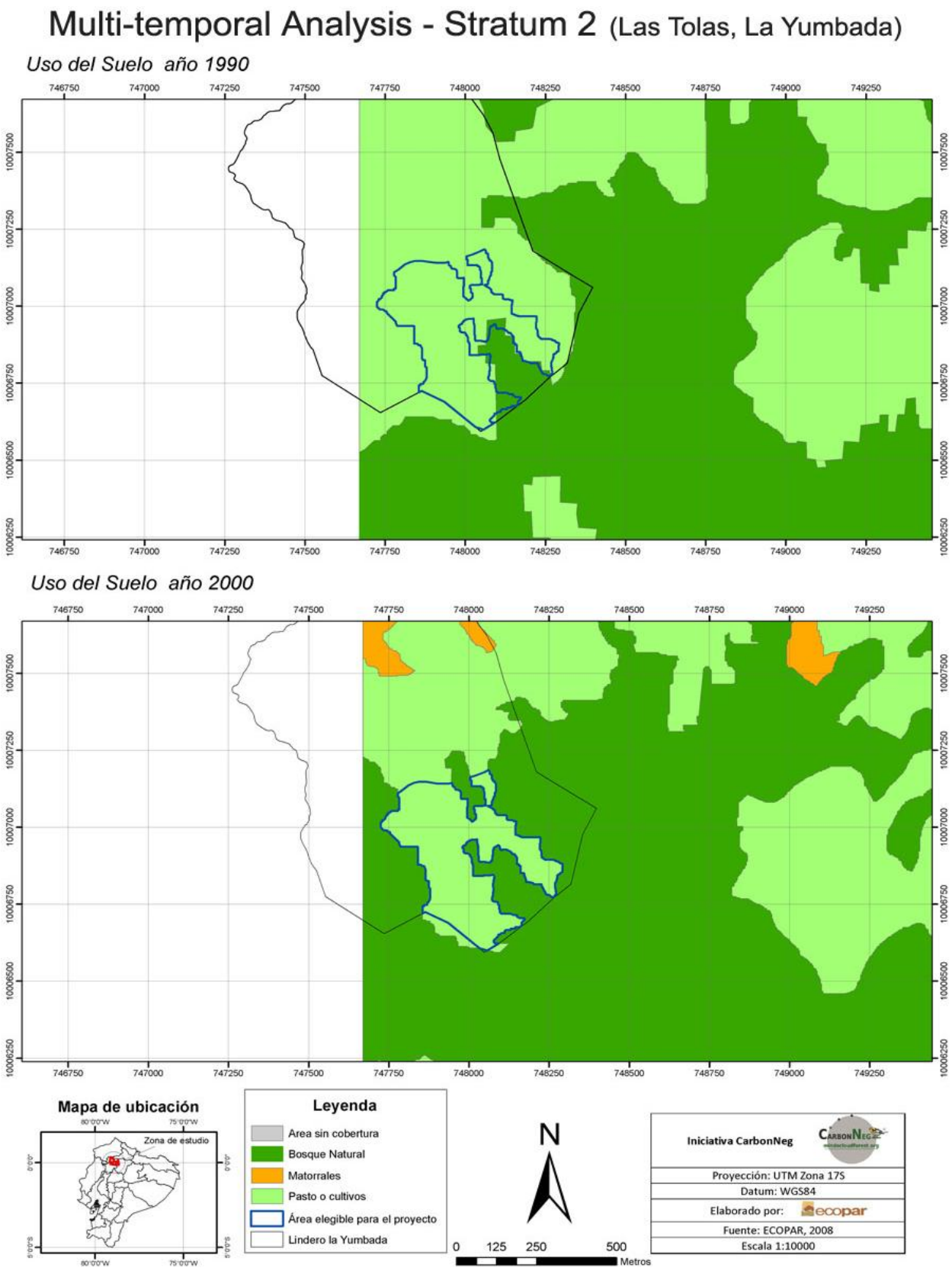
In accordance with AR-AMS0007 / Version 01 “The most plausible baseline scenario of a small-scale A/R CDM project activity implemented on grasslands or croplands is continuation of pre-project land use.” As mentioned elsewhere in this PDD project developer knowledge and contact with many of the participating landowners and familiarity with project boundary goes back over a decade. Then, more specifically, initial work on the Pichincha province portion of this project was begun in 2008 and in Imbabura in 2009. Recent, 2011, site visits and photography show no perceivable change in forest cover on project grasslands or other changes in carbon stocks. This reality is objectively demonstrated in following images created with remote sensors and GIS software by Ecopar personnel.


Multi-temporal Analysis - Strata 1-2 (Santa Rosa - San Tadeo)
Uso del Suelo año 1990
Uso del Suelo año 2000
750000
752000
754000
756000
9998000
9996000
PSOL1
PSOL2
PSE
PSPN2
PSLM1
PSPN1
PSLM2
PV1
PV2
PV3
PV4
PV5
PV6
PGF1
PGF2
PGF3
PGF4
PGF5
PGF6
PGF7
PGF8
PGF9
PGF10
PGR1
PB1
PB2
Mapa de ubicación
Zona de estudio
Leyenda
Area sin cobertura
Bosque Natural
Matorrales
Pasto o cultivos
N
0 250 500 1.000 1.500 2.000
Metros
Iniciativa CarbonNeg
Proyección: UTM Zona 17S
Datum: WGS84
Elaborado por: ecopar
Fuente: ECOPAR, 2008
Escala 1:25000

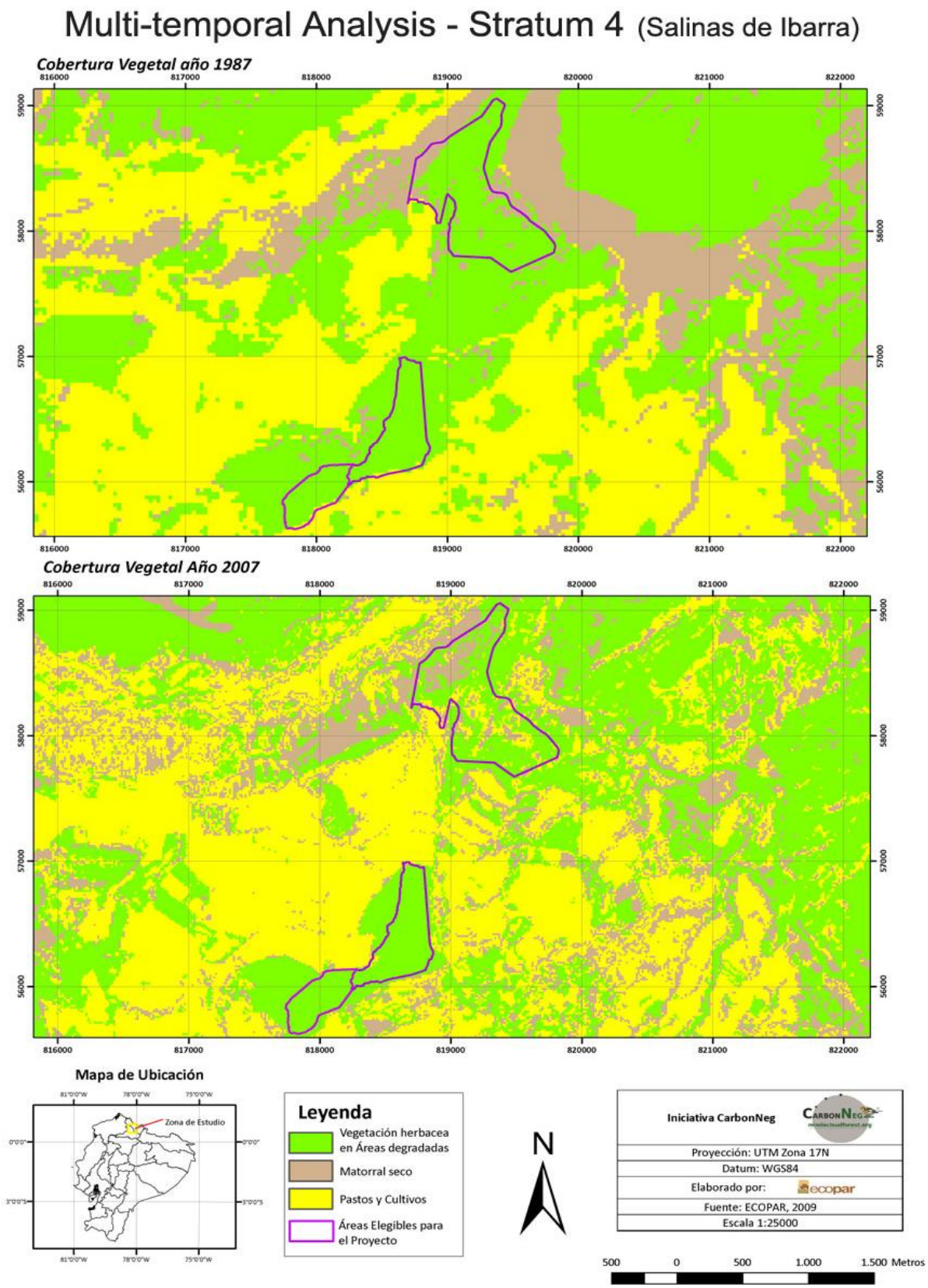
Map 12


Multi-temporal Analysis - Stratum 2 (La Armenia, Salvestroni)
Uso del Suelo año 1990
PSAV1
Uso del Suelo año 2000
PSAV1
Mapa de ubicación
Zona de estudio
Leyenda
Area sin cobertura
Bosque Natural
Matorrales
Pasto o cultivos
N
0 125 250 500
Metros
Iniciativa CarbonNeg
Proyección: UTM Zona 17S
Datum: WGS84
Elaborado por: ecopar
Fuente: ECOPAR, 2008
Escala 1:5000

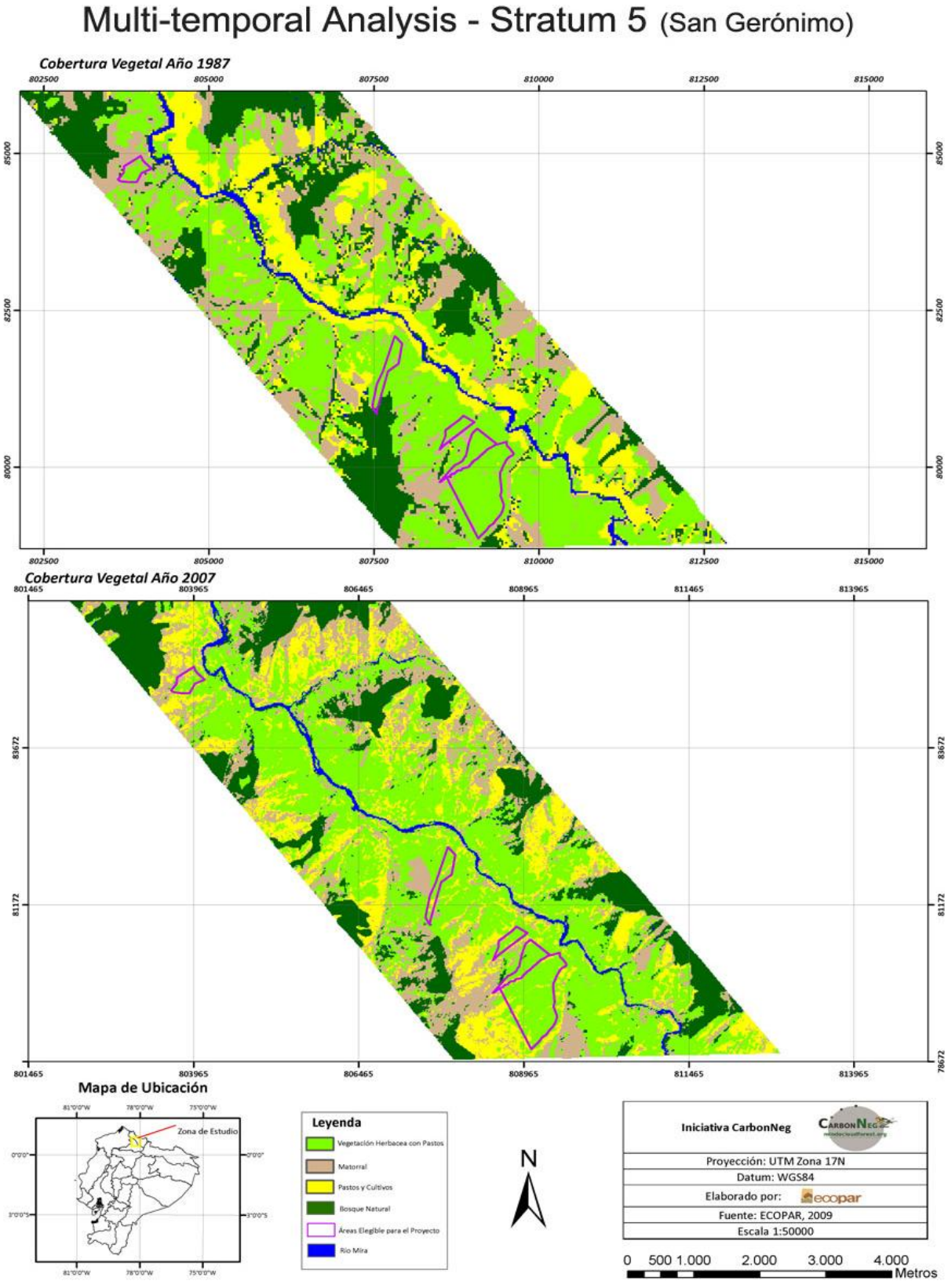
Map 13


Multi-temporal Analysis - Stratum 2 (Las Tolas, La Yumbada)
Uso del Suelo año 1990
Uso del Suelo año 2000
Mapa de ubicación
Zona de estudio
Leyenda
Area sin cobertura
Bosque Natural
Matorrales
Pasto o cultivos
Área elegible para el proyecto
Lindero la Yumbada
N
0 125 250 500
Metros
Iniciativa CarbonNeg
Proyección: UTM Zona 17S
Datum: WGS84
Elaborado por: ecopar
Fuente: ECOPAR, 2008
Escala 1:10000

Map 14


Multi-temporal Analysis - Stratum 4 (Salinas de Ibarra)
Cobertura Vegetal año 1987
Cobertura Vegetal Año 2007
816000
817000
818000
819000
820000
821000
822000
59000
58000
57000
56000
Mapa de Ubicación
Zona de Estudio
Leyenda
Vegetación herbacea en Áreas degradadas
Matorral seco
Pastos y Cultivos
Áreas Elegibles para el Proyecto
N
Iniciativa CarbonNeg
Proyección: UTM Zona 17N
Datum: WGS84
Elaborado por: ecopar
Fuente: ECOPAR, 2009
Escala 1:25000
500 0 500 1.000 1.500 Metros

Map 15


Multi-temporal Analysis - Stratum 5 (San Gerónimo)
Cobertura Vegetal Año 1987
802500
805000
807500
810000
812500
815000
85000
82500
80000
Cobertura Vegetal Año 2007
801465
803965
806465
808965
811465
813965
83672
81172
78672
Mapa de Ubicación
Zona de Estudio
Leyenda
Vegetación Herbacea con Pastos
Matorral
Pastos y Cultivos
Bosque Natural
Áreas Elegible para el Proyecto
Rio Mira
N
Iniciativa CarbonNeg
Proyección: UTM Zona 17N
Datum: WGS84
Elaborado por: ecopar
Fuente: ECOPAR, 2009
Escala 1:50000
0 500 1.000 2.000 3.000 4.000
Metros

Map 16

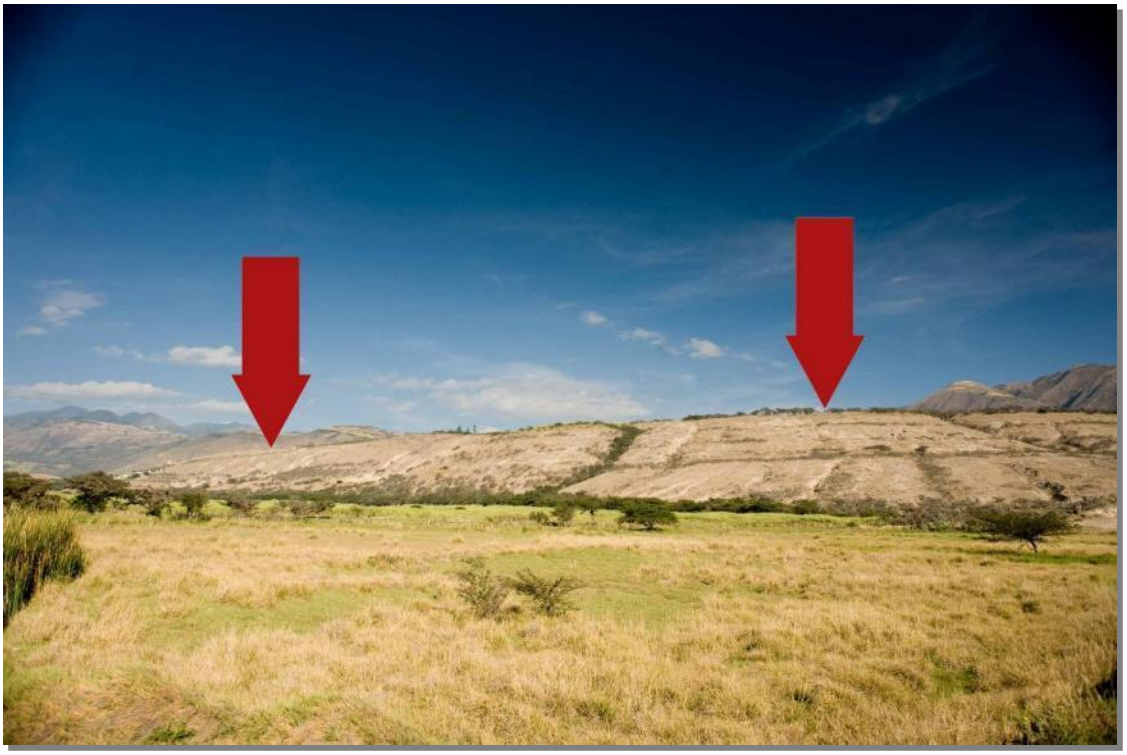
NOTE: Project was unable to obtain either aerial photography or satellite images from any date near to 1989 without clouds of Rafael Ferro and Giovanni Vallejo's lands, Stratum 3. However, according to the EB 22 Report Annex 16 "PROCEDURES TO DEFINE THE ELIGIBILITY OF LANDS FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES", without the availability of "(a) Aerial photographs or satellite imagery complemented by ground reference data; it is also possible to use (b) Ground based surveys (land use permits, land use plans or information from local registers such as cadastre, owners register, land use or land management register). Project proponent has archived documents and statements from both señores Ferro y Vallejo that objectively demonstrate this part of the property boundary´s compliance with the 31-12-1989 non-forest definition parameter. This material will be available for project auditors at time of field visit or sooner.

2.5 Additionality

In accordance with AR-AMS0007 / Version 01, Annex 1, "Assessment of Additionality" project proponent "shall demonstrate that the project activity would not have occurred anyway due to at least one of the following barriers," and of the list provided, 5 different subcategories of barrier "**(f) Barriers due to local ecological conditions…"** come in to play in varying degrees on the 16 different properties in the project boundary. That being said, all of the properties also face the economic barrier of the costs of reforestation, especially as this is reforestation for habitat creation which will give only marginal economic returns and on a time scale that would prohibit any at-risk investment in the activity. Especially in strata 1-3, these future economic returns will be included in project monitoring, especially for CCB criteria CM3, as compared to baseline scenario of land use for cattle grazing. The ecological barriers faced are:

(i) Degraded soil (e.g. water/wind erosion, salinization);

In the case of the three Enriquez sisters' properties in Salinas not only are the soils eroded but they are arid, to the point that native 'Guarangos' and 'Faiques' (*Caesalpinia spinosa* and *Acacia macracantha*) remain stunted where present and exposed to wind, but where they are not exposed to wind they grow to normal size, in arroyos or where protected by windbreaks. Investment is required to overcome this ecological barrier with the application of basic irrigation and the establishment of wind breaks with *Casuarina equisetifolia.* This investment however would never be able to demonstrate a positive cost/benefit relation without carbon financing. See picture taken during dry-season on following page to better understand the ecological conditions in Salinas. The eroded hillside shown between the sugar cane at the bottom and the band of acacia trees at the top is precisely the project boundary for Fanny and Grace Enriquez. The band of acacias and other native vegetation is outside of the project boundary bordering an irrigation channel that services sugar cane plots that provide the economic sustenance of these farms. Sister Ximena Enríquez's land is around the corner and out of the picture, but is very similar if a little flatter and less eroded.



Picture 20

(ii) Catastrophic natural and/or human-induced events (e.g. land-slides, fire);
(iv) Pervasive opportunistic species or group of species preventing regeneration of trees (e.g. grasses, weeds);
(v) Unfavorable course of ecological succession;

On following page a picture of Richard Wheeler´s land in San Gerónimo, stratum 5, was taken on May 15th, 2011 at the end of the rainy season and shows the dominant grass and weeds that help prevent natural regeneration of tree species (barrier **iv**). This stratum is also facing barriers **ii** and **v** to its natural regeneration. In this area in the last couple of years fire prevention through social pressure and awareness building has risen in part due to the efforts of area residents Gerardo Cuasapaz, Piet Sabbe, Joselo Mina, and also fire and police stations have been opened in San Gerónimo creating a new atmosphere of development where once this was a very barren crossroads. However, use of fire during decades has left the area barren of trees and at a point of broken ecological succession. Also, please recall photograph of Peter Ramos on page 7 where burning is occurring in neighboring Carchi province across the Mira river to appreciate what San Gerónimo suffered in the recent past (barrier **ii**). Barrier **v** is in part the result of the loss of bird species and other natural vectors which would ordinarily help introduce seeds. In San Gerónimo native cloud forests are present on all ridge tops, but as demonstrated in the multi-temporal maps, these forests have not returned to the lands within the project boundary as a result of the combination of these barriers.

Picture 21

(vi) Biotic pressure in terms of grazing, fodder collection, etc.

All project lands in Pichincha province were cleared to establish pasture and have been grazed at different times both intensively and sporadically. In the specific case of Brian Krohnke and partners' property a small dairy operation is maintained to create income to pay the caretaker. This is currently the only possible activity on the land without further investment and has been the case since property purchase in 1996. Brian is the lead project developer of this PDD as well as President of MCF since 2004, and he and partners are dedicated environmentalists, but simple economics have kept them from reforesting the pasture areas of their property. Comments from other participants in Pichincha tell essentially the same story. Where participants Ferro and Salazar do not own their own cattle, they rent their grazing lands to neighbors as a relatively hands-off means to augment property incomes. They cannot forego this income to let lands regenerate naturally as the process takes too long and will diminish their property value; with carbon financing on the other hand, they are assured of having high-value, species-diverse plantations established in less time.

2.6 Methodology Deviations

Not applicable.

3 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

3.1 Baseline Emissions

To calculate baseline emissions for the two carbon pools (the living biomass pool considered as the sum of the above-ground and below-ground biomass pools and the soil organic carbon pool) accounted for in project boundary, project proponent has followed a three step procedure:

1. Stratification of project boundary;

2. Determination of baseline net GHG removals by sinks following AR-AMS0007 / Version 01 and EB 46 Report Annex 16 “GUIDANCE ON CONDITIONS UNDER WHICH THE CHANGE IN CARBON STOCKS IN EXISTING LIVE WOODY VEGETATION ARE INSIGNIFICANT” (Version 01); And following AR-AMS0001 / Version 03, #10 (a) and (b), where it is indicated that if below ground biomass in grasslands is expected to decline in the absence of project activity, it can conservatively be counted as zero.

3. Determination of carbon stocks in the two pools accounted for in project boundary, living biomass pool and organic soil carbon pool.

1.- In accordance with guidelines established in AR-AMS0007 / Version 01, Chapter II Baseline Methodology Procedure and its item 9 regarding the stratification of project lands, project proponent has adopted a simple 5 strata *ex ante* design where a stratum is defined by both geographical and altitudinal proximity of work areas, as well as similarity of current vegetation cover. The methodology states:

9. Stratification of the planned project area for baseline estimation is not required but may be carried out if it improves the accuracy and precision of biomass estimation.....

a. For baseline net GHG removals by sinks. It will usually be sufficient to stratify the areas on the basis of tree/shrub crown cover;

2.- Following Annex 16 “GUIDANCE ON CONDITIONS UNDER WHICH THE CHANGE IN CARBON STOCKS IN EXISTING LIVE WOODY VEGETATION ARE INSIGNIFICANT” project proponent has determined that baseline net GHG removals by woody vegetation will remain constant and so can be counted as zero for all lands within the project boundary as condition (i) will be met:

> (i) Existing trees and/or shrubs within the area are allowed to remain, are not expected to be impacted by A/R project activities, and shall be excluded from estimates of project net GHG removals by sinks;

This exclusion of existing trees and/or shrubs will be demonstrated during monitoring phase of project following recommendation:

> (a) For condition (i): existing trees and/or shrubs are allowed to remain, are not impacted by project activities, and shall not be included in estimates of project net

GHG removals by sinks, as part of the project management plan how the state of the existing trees and or shrubs is to be maintained (e.g., by permanently marking the trees/shrubs, by controlling the use of fire during site preparation, and by planting only to within some minimum distance of the existing trees/shrubs). Also record and archive as part of the CDM-AR-PDD photographic evidence of the state of the existing vegetation prior to any site preparation;

AR-AMS0007 / Version 01 does not refer to carbon stocks in the below ground biomass of grasslands, but other simplified methodologies (particularly AR-AMS0001 / Version 03, #10 (a) and (b)) determine that if carbon stocks can be expected to decrease without the implementation of the project, they can conservatively be assumed to be constant from the pre-project scenario. In this spirit, as indicated in section **2.5 Additionality** where it is shown that since initial work on this project in 2008 and over a decade of project proponent's familiarity with land in the project boundary no perceptible change has occurred, carbon stocks in grasslands are expected to decline as the result of continuing erosion, grazing and pasture maintenance, and so as a conservative measure will be counted also as zero. This statement is also objectively demonstrated with the multi-temporal analysis included above in section 2.4.

Also, in agreement with AR-AMS0007 / Version 01 #13: "Since carbon stock in soil organic carbon (SOC) is unlikely to increase in the baseline, the change in carbon stock in SOC may be conservatively assumed to be zero for all strata in the baseline scenario".

3.- Again, in agreement with AR-AMS0007 / Version 01 the formula used for calculating baseline Soil Organic Carbon and later change in the SOC with project activity is found in the EB 60 Report Annex 12 A/R Methodological Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities. (Version 01.1.0):

7. The initial SOC stock at the start of the project is estimated as follows:

$$SOC_{INITIAL,i} = SOC_{REF,i} * f_{LU,i} * f_{MG,i} * f_{IN,i}$$

The values used to populate each variable in the formula are taken from the tables 3 and 6 of the same tool and in essence provide a series of factors for the different general strata types which give us the following results:

Strata	SOC initial, i	equals	SOC ref, i	*F LU, i	*F MG, i	*F IN, i	*ha stratum
1-2	3691.6	Santa Rosa-San Tadeo	34	1	0.96	1	113.1
3	2848.9	Rancho Suamox	66	1	0.97	1	44.5
4	2387.0	Salinas	31	1	0.7	1	110
5	3166.8	San Gerónimo	39	1	0.7	1	116
	12094.3 TOTAL SOC t C Initial						

This figure for $SOC_{INITIAL}$ will be used for baseline Soil Organic Carbon pool once converted to tCO_2e; this figure multiplied by standard IPCC conversion formula 44/12 = 44,345.7 tCO_2e. Again, in keeping with this methodological tool, we assume that "the increase in SOC content in the project scenario takes place at a constant rate over a period of 20 years from the year of planting", and so that value that will be included in project calculations. See section **3.4** Summary

of GHG Emission Reductions and Removals below for more details where this figure is included in the column estimated project emissions or removals (tCO2e).

To calculate baseline biomass in non-woody vegetation, again in accordance with AR-AMS0007 / Version 01, default values from the IPCC Good Practices Guide were relied upon. And, to maintain coherence with the treatment of the increase in Soil Organic Carbon, we subtract this amount of baseline tCO2e from project results in equal parts over the 20 year project period. See section **3.4** Summary of GHG Emission Reductions and Removals.

Project Baseline Living Biomass Pool

STRATA	IPCC Climate Zone	IPCC LULUCF Good Practices Guide Table 3.4.9 Default non-woody biomass on land converted to grassland in metric tons dry matter/hectare		t C ha = 1/2 non-woody biomass	Hectares	Total t C Strata	Total tCO2 Strata * 44/12
Pichincha Province, 1-3	Tropical - Moist & Wet		16.1	8.05	157	1263.85	4634.12
Salinas de Ibarra, 4	Tropical - Dry		8.7	4.35	110	478.50	1754.50
San Gerónimo, 5	Tropical - Moist & Wet		16.1	8.05	116	933.80	3423.93
				TOTALS	383	2676.15	9812.55
			Total tCO2 in baseline biomass will be accounted for in twenty equal parts, and quantity subtracted from project net annually, see section 3.4: Summary of GHG Emissions Reductions and Removals				490.6

3.2 Project Emissions

Methodology AR-AMS0007 / Version 01 in the section on estimation of GHG emissions within the project boundary is very clear:

> 19. The only increase in GHG emissions within the project boundary which results from the implementation of the A/R CDM project activity and which is required to be accounted for is the non-CO2 GHG emission from burning of biomass for site preparation and/or forest management.

This project does not plan to nor will use fire as a management tool in the preparation of project lands, and so project emissions will be counted as zero.

3.3 Leakage

Following the recommendation of AR-AMS0007 / Version 01 in the section on Leakage #22 it is only necessary to calculate project leakage if, after using the guidelines mentioned below, the conclusion is that grazing activities displaced by the project are not insignificant. However, in the **CDM – A/R WG** Twenty-sixth meeting Annex 1 DRAFT GUIDELINES ON CONDITIONS UNDER WHICH INCREASE IN GHG EMISSIONS RELATED TO DISPLACEMENT OF PRE-PROJECT

GRAZING ACTIVITIES IN A/R CDM PROJECT ACTIVITY IS INSIGNIFICANT (Version 01) in section III. PROCEDURE:

> 4. The increase in GHG emissions due to displacement of pre-project grazing activities attributable to the A/R CDM project activity is insignificant if at least one of the conditions (a) to (d) below is met:
>
> (b) The total area expected to be displaced is more than 5% of the entire A/R CDM project activity or more than 50 ha, and the n-a ha (where "n" is the area in ha expected to be displaced and "a" is 5% of the total project area or 50 ha) are displaced to:
> (ii) Existing grasslands with the carrying capacity that allows for accommodation of the displaced animals during the entire period of displacement;

Cattle to be displaced from the project boundary are only found in the project lands in Pichincha province, as the lands in Imbabura are abandoned. As mentioned in the section 2.5 Additionality, cattle are present on all project lands in Pichincha but are for the most part not the property of project participants, but rather belong to owners external to the project, renting grazing rights. Applying the formula described above we establish the following:

- n= The project boundary in Pichincha total 157.5 ha
- a= 50 ha
- n-a =107.5

Average stocking rate in this area is roughly one bovine per hectare.[13] Following the formula this means that the areas around the project boundary would need to have the capacity to accommodate roughly 108 head of cattle, and this is clearly the case. Two concrete examples:

1. One neighbor (and possible future project participant) of stratum 1, Santa Rosa, Eduardo Goetschel, has over 100 hectares of pastures currently without cattle, as his land had been rented for several years, but has recently been returned to Eduardo´s control (Pers. Com. Eduardo Goetschel 1 July, 2011.)
2. Project participants Rommy Idrobo and Christian Marlin, partners of La Yumbada, have only recently bought their property with more than 60 hectares of pasture and currently have no cattle. With our project they only plan to reforest 14.3 hectares, the steepest and most degraded area of the farm. This would mean that on their remaining pastures they would have capacity for roughly half the animals that will be displaced by the project. (Pers. Com. Rommy Idrobo, 2 July, 2011.)

Without searching very far, there is currently unstocked pastureland available in the vicinity of the project boundary. Further, project developer from personal knowledge of the area can attest that certainly there are many other similar, under-stocked properties too. Thus, project developer has

[13] Personal observations and experience of project developer, and also page 5: "Secondary forests as temporary carbon sinks? The economic impact of accounting methods on reforestation projects in the tropics", Roland Olschewskia and Pablo C. Benítez in Ecological Economics #55, 2005.

determined that project leakage is insignificant and following AR-AMS0007 / Version 01 will count leakage as zero throughout the project calculations.

3.4 Summary of GHG Emission Reductions and Removals

Project developer, in accordance with AR-AMS0007 / Version 01, has chosen to estimate GHG emission reductions and removals by applying the Equation 3.2.5 "Average Annual Increment in Biomass" from the IPCC Good Practice Guidance for LULUCF, chapter 3.2 Forest Land.

EQUATION 3.2.5
AVERAGE ANNUAL INCREMENT IN BIOMASS

$G_{TOTAL} = G_W \bullet (1 + R)$ **(A)** In case aboveground biomass increment (dry matter) data are used directly. Otherwise G_W is estimated using equation B or its equivalent

$G_W = I_V \bullet D \bullet BEF_1$ **(B)** In case net volume increment data are used to estimate G_W.

Where:

G_{TOTAL} = average annual biomass increment above and belowground, tonnes d.m. ha^{-1} yr^{-1}

G_W = average annual aboveground biomass increment, tonnes d.m. ha^{-1} yr^{-1}; Tables 3A.1.5 and 3A.1.6

R = root-to-shoot ratio appropriate to increments, dimensionless; Table 3A.1.8

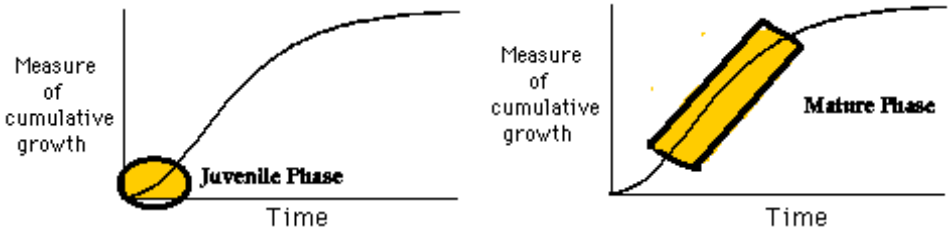
To arrive at G_{TOTAL}, the appropriate values for G_W and R were found in tables 3A.1.5, 3A.1.6 and 3A.1.8 of the Annex 3A.1 Biomass Default Tables for Section 3.2 Forest Land of the IPCC Good Practice Guidance. As a conservative measure, as our species diverse plantations will have features of assisted natural regeneration, for G_W values we have used an average of the values found in table 3A.1.5 for natural regeneration and those found in table 3A.1.6 for forest plantations. As described in chapter 4 "Monitoring" this project will enjoy the participation of the Catholic University of Leuven and the University Ghent from Belgium and project partner organization Groenhart, and ongoing monitoring of results will generate much more precise information as to *ex post* project results. As this project is funded and beginning the implementation stage, project developer feels confident that this conservative calculation will meet contractual obligations.

Strata	Gtotal	equals	Gw, natural regeneration Table 3A.1.5	Gw, plantation Table 3A.1.6	*(1+R)	R Table 3A.1.8	Hectares
1	985.3	Santa Rosa	10	17	1.42	0.42	51.4
2	1182.8	San Tadeo, etc.	10	17	1.42	0.42	61.7
3	853.1	Rancho Suamox	10	17	1.42	0.42	44.5
4	405.1	Salinas	1.8	4	1.27	0.27	110
5	1194.2	San Gerónimo	4	10.5	1.42	0.42	116
	4620.5	TOTAL Biomass tonnes dry matter/year					
Half of Biomass		Multiplied by IPCC standard 44/12					
Result C	2310	Result tCO2e	8471	Annual Removals by Sinks			

Demonstrates baseline biomass removals, Soil Organic Carbon (SOC) and annual average removals by sinks over project lifetime.

Years	Estimated baseline emissions or removals (tCO2e)	Estimated evolution of SOC (tCO2e)	Estimated annual average project removals by sinks (tCO2e)	Estimated net GHG emission reductions or removals (tCO2e)
2011			0	0.00
2012	-490.6	480.72	8470.99	8461.11
2013	-490.6	480.72	8470.99	8461.11
2014	-490.6	480.72	8470.99	8461.11
2015	-490.6	480.72	8470.99	8461.11
2016	-490.6	480.72	8470.99	8461.11
2017	-490.6	480.72	8470.99	8461.11
2018	-490.6	480.72	8470.99	8461.11
2019	-490.6	480.72	8470.99	8461.11
2020	-490.6	480.72	8470.99	8461.11
2021	-490.6	480.72	8470.99	8461.11
2022	-490.6	480.72	8470.99	8461.11
2023	-490.6	480.72	8470.99	8461.11
2024	-490.6	480.72	8470.99	8461.11
2025	-490.6	480.72	8470.99	8461.11
2026	-490.6	480.72	8470.99	8461.11
2027	-490.6	480.72	8470.99	8461.11
2028	-490.6	480.72	8470.99	8461.11
2029	-490.6	480.72	8470.99	8461.11
2030	-490.6	480.72	8470.99	8461.11
2031	-490.6	480.72	8470.99	8461.11
Total	-9812	9614.40	169419.8	169222

Next, to develop a clearer estimate of actual estimate project performance, the estimated annual average project removals by sinks were distributed over the 20 year crediting period following standard growth curves for mixed species forest.



Years	Estimated baseline emissions or removals (tCO2e)	Estimated project emissions or removals (tCO2e)	Estimated leakage emissions (tCO2e)	Estimated net GHG emission reductions or removals (tCO2e)
2011			0	0.00
2012	-490.6	2174.92	0	1684.32
2013	-490.6	3869.12	0	3378.52
2014	-490.6	5563.31	0	5072.71
2015	-490.6	7257.51	0	6766.91
2016	-490.6	8104.61	0	7614.01
2017	-490.6	8951.71	0	8461.11
2018	-490.6	8951.71	0	8461.11
2019	-490.6	9798.81	0	9308.21
2020	-490.6	9798.81	0	9308.21
2021	-490.6	10222.36	0	9731.76
2022	-490.6	10222.36	0	9731.76
2023	-490.6	10307.07	0	9816.47
2024	-490.6	10307.07	0	9816.47
2025	-490.6	10476.49	0	9985.89
2026	-490.6	10645.91	0	10155.31
2027	-490.6	10476.49	0	9985.89
2028	-490.6	10476.49	0	9985.89
2029	-490.6	10476.49	0	9985.89
2030	-490.6	10476.49	0	9985.89
2031	-490.6	10476.49		9985.89
Total	-9812	179034.20	0	169222

4 MONITORING

This project is designed as a natural restoration project within 2 watersheds[14] with a multiple benefit aim:

1) climate change mitigation by GHG removals, in particular carbon sequestration;
2) biodiversity restoration, and
3) community development.

Monitoring entails the utilization of all information related to project development to estimate at a certain moment during the project crediting period the GHG removals (VCS and CCB standard) and to assess the project results related to biodiversity and community (CCB standard).

Monitoring activities include gathering information directly from the field and from indirect sources. Further, monitoring involves making the required calculations and estimations to assess if the project is being developed according to the project design documents and the forest management plan, with the final aim to determinate GHG removals and community and biodiversity impacts.

- Continuous monitoring of project sites and forest management will take place (e.g., site preparation and planting, re-planting, and areas affected by disturbances).
- Monitoring of survival rate will be done during the early stage of the forest establishment, covering the 1-3 year period after the planting activity. Replants will be done at latest in 2014.
- Monitoring of firebreaks will be done during the establishment and maintenance phases during the first 3 years in Stratum 5.
- The monitoring of the project and strata boundaries will be done on a regular basis.
- Monitoring of the social/community aspects will be done following the standards of the community section of the CCB standards.
- Monitoring of the biodiversity aspects will take place following the standards of the biodiversity section of the CCB standards.

Part of this monitoring process includes the installation of permanent sample plots to measure

- the growth of the trees and the amount of sequestered carbon in their biomass and
- the content of organic carbon in the soil

The collected data within the sample plots will serve the main monitoring purpose within the climate theme: the determination and verification of GHG removals.

Monitoring of leakage will be neglected, as no significant grazing and fuel-wood collection takes place according to the assumed baseline scenario.

Monitoring will be conducted by a professional team. Personnel will be trained to ensure data quality.

In accordance with the CCB Standards (Version June 21, 2010) project proponent and third-party monitors will develop a CCB Standards monitoring plan to be integrated with the following monitoring structure in the six-month period after project start date, November 1st, 2011.

[14] Strictly speaking stratum 3 is located in a third watershed adjacent to the Pachijal, Rio Cuberas.

4.1 Data and Parameters Available at Validation

Data Unit / Parameter:	BEF_2
Data unit:	Dimensionless
Description:	Biomass expansion factor for conversion of stem biomass to above-ground biomass for tree species or group of species j
Source of data:	IPCC default value
Value applied:	Table 3A 1.10
Justification of choice of data or description of measurement methods and procedures applied:	
Any comment:	

Data Unit / Parameter:	CF
Data unit:	Dimensionless
Description:	Fraction of carbon in dry matter
Source of data:	IPCC default value
Value applied:	0,5
Justification of choice of data or description of measurement methods and procedures applied:	
Any comment:	

Data Unit / Parameter:	D_j
Data unit:	Dimensionless
Description:	Basic wood density (tonnes d.m. per m) of $species_j$
Source of data:	IPCC and USDA wood densities
Value applied:	
Justification of choice of data or description of measurement methods and procedures applied:	
Any comment:	The wood densities are not available of all species that will be used. In case of missing data a conservative default value will be used.

Data Unit / Parameter:	R_j
Data unit:	Dimensionless
Description:	Root-shoot ratio of species$_j$
Source of data:	IPCC table 3A 1.8
Value applied:	
Justification of choice of data or description of measurement methods and procedures applied:	
Any comment:	

Data Unit / Parameter:	$f_j(DBH,H)$
Data unit:	tonnes per tree
Description:	allometric function linking a diameter or height of a tree$_j$ to above-ground biomass
Source of data:	
Value applied:	
Justification of choice of data or description of measurement methods and procedures applied:	
Any comment:	

Data Unit / Parameter:	$V_{tree,j}$
Data unit:	m^3
Description:	stem volume of given age/diameter/height
Source of data:	
Value applied:	
Justification of choice of data or description of measurement methods and procedures applied:	
Any comment:	

Data Unit / Parameter:	F_f
Data unit:	Dimensionless
Description:	Form factor of stem

Source of data:	Default tables
Value applied:	
Justification of choice of data or description of measurement methods and procedures applied:	
Any comment:	http://fennerschool-associated.anu.edu.au/mensuration/shape.htm "Allometric equations for four valuable tropical tree species"

4.2 Data and Parameters Monitored

Data Unit / Parameter:	GPS coordinates of the boundaries of stratum$_i$
Data unit:	X and Y coordinates
Description:	
Source of data:	
Description of measurement methods and procedures to be applied:	GPS
Frequency of monitoring/recording:	Yearly till 2015
Value applied:	N/A
Monitoring equipment:	GPS and GIS (Arc-view) software
QA/QC procedures to be applied:	
Calculation method:	
Any comment:	

Data Unit / Parameter:	GPS coordinates of the plot center of sample plot$_i$
Data unit:	X and Y coordinates
Description:	
Source of data:	
Description of measurement methods and procedures to be applied:	GPS
Frequency of monitoring/recording:	Once at baseline set-up
Value applied:	N/A
Monitoring equipment:	GPS and GIS (Arc-view) software
QA/QC procedures to be applied:	
Calculation method:	

Any comment:	

Data Unit / Parameter:	DBH_i
Data unit:	Cm
Description:	Diameter at breast height (1,30 m) of $tree_i$
Source of data:	Measured
Description of measurement methods and procedures to be applied:	
Frequency of monitoring/recording:	Yearly during period 2011-2016, 2-yearly during 2018-2031
Value applied:	
Monitoring equipment:	
QA/QC procedures to be applied:	
Calculation method:	
Any comment:	Will be used to calculate the volume.

Data Unit / Parameter:	H_i
Data unit:	M
Description:	Height of the $tree_i$
Source of data:	Measured
Description of measurement methods and procedures to be applied:	
Frequency of monitoring/recording:	Yearly during period 2011-2016, 2-yearly during 2018-2031
Value applied:	
Monitoring equipment:	
QA/QC procedures to be applied:	
Calculation method:	
Any comment:	Will be used to calculate the volume.

Data Unit / Parameter:	Soil $texture_i$
Data unit:	
Description:	Main texture of the soil $sample_i$
Source of data:	
Description of measurement methods and	

procedures to be applied:	
Frequency of monitoring/recording:	Once at baseline set-up
Value applied:	
Monitoring equipment:	
QA/QC procedures to be applied:	
Calculation method:	
Any comment:	

Data Unit / Parameter:	$Soil\ type_i$
Data unit:	
Description:	$Type\ of\ the\ soil\ of\ the\ plot_i$
Source of data:	
Description of measurement methods and procedures to be applied:	
Frequency of monitoring/recording:	Once at baseline set-up
Value applied:	
Monitoring equipment:	
QA/QC procedures to be applied:	
Calculation method:	
Any comment:	

Data Unit / Parameter:	$Soil\ depth_i$
Data unit:	Cm
Description:	$Soil\ depth\ within\ plot_i$
Source of data:	
Description of measurement methods and procedures to be applied:	
Frequency of monitoring/recording:	Once at baseline set-up
Value applied:	
Monitoring equipment:	
QA/QC procedures to be applied:	
Calculation method:	
Any comment:	

Data Unit / Parameter:	Soil $mass_j$
Data unit:	G
Description:	Mass of soil $sample_j$
Source of data:	
Description of measurement methods and procedures to be applied:	
Frequency of monitoring/recording:	Yearly during period 2011-2016, 2-yearly during 2018-2031
Value applied:	
Monitoring equipment:	
QA/QC procedures to be applied:	
Calculation method:	
Any comment:	

Data Unit / Parameter:	Soil $volume_i$
Data unit:	Cm^3
Description:	Volume of soil $sample_i$
Source of data:	
Description of measurement methods and procedures to be applied:	
Frequency of monitoring/recording:	Yearly during period 2011-2016, 2-yearly during 2018-2031
Value applied:	
Monitoring equipment:	
QA/QC procedures to be applied:	
Calculation method:	
Any comment:	

4.3 Description of the Monitoring Plan

4.3.1 Purpose of the monitoring plan

This Monitoring Plan fulfills the requirement that the project activity should have credible and accurate monitoring procedures in place to enable the evaluation of project performance and verification of the net anthropogenic GHG emission removals, and also the social and ecological impacts. It sets out monitoring procedures that follow the provisions outlined in this Project Description, the approved monitoring methodology AR-AMS0007 Version 01 and the CCB standards.

4.3.2 The monitoring plan in general

Year	Project implementation and forest management	Carbon monitoring	Community and Biodiversity monitoring
2011	Contracting land owners	baseline monitoring soil and living biomass	baseline monitoring Comm-BD criteria CCB-standard
	Contracting nurseries		
	Contracting labor		
	Planting phase I in strata 1 to 5		
2012	Weeding stands phase I in strata 1 to 5	monitoring soil and living biomass	monitoring Comm-BD criteria CCB-standard
	Watering stands in stratum 5		
	National registration of stands planted in 2011		
	Replanting stands phase I in strata 1 to 5		
	Planting phase II in strata 1 to 5		
	Motivating natural regeneration		
2013	Weeding stands phase I in strata 1 to 5	monitoring soil and living biomass	monitoring Comm-BD criteria CCB-standard
	Weeding stands phase II in strata 1 to 5		
	Watering stands in stratum 5		
	National registration of stands planted in 2012		
	Replanting stands phase II in strata 1 to 5		
	Planting phase III in strata 1 to 5		
	Motivating natural regeneration		
2014	Weeding stands phase II in strata 1 to 5	monitoring soil and living biomass	monitoring Comm-BD criteria CCB-standard
	Weeding stands phase III in strata 1 to 5		
	Watering stands in stratum 5		
	National registration of stands planted in 2013		
	Replanting stands phase III in strata 1 to 5		

	Planting phase III in strata 1 to 5 Motivating natural regeneration		
2015		monitoring soil and living biomass	monitoring Comm-BD criteria CCB-standard
2016	technical evaluation of stands and social assessment with owners	monitoring soil and living biomass	
2017			
2018	technical evaluation of stands and social assessment with owners	monitoring soil and living biomass	
2019			
2020	technical evaluation of stands and social assessment with owners	monitoring soil and living biomass	monitoring Comm-BD criteria CCB-standard
2021			
2022	technical evaluation of stands and social assessment with owners	monitoring soil and living biomass	
2023			
2024	technical evaluation of stands and social assessment with owners	monitoring soil and living biomass	
2025			
2026	technical evaluation of stands and social assessment with owners	monitoring soil and living biomass	monitoring Comm-BD criteria CCB-standard
2027			
2028	technical evaluation of stands and social assessment with owners	monitoring soil and living biomass	
2029			
2030			
2031 2032-2042	technical evaluation of stands and social assessment with owners Implementation of sustainable, participative management plans	monitoring soil and living biomass	monitoring Comm-BD criteria CCB-standard

4.3.3 Data management

General instructions on data collection

Collecting reliable field measurements is an important part of quality assurance (QA). Standard Good practices be followed to collect reliable data to ensure credibility in the estimation of the baseline, project emissions, leakage, and GHG removals. Particular attention shall be paid to

monitoring and measurement errors. This issue will be addressed through mandatory data checks and training of field personnel.

Data storage

The project entity shall make necessary arrangements for data entry on the registry forms. The forms shall be both in paper and electronic formats to ensure that the information is stored in multiple ways. Generally data are collected in paper formats following the good practices during field measurement. Data are then transferred to a database. All paper and electronic formats are stored in MCF's offices either in Quito or Ibarra. Further, the entity shall ensure the transfer of data to the spreadsheet database. The data shall be archived using acceptable standards and stored in compliance with the instructions of the project information management system. The electronic data shall be stored securely at multiple locations using backup procedures.

Information management system

The project information management links the operations of the field data collection and spreadsheet database. Further it outlines responsibilities of staff involved in collecting field data and organization of the spreadsheet database. The supervisory staff overseeing the field data and spreadsheet database must check and certify the data. If any changes occurred in the data collected and processed during the month, the supervisory staff has to provide necessary clarification.

Monitoring periods and frequency

Cfr general plan

Good practices

The project personal shall use good practices for data collection. All measured and experimental data shall be documented and archived. Those good practices will enable measuring and estimating net carbon stock changes associated with the plantations under the project activity, as well as general monitoring of forestry operations. The project personal shall keep records of all activities, like changes in the actual planted areas, site preparation and forest management.

Also, in accordance with the 14 required standards and the optional standard GL3 of the CCB, project will develop robust monitoring plan not only for changes in carbon stocks but also for community and biodiversity impacts with inputs from the various partner organizations and participating universities and institutions.

4.3.4 Stratification and sampling design

The *ex ante* stratification of project is based on geophysical and climatic characteristics of the area that influence the planting scheme. Then, an *ex post* stratification will be conducted after each monitoring event, and if proved necessary, substrata will be defined to address possible changes of project boundary and plantation management in comparison to the project design. The *ex post* stratification will also address the change in carbon stocks if they are more or less variable than it is expected. Sub-strata may be grouped into one sub-stratum if they demonstrate similar tree composition, carbon stock, carbon stock change and spatial variation. Otherwise, new substrata may be defined. The ex post stratification shall be updated for the following reasons:

- Unexpected disturbances occurring during the crediting period (e.g. due to fire, pests or disease outbreaks) that have differing impacts on various parts of an originally homogeneous stratum;

- Forest management activities (cleaning, planting and re-replanting) that are implemented in a way that affects the existing stratification.
- Differing performance and results of project plantations.
- Established strata may be merged if reasons for their definition have disappeared.

The following properties of the sampling design will be taken into consideration:

1. **Sampling Frame –** The sample frame is the actual set of units from which a sample is drawn. In the case of the applied random sample, all units from the sampling frame have an equal chance to be drawn and to occur in the sample. The sampling frame generally coincides with the population of interest – the area reforested throughout the reforestation project activity. Permanent sample plots (PSPs) are used for sampling over time to measure and monitor changes of the relevant carbon stocks. Permanent plots will be installed prior to the first verification but may not be installed at time 0. GPS readings will be taken at the centre of the plot and the radius of the plot will be set. The sample plots are used to take measurements such as tree height, DBH and species type. The plots are treated in the same way as the rest of the stratum and/or sub-stratum, in terms of site preparation and weeding.

Inside the sample plots unique number tags are assigned on all trees, when trees reach a diameter of ≥ 2.5 cm at DBH. The unique tree ID allows keeping track of the information concerning individual trees. For all trees the DBH measurement will be taken at a height of 1.3 m. This is good practice in inventory and assures that the same point is measured continuously.

The field forms for every PSP shall be recorded and kept in the PSP file.

To calculate the number of PSP's required per stratum to reach a confidence level of 90 %, the equation from annex 15 (EB58) to AR-AMS0007 version 01 will be used.

Data will be collected using the same method for all strata. This field sampled data are further processed to generate summarized statistics and finally estimate mean carbon stocks and variance for each stratum and/or sub-stratum. Because the actual variability of the project stratum will be unknown and some plots may be lost, to guarantee conservative results, the number of plots will be increased by 10% from the number determined using the method described above.

2. **Plot size** – Circular shaped PSPs of 201 m2 (radius of 8 m) will be used, since these are easy to establish and re-measure within the terrain of the project boundary.

3. **Locating permanent sample plots –** The plots will be ad random located in each stratum to avoid subjective choice of plot locations. The plot locations will be identified with the help of a GPS device in the field. For each plot the geographic position (GPS coordinates of the plot center) will be recorded and archived. The PSPs will be established before the first monitoring takes place and measured for each monitoring event. In the case of special circumstances (e.g., forest fires, uneven growth) additional PSPs may be laid out.

4.3.5 Monitoring of project implementation: forest establishment and forest management

The project personnel shall monitor the implementation of the project through monitoring the:

- Boundary
- Forest establishment
- Forest management

The project monitoring team will monitor and record the boundaries of the project and all strata and substrata on which the reforestation project activity is undertaken over the crediting period. Sample plots will be installed in these substrata and strata throughout the project boundary.

A special aspect of monitoring the reforestation project activity is the variety of tree species being planted in eligible areas and requires particular attention. Changes in the sample plots of any strata and substrata will be recorded, including the areas of disturbance due to natural (e.g., fire and pests) and/or anthropogenic factors.

The project personnel shall ensure that the established plantations are protected over the crediting period. Firebreaks will be established in Stratum 5. In the case of fire and pests outbreak the stratum affected shall be recorded and mapped. Replanting of the areas should be done and data recorded for each stratum. The factors affecting the carbon stock changes shall be monitored.

Monitoring project boundary

The monitoring of the project boundary (strata and substrata) will be done using direct ground truthing of every project polygon in the field with GPS. The project boundary will be thoroughly monitored yearly during the first 3 years. The geographical coordinates (latitude and longitude) of each corner of the parcel polygon are determined using GPS, collected and exported to the GIS software (ArcView). There they are further processed to generate monitoring maps of the actual project boundary including species and year planted.

From 2015 onwards, boundary will be monitored by observation. When these yearly field surveys (observational) are used to monitor the project boundary (strata and sub-strata), the existence and permanence of related permanent marks is controlled. During the crediting period the natural boundaries (e.g., rivers, valleys, roads, vegetation features) are used as reference, and where no natural boundary exists barbed wire fences on living fence posts have been established.

Any discrepancies between the area reported and the area estimated under the proposed reforestation project activity in any part of a strata and/or sub-strata shall be recorded and reported.

Monitoring forest establishment

Good practices of commonly accepted forest management will be implemented to ensure that planting practice and quality conforms to that described in the Project Description.

The following monitoring activities will be conducted as part of the forest establishment:

- Register the type of activities applied for site and soil preparation, and the area involved.
- Register the planting activities: date, area, tree species, planting distance and area of stratum and/or sub-stratum.
- Document and explain any deviation from the planned forest establishment.
- Survival checking:
    - The survival rate of planted trees will be counted from year 1 to year 3 of the plantation. Re-planting shall be conducted within the next planting season, if the survival rate is lower than 80 percent of the final planting density.
    - The checking of the survival rate will be conducted when routine maintenance is carried out. Monitoring is done in temporary sample plots of 10x10 meters. As rule of a thumb a minimum of 10 plots per 100 ha (of the same stratum and/or sub-stratum) should be selected randomly.
        - In stratum 1 (51.4 ha): 5 plots
        - In stratum 2 (61.7 ha): 6 plots
        - In stratum 3 (44.5 ha): 4 plots
        - In stratum 4 (110 ha): 11 plots

  - In stratum 5 (116 ha): 12 plots
- Register and document the installation of firebreaks.
- Document and explain the use and amount of fertilizer used for the forest establishment.

Monitoring of forest management

Commonly accepted forest management techniques will be used by the project. The following practices will be monitored:

- Weeding: date, area, location (stratum and/or sub-stratum)
- Fertilizer application: date, location (stratum and/or sub-stratum), type and amount of fertilizer used, and reason for fertilization.
- Register disturbances: date, location (stratum and/or sub-stratum), GPS coordinates, area and type of disturbance.
- Confirm, check and document the information on forest protection practices such as firebreaks.

4.3.6 Monitoring of GHG emissions and removals

As per the provisions of the baseline methodology selected, carbon stocks in deadwood and litter are not monitored.

GHG emissions by sources do not need to be monitored because they are not significant. According to the methodology AR-AMS0007 Version 01: The only increase in GHG emissions within the project boundary which results from the implementation of the A/R CDM project activity and which is required to be accounted for is the non-CO_2 GHG emission from burning of biomass for site preparation and/or forest management. Since there is no burning involved for site preparation, these emissions are **insignificant**. Monitoring anyway will make sure that this assumption for the exclusion made in the *ex ante* assessment will still hold in the ex post situation.

Therefore, changes in carbon stocks equal the carbon stock changes in above-ground, below-ground biomass and soil organic carbon within the project boundary.

$$\Delta C_{project} = \Delta C_{t} - \Delta C_{Baseline} - Leakage$$

Baseline net GHG removals by sinks

According to the methodology AR-AMS0007 Version 01, the carbon stock changes of the baseline net GHG removal by sinks are set to zero and do not need to be monitored over the project lifetime.

Leakage

The leakage represents the increase in GHG emissions by source that occurs outside the boundary of a reforestation project activity. Leakage is measurable and attributable to the reforestation project activity.
In the case of this reforestation project, according to the methodology AR-AMS0007 Version 01: The increase in GHG emissions due to displacement of pre-project grazing activities attributable to the A/R CDM project activity is **insignificant** because

The total area expected to be displaced is more than 5% of the entire A/R CDM project activity or more than 50 ha, and the n-a ha (where "n" is the area in ha expected to be displaced and "a" is 5% of the total project area or 50 ha) are displaced to:

Existing grasslands with the carrying capacity that allows for accommodation of the displaced animals during the entire period of displacement.

Since the application of the "Guidelines on conditions under which increase in GHG emissions related to displacement of pre-project grazing activities in A/R CDM project activity is insignificant" does lead to the conclusion that the applicable increase in GHG emissions is insignificant, then leakage from displacement of agricultural activities shouldn't be estimated.

Actual net GHG removals by sinks/carbon pools:

1. ABOVE-GROUND AND BELOW-GROUND BIOMASS

Data will be taken and registered in an excel file (cfr annex x: biomass).

MEASURING AND ESTIMATING CARBON STOCK AFTER ESTABLISHMENT

$$C= (V.D.BEF_2).(1+R).CF$$

With $V= DBH . H . F_f$

As recommended by the Good Practices Guide for LULUCF, if national or site specific ratios are available or have been developed they should be used to estimate volume and biomass. Due to the absence of species specific parameters (project and regional) for the Biomass Expansion Factor (BEF) and Root-to-shoot ratio (R) the project participants use default values from the Good Practices Guide LULUCF, 2003.

The BEF_2 given in Table 3A.1.10 of the GPG LULUCF represent averages with a range for average growing stock and age. The project participants use the BEF for the climate zone "Tropical Broadleaf" in the carbon model: 3.4 (2.0-9.0). The BEF is reduced to the lowest level to follow the conservative approach.

The R given in Table 3A.1.8 of the GPG LULUCF represent average values with a range for growing stock and age. The project participants use the R for "secondary tropical/subtropical forest" in the carbon model: 0.42 (0.14-0.83). Following a conservative approach, the lowest value of the range is applied.

Species specific values for the basic wood density will be applied to convert the volume to biomass as displayed in the table below. Following a conservative approach, the lowest value of the range is applied.

Scientific name	Family	Common name	Basic wood density (t d.m/m3)
Acacia macrocantha		Espino, faique	
Alnus nepalense		Aliso	
Anona purpurea		Cabeza de negro	
Bactris gasipaes		Chontadura	
Borojoa patinoi		Borojó	0,52
Brosimmum utile		Sande	0,41: 0,46+

Brownea hertae		Clavellín	
Caesalpina spinosa		Guarango or Tara	1,05
Carapa guianensis		Tangaré	0,47
Castilla elastic		Caucho	
Casuarina equisetifolia		Casuarina	0,81
Cecropia sp		Guarumo	0,36
Cedrela montana		Cedro	0,40; 0,46+
Cedrela odorata		Cedro	0,40; 0,46+
Chysophyllum caimito		Caimito	
Clusia crenata		Sangre de Gallina	
Cordia alliadora		Laurel	0,48
Croton lecheri		Sangre de Drago	
Gliricidia sepium		Yuca de Ratón	
Hyeroina chocoensis		Mascarey	
Inga sp		Guabo	0,49; 0,52; 0,58; 0,64+
Iriiartea deltoid		Pambil	
Jacaranda copalba		Jacaranda	0,55
Juglans neotropica		Nogal	
Leucaena		Leucaena	0,64
Machura tinctoria		Moral fino	
Mammea Americana		Mamey	0,62
Melastomatacea sp		Colcas	
Ochroma pyramidale		Balsa	0,30
Psidium guajave		Guayaba	
Schinus molle		Molle	
Symphonia globulifera		Azufre	0,68
Sysygium malaccense		Pera de agua	
Tecoma stans		Cholán	
Trema integerrima		Sapán	
Trema micrantha		Sapán de paloma	
Triplaris cuminngiana		Fernán sánchez	0,56
Vismia obtuse		Sangre de gallina	0,41
		Manteca de Puerco	
		Guayacán Pechiche	
		Moral Bobo	
		Chíparo	
		Copal	
		Mambla	
		Jagua	

For species where specific basic wood densities could not yet be identified from the literature, data will be looked for during the project running and in case one would not find it, a conservative value of 0.3 would be applied.

MEASURING AND ESTIMATING CARBON STOCK CHANGES OVER TIME

The changes in the above-ground biomass and belowground biomass will be estimated using BEFs or allometric equations, depending on their availability. If no allometric equation is available for calculating volumes, volume calculations will be based on DBH and height measurement.

$$\Delta C_{i,t2} = (C_{t2}-C_{t1})/(t2-t1)$$

SOIL ORGANIC CARBON

Data will be taken and registered in an excel file (cfr annex x: soil carbon).

MEASURING AND ESTIMATING CARBON STOCK BEFORE ESTABLISHMENT OF TREES (BASELINE)

C = volume weight . % C

MEASURING AND ESTIMATING CARBON STOCK CHANGES OVER TIME

$$\Delta C_{i,t2} = (C_{t2}-C_{t1})/(t2-t1)$$

Methodology

The determination of the carbon content will be based on the *Walkley & Black* method. This method is generally known and is often used as a reference for other methods with the same purpose (Schumacher, 2002). In brief, for the Walkley & Black method, the organic carbon is determined by the amount of dichromate consumed by the organic carbon. The amount of dichromate consumed is determined by a titration with an iron solution (Grobler et al, 1979). Advantages of this method are the low cost, limited time and number of instruments (Grobler et al, 1979; Schumacher, 2002).

In the laboratory, the following steps are required:

- Mix 1 gram of dry soil with an excess (10 ml) of K2Cr2O7; add 20 ml H2SO4 to the mix, shake and let it rest during half an hour;
- After that half hour, add another 150 ml of distilled water, 10 ml of H3PO4 85% and 1 ml of diphenylamine;
- Titrate the excess K2Cr2O7 which did not react with the organic matter. Use FeSO4 until there is a colour change from violet to green

This procedure should also be carried out “blank” without soil sample. The quantity of carbon in the sample can be calculated based on the added amount of dichromate. The overall chemical reaction is represented by the following formula (Schumacher, 2002):

$$2Cr_2O_7^{2-} + 3\,C + 16H^{+} = 4Cr^{3+} + 3CO_2 + 8H_2O$$

One has to remember that with this method not all carbon will be oxidized. Only 75% of the amount of carbon will be, on average, oxidized (Schumacher, 2002). The resulting quantity is therefore multiplied with a generally accepted factor of 4/3 to get the total carbon content (Vanhoof et al, 2006). Ultimately the percentage of carbon in the sample can be calculated with the following formula:

$$\frac{\text{g C}}{\text{g dry soil}}\ (\%) \ = \ 4 \times \frac{(\text{a} - \text{b})}{\text{a}}$$

a = the quantity added to the blank ml $FeSO_4$
b = the amount added to the sample ml $FeSO_4$

By using the volume weight, the carbon sequestration (mass / volume) in the sample may be determined. The volume weight we define as follows:

$$\text{Volume weight} = \frac{\text{mass dry soil (g)}}{\text{volume soil sample } (\text{cm}^3)}$$

The carbon sequestration in each soil sample (g / cm ³) can be calculated by multiplying the volume weight with the carbon percentage. These values are then converted to carbon sequestration in soil volume (tonnes / ha) by starting from a soil depth that will be determined when doing the soil investigation.

4.3.7 Monitoring community aspects

The CCB standards will be followed as guidelines to elaborate a detailed community monitoring plan. Beside the more general standards tackling community aspects, as described in the general part of the CCB standards, monitoring will focus particularly on the standards of the community section.
The monitoring plan will indicate which communities and other stakeholders will be monitored, and identify the types of measurements, the sampling method, and the frequency of measurements.

Hereafter impacts that will be monitored are briefly enumerated. A couple of corresponding questions will help start up the monitoring process:

1) Impact on the social and economic well-being of the involved communities living inside the project zone

- Are costs and benefits equitably shared among involved target groups during the project lifetime?
- Which indicators will be used to measure social and economic well-being within the project zone? What is the baseline?
- Which natural resources and ecosystem services are important for the people from the project area?
- Which indicators will be used to measure changes in natural resources and ecosystem services identified as important by the communities? What is the baseline?

2) Impact on the High Conservation Values of particular importance to the communities' well-being in the project zone

- Which High Conservation Values are of particular importance to the communities' well-being?
- Which indicators will be used to measure changes in these High Conservation Values?

3) Impact on the social and economic well-being of the involved communities living outside the project zone

- Which area will be considered as outside project zone?
- Which indicators will be used to measure social and economic well-being outside the project zone? What is the baseline?
- Does the project cause any negative impacts?
- If so, how does the project plan to mitigate these negative offsite social and economic impacts.

Answers on these questions will help to select the community variables to be monitored and the frequency of monitoring of any of these variables so that the full monitoring plan can be ready within twelve months of validation. This plan and the results of monitoring will be disseminated, ensuring that they are made publicly available on the internet and are communicated to the communities and other stakeholders.

4.3.8 Monitoring biodiversity

The CCB standards will be followed as guidelines to elaborate a detailed biodiversity monitoring plan. Beside the more general standards tackling biodiversity aspects, as described in the general part of the CCB standards, monitoring will focus particularly on the standards of the biodiversity section. Please see Annex 1 CCB Compliance Key.

GOLD LEVEL EXCEPTIONAL BIODIVERSITY BENEFITS

This project will be monitored for the Gold Level Exceptional Biodiversity Benefits. Within this project zone is indeed a site of high biodiversity conservation priority. Please see Annex 1 CCB Compliance Key.

4.4 Organizational structure

4.4.1 Schematic presentation

The monitoring activity entails 4 main tiers with different actors responsible for each:

1) Coordination
2) Scientific input and output
3) Daily implementation and administration
4) Field assistance

The following table enumerates the actors involved:

<table>
<tr><th></th><th>Project implementation and forest management</th><th colspan="2">Carbon</th><th>Community</th><th>Biodiversity</th></tr>
<tr><th></th><th></th><th>Biomass</th><th>Soil</th><th></th><th></th></tr>
<tr><td>Final responsibility</td><td colspan="4">VBV</td><td></td></tr>
<tr><td>Coordination</td><td colspan="4">Groenhart</td><td></td></tr>
<tr><td rowspan="4">Scientific input and output</td><td>KUL</td><td>UGent</td><td>UGent</td><td>KUL</td><td>MCF</td></tr>
<tr><td rowspan="3">Forestry dept of Northern Technical University in Ibarra (UTN)</td><td>KUL</td><td>KUL</td><td rowspan="3">Northern Technical University in Ibarra (UTN)</td><td>UGent</td></tr>
<tr><td>(VITO)</td><td>(VITO)</td><td rowspan="2">Northern Technical University in Ibarra (UTN)</td></tr>
<tr><td>Forestry dept of Northern Technical University in Ibarra (UTN)</td><td>PROMAS, University of Cuenca</td></tr>
<tr><td>Daily implementation and administration</td><td colspan="5">MCF</td></tr>
<tr><td>Assistance in the field</td><td colspan="5">MCF & Local owners and employees</td></tr>
</table>

4.4.2 Actors involved: their responsibilities and competencies

- **Association for Forests in Flanders, Belgium (VBV)**
  This is the Belgian association with final responsibility of the project, having signed the agreement with the main financing entity. As their work is focused on forests in Flanders, Belgium, they subcontract their sister organization, Groenhart, as the daily project manager.

- **Groenhart, Belgium**
  Groenhart is a Belgian non-governmental organization for development & co-operation that states that the natural resources of the South belong at first to the local population. Groenhart finds it reasonable to stimulate processes that allow that population to use the advantages these natural resources offer, in an optimal and sustainable way.
  Groenhart is active with project management in South America: Bolivia, Ecuador, Peru and Chile. Its activities focus on forestry themes: forest preservation, sustainable management, restoration, forestation and reforestation.
  Groenhart, as administrator of the Flemish Fund for Tropical Forests, has cooperated with MCF since 2008, when MCF was granted 2 funds for developing the 2 different Project

Design Documents that are now bundled into one. In its updated form it is the basis for this project with multiple aims.
Groenhart has experience with reforestation activities in the tropical context.
Groenhart will be administrating the project, its implementation and its monitoring. Groenhart will be the central actor coordinating the monitoring process with other involved actors.

- **Catholic University of Louvain, Belgium (KUL)**
  VBV and Groenhart have very close contacts with the Faculty of Bio-engineering, Department of Forestry and Natural Sciences of the Catholic University of Louvain. A senior professor, with great experience in tropical forestry, climate change and biodiversity issues, Prof. Bart Muys, is president of VBV and a member of Groenhart. He has been part of the project team of VBV since the beginning of this project and was involved in the negotiations and contract with the main financing entity.
  Prof. Muys is also coordinator of a well known academic consortium, named KLIMOS, which focuses on climate and development co-operation. Among other things they are doing case studies about the role of tropical forests within the theme of climate change and development.
  Master students might be interested to participate and document this project in a range of monitoring activities, within the framework of their thesis as Forestry engineer or within the KLIMOS network. There will be networked also with other departments of the KUL to check for thesis students with interest in community and biodiversity aspects.
  The set-up of the detailed monitoring plan and implementation, with specific attention for the themes indicated in the scheme above, will be discussed in detail with the KUL.

- **University of Ghent, Belgium (UGent)**
  As VBV and Groenhart's offices are within the same building as the offices of the laboratory of forestry of the University of Ghent, there are daily contacts between VBV/Groenhart and the university staff. The head of this forestry lab, Prof. Kris Verheyen, is vice-president of the VBV; and, he has closely followed the elaboration of this reforestation project. Within the faculty of bioscience engineering, there are close links and contacts with the laboratory of plant ecology where a couple of academics are busy doing applied research on amongst other issues (Tropical) forest ecosystem modeling and ecosystem carbon and water fluxes and their interactions. Dr. Engineer Hans Verbeeck is the suitable contact person. Their master students might be interested to participate and document this project in a range of monitoring activities, within the framework of their thesis. There will be networked also with other departments of the UGhent to check for thesis students with interest in community and biodiversity aspects.
  The set-up of the detailed monitoring plan and implementation, with specific attention for the themes indicated in the scheme above, will be discussed in detail with the UGent.

- **Flemish Institute for Technological Investigation, Belgium (VITO)**
  VITO is a Flemish research institute with much expertise in environmental themes. There is amongst others the "Transition, energy and environment" research group. One of their specialties is an integrated approach to climate and land use. VBV and Groenhart do have many contacts with researcher Engineer Dieter Cuypers. His current activities are concentrated on the interface of land use, forest ecosystems and climate change. He was the previous coordinator of Groenhart and started up the projects with MCF while he was still working for Groenhart. He is a member of the steering committee of VBV and was very involved in the elaboration of this reforestation project and the agreement between VBV and Telenet.
  The set-up of the detailed monitoring plan and implementation, with specific attention for the themes indicated in the scheme above, will be discussed in detail with VITO.
  Since VITO is a research institute with limited possibilities in supporting the project with students, priority will be given to abovementioned Flemish universities.

- **Northern Technical University, Ibarra, Ecuador (UTN)**
  Forestry and natural sciences units of Ecuadorian universities search for practical input into the curricula of their students. So does the Northern Technical University in Ibarra. Since there are good contacts between MCF, UTN and Ing. Leila López, it is quite realistic that project interns and thesis students will be willing to participate and help document different aspects of project activities. Engineer López is a graduate of this forestry school and was hired by MCF to co-author version 2 of this PDD. Also as mentioned in the Project Description, she is currently Director of the Ministry of Environment´s regional office in Carchi province, and has signed a cooperation agreement with MCF to help expand the geographical extension of the project in the Mira watershed within Carchi. The set-up of the detailed monitoring plan and implementation, with specific attention for the themes indicated in the scheme above, will be discussed in detail with the UTN.

- **Programa para el Manejo del Agua y del Suelo, University of Cuenca, Ecuador (PROMAS)**
  This unit of the University of Cuenca has great interest in this project, mainly in the soil and water management parts of it. The design of this reforestation activity, namely small-scale, mixed stands of native species, to evolve into a 'climax' natural forest, in Ecuador is a new approach to carbon capture projects. Academics of PROMAS share the interest to research impacts on soil (carbon mainly) and water, if possible, as a valuable commodity.
  Groenhart and KUL have good contacts going back years with PROMAS, and Groenhart has project activities in the working area of PROMAS, so that there have been frequent exchanges of information and experiences. Bio-engineers from the KUL and UGent cooperate with PROMAS on a very active basis with support of the Flemish Cooperation between Universities. The director of PROMAS, Dr. Felipe Cisneros, visits Belgian universities from time to time, and Belgian professors like Prof. Muys have visited PROMAS a couple of times to work together on certain themes.
  The set-up of the detailed monitoring plan and implementation, with specific attention for the themes indicated in the scheme above, will be discussed in detail with PROMAS.

- **MCF**
  Mindo Cloudforest Foundation is a legally established Ecuadorian conservation foundation, since 2001. The proposed reforestation project activity was designed and will be implemented by MCF utilizing locally available personnel and experienced staff. In coordination with project partner organization Groenhart and the universities involved, MCF will participate in, record and archive all monitoring activities.

- **Ecopar**
  The Corporation for Investigation, Training and Technical Support for the Sustainable Management of Tropical Ecosystems, has provided technical services since the beginning of the project in 2008. They may also be involved in ongoing project monitoring with the provision of support staff or technical expertise in GIS, Soil Organic Carbon content or other aspects.

- **Local owners**
  Local land owners and future forest owners will be responsible as good "hosts" to monitor their plantations and the whole ecosystem, the social and economical context. They will be questioned by researchers/students about the project activities and their potential impacts. Their opinion does have high value. How and where they will be participating in the monitoring process will be prepared more in detail once the validation process has started up.

- **Local employees**
  Local people will be trained and employed to execute the planned monitoring activities. They will be contracted by MCF at appropriate times.

4.5 Quality Assurance and Quality Control (QA/QC)

The implementing organization MCF is managing the reforestation project on the field and will be responsible for the centralized documentation of all project planning and implementation. QA/QC procedures will be implemented and the use of these procedures monitored to ensure that net anthropogenic GHG removals by sinks are measured and monitored precisely, credibly, verifiably, and transparently. Groenhart will coordinate QA/QC activities and are responsible for implementing and documenting these QA/QC procedures. Groenhart will ensure that the QA/QC plan is developed and implemented.

The project will follow the IPCC Good Practices Guide recommendation of using two types of procedures in order to ensure that the inventory estimates and their contributing data are of high quality: Quality assurance (QA) and Quality control (QC).

The plan that describes specific QC / QA procedures will be presented in the following:
a) Good practices for data collection that will be established for all procedures such as: GIS analysis; field measurements; data entry; data documentation, and data storage.
b) Training courses will be held for all relevant personnel on all data collection and analysis procedures.
c) Steps will be taken to control for errors in the sampling and data analysis to develop a credible plan for measuring and monitoring carbon stock change in the project context. The same procedures shall be used during the project life cycle to ensure continuity.

4.5.1 Field data collection

The personnel involved in the measurement of carbon pools will be fully trained in field data collection and analysis. Good practices will be developed for each step of the field measurements and followed so that measurements are comparable over time. To verify that plots have been installed and the measurements taken correctly: A minimum of 10% of randomly selected plots will be re-measured by a supervisor with a team not involved in the initial measurement sampling. The re-measurement data will be compared with the original measurement data. Any errors found will be corrected and recorded.

The following quality targets will be achieved for the re-measurements, compared to the original measurements:

a) Missed or extra trees no error within the plot.
b) Tree species or groups no error.
c) D.B.H. < ± 0,1 cm or 1% whichever is greater
d) Height < ± 5%
e) Circular plot radius/sides of rectangular plot < ± 1% of horizontal (angle-adjusted)

4.5.2 Data entry

The proper entry of data is required to produce reliable carbon estimates. Therefore an entry form for all those data measured in the field required by the methodology will be used. All data sheets will include a “Data recorded by” field.
Communication between all personnel involved in measuring and analyzing data will be used to resolve any apparent anomalies before final analysis of the monitoring data can be completed. If there are any problems with the monitoring plot data that cannot be resolved, the plot will not be used in the analysis. Expert judgment and comparison with independent data will be used to ensure data results are in line with expectations. Additionally, field data will be reviewed further ensuring that the data and analysis are realistic.

4.5.3 Data maintenance and archiving

Due to the long timeframe of the project and the speed at which technology changes data archiving will be an essential component. Data will be archived in several forms and copies of all data will be provided to each project actor.

- Original copies of the field measurement (data sheets and electronic files) and laboratory data will be stored in a secure location.
- Copies of all data analysis and models, the final estimate of the amount of carbon sequestered, any GIS products, and the measuring and monitoring reports will be stored in a dedicated and safe place (preferably offsite).
- Electronic copies of all data and reports will be updated periodically and converted to any new format required by future software or hardware. A project participant involved in the field measurements will be assigned to implement this updating.

4.5.4 Uncertainty assessment

The major sources of uncertainties related to changes in the carbon stock in the living biomass pool include: natural factors such as fire and pest outbreaks; stand variables such as variation in the yield tables, allometric equations, biomass expansion factors (BEFs), wood density, and carbon fraction; and the errors contributed by the measurement.

In general there is a strong relationship between sampling design and uncertainty estimates. Good practice requires the monitoring to be accurate. Monitoring schemes should neither “over-estimate” nor “under-estimate”, as far as can be judged.

Uncertainties will be reduced as far as practicable. Uncertainty information is not intended to dispute the validity of the monitoring estimates, but is assessed to help prioritize efforts to improve the accuracy in the future and guide decisions on methodological choice. The project will follow the IPCC Good Practices Guide on the assessment of uncertainty. Uncertainty in inventories arises through at least three different processes:

- Uncertainties from definitions
- Uncertainties from natural variability of the processes
- Uncertainties resulting from the assessment of the process or quantity: (i.) Measuring, (ii.) Sampling, (iii.) Reference data, (iv.) Expert judgment

4.6 Procedures for handling internal auditing and non-conformities

If external supervisors encounter errors while reviewing the 10% of monitoring data (cfr section 4.5.1), any errors found will be corrected and recorded. The necessary follow-up training and/or disciplinary measures will be given to the personnel identified.

5 ENVIRONMENTAL IMPACT

The project activity will have zero negative environmental impacts and reforestation on private lands does not require environmental impact studies in Ecuador. Project work areas are significantly degraded, and establishing plantations of native tree species will bring only positive environmental impacts corollary to the other various ecosystem services provided by new forests. Project plan does include the use of < 8% casuarinas (*Casuarina equisetifolia*), an exotic species present in the region for decades which has been proven to be non-invasive and of great value in the establishment of wind-breaks in the harsh conditions of Salinas parish. Also project will use <

2% *Alnus nepalense,* an exotic species present in project area and highly valued for its rapid growth and ability to shade-out aggressive, non-native grasses.

6 STAKEHOLDER COMMENTS

Mindo Cloudforest Foundation owns and operates three bird sanctuaries totaling 330 hectares in the immediate vicinity of project strata 1-3. Also, as is the case with project developer, MCF members own other forest properties in the area for a total of some 960 hectares. We mention this because in a very real sense MCF and its members are stakeholders in this project.

In a straight line, the area of strata 1-3 is roughly 100 kilometers southwest of strata 4-5, where project developer has long-term friendships with various land-owners and conservationists. MCF has also given avitourism guide training courses in nearby Lita, Imbabura, Mr. Krohnke has lived in nearby Ibarra for the past 13 years. Again, this in an endogenous project born of these experiences and has been discussed in detail with local environmental activists, leaders and all project participants, and each participating landowner was interviewed as a step in the pre-selection process.

The project has also been formally presented to the Sub-secretariat for Climate Change of the Ministry of Environment. This relation has been at the level of informal conversations since 2009 and more recently in 2011 in formal meetings with Marco Chiu, Sub-secretary and Carola Borja Osorio, Director of Sustainable Development and Conservation Tools. At different points the project has also been presented to and discussed with the Municipality of Ibarra, the Parish Board (Junta Parroquial) of Salinas parish, the Director of Environment and Tourism of the Municipality of San Miguel de Los Bancos, Municipal Council representatives from Canton Puerto Quito and various other functionaries.

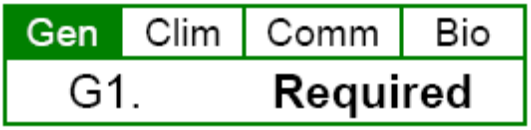
Summary of comments received during process:

1. “Who wouldn´t want to improve their property with trees, help get more green in this area.”
2. “Our haciendas already produce economically, our interest in this project is strictly ecological recuperation. When we were kids there were parrots and sometimes monkeys down near the house. That was a long time ago.”
3. “I hope someday to build a small ecotourism hotel and need help recreating a little jungle.”
4. “Twenty years is a long time, but my children will have a new opportunity with the land.”
5. “I hope this protects my property from invasions [squatters]”.
6. “We had to sell our few cows to cover some debts, and now the land produces nothing.”
7. “It´s good that there will be some paying jobs for a few years. Right now there is next to nothing available and everybody goes to Ibarra, Quito or leaves Ecuador to find work”.
8. “We want to plant native species that we know will grow here, not introduced things”.
9. “Salinas used to have a lot of forest, but with the construction of the sugar mill in the nineteen-sixties, everybody cleared their land to plant cane.”
10. We are interested in seeing a Voluntary Carbon Standard project carried out and validated in Ecuador, and we want to include that kind of project in our national registry of climate change mitigation projects.

As MCF continues to work and its members continue to live in and around the project areas, community and project participant comments will be duly registered and responded to in the most appropriate manner and on a case by case basis.

ANNEX 1 CCB Standards Compliance Key

In this annex it is indicated how this project meets each of the 14 required CCB criteria and the golden level criterion on biodiversity.



Original Conditions in the Project Area

General Information

1. The location of the project and basic physical parameters (e.g., soil, geology, climate).

--This is described in section **1.1 Summary Description of the Project**; in section **1.9 Project Location**; and section **1.10 Conditions Prior to Project Initiation**.

2. The types and condition of vegetation within the project area.

--Also described in section **1.10 Conditions Prior to Project Initiation**.

3. The boundaries of the project area and the project zone.

--This is described in detail and with precision maps created using remote sensors in section **2.3 Project Boundary**.

Climate Information

4. Current carbon stocks within the project area(s), using stratification by land-use or vegetation type and methods of carbon calculation (such as biomass plots, formulae, default values) from the Intergovernmental Panel on Climate Change's 2006 Guidelines for National GHG Inventories for Agriculture, Forestry and Other Land Use (IPCC 2006 GL for AFOLU) or a more robust and detailed methodology.

--Following methodology AR-AMS0007 / Version 01, project has calculated baseline carbon stocks for the two pools affected by the project activity, the Living Biomass and Soil Organic Carbon pools. This estimation is described in section **3 Quantification of GHG Emissions Reductions and Removals**.

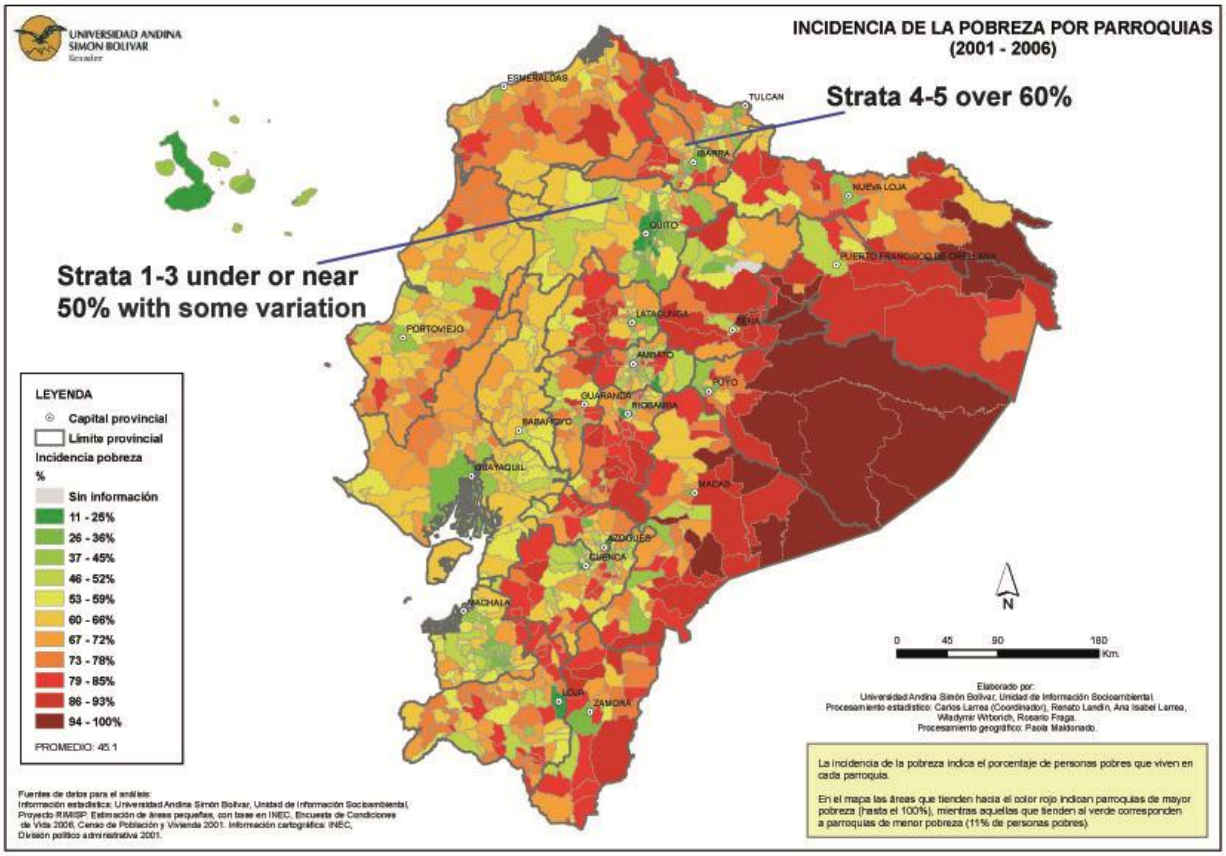
Community Information

5. A description of communities located in the project zone, including basic socio-economic and cultural information that describes the social, economic and cultural diversity within communities (wealth, gender, age, ethnicity etc.), identifies specific groups such as Indigenous Peoples and describes any community characteristics.

--The project boundary and area of influence does not include identified Indigenous Peoples communities or high percentages of indigenous residents (see pdf file "PORCENTAJE POBLACION INDIGENA" in folder "Other Reference Materials"). However, both Salinas and La Carolina parishes home to our strata 4-5 respectively, hold high percentages of Afro-Ecuadorian people who have historically, analyzing

various economic and social development indicators, been second to last after the indigenous in Ecuador in development terms. (Please see map “Porcentaje poblacion afro parroquias 2001.pdf” and “MÁS ALLÁ DE LOS PROMEDIOS: Afrodescendientes en América Latina LOS AFROECUATORIANOS” Juan Ponce Editoras: Josefina Stubbs y Hiska N. Reyes in folder “Other Reference Materials”.)

In contrast, the towns near project strata 1-3 are largely comprised of colonists from other regions of Ecuador, mostly of mixed ancestral origin, ‘mestizos’. While nearly all rural areas of Ecuador have high levels of poverty, there is a great difference between our project strata 1-3 in Pichincha province on the one hand and strata 4-5 on the other.



There is some evidence that poverty indices have been improving in the period since 2006 (see website “La pobreza en Ecuador se redujo 3,64% en el último año, según cifras oficiales ANDES” saved in folder “Other Reference Materials”). However, in the rural setting poverty levels at or above 50% are still palpable throughout the project area.

6. A description of current land use and customary and legal property rights including community property in the project zone, identifying any ongoing or unresolved conflicts or disputes and identifying and describing any disputes over land tenure that were resolved during the last ten years (see also G5).

--There is no community property in the project boundary or immediate area of influence. Project has not identified any disputes over land tenure amongst its 16 participating land-owners. Care was taken during pre-selection of participants to work only with people who have clear land title. This will be objectively demonstrated by certificates from the relevant property registries and/or municipal tax rolls and will be available for inspection during auditors’ Ecuador visit.

Biodiversity Information

7. A description of current biodiversity within the project zone (diversity of species and ecosystems) and threats to that biodiversity, using appropriate methodologies, substantiated where possible with appropriate reference material.

--Description of approach focusing on avifauna due to project developer´s expertise, and interesting composition of project lands in two altitudinal transects that are parallel and similar in many ways, but very dissimilar in the composition of their avifauna populations found in **1.1 Summary Description of the Project**. Other relevant biodiversity information is available for strata 1-2 in the Tandayapa-San Tadeo Protected Forest Management Plan (PLAN DE MANEJO DEL BOSQUE Y VEGETACIÓN PROTECTOR TANDAYAPA – SAN TADEO) included in supporting materials for the risk analysis done following the AFOLU Non-Permanence Risk Tool: VCS Version 3.

8. An evaluation of whether the project zone includes any of the following High Conservation Values (HCVs) and a description of the qualifying attributes:

8.1. Globally, regionally or nationally significant concentrations of biodiversity values;

a. protected areas:
--Project boundary, Stratum 1, includes areas in the buffer zone of the Mindo-Nambillo Protected Forest, South America´s first declared Important Bird Area (Birdlife International EC043, declared 1997.
b. threatened species:
--As described in GL3. IUCN Red List species: 12 Vulnerable and 3 Endangered.
c. endemic species:
--49 Chocó Bioregion endemic bird species; 9 Tumbesian region endemic bird species (Choco and Tumbesian Endemic Bird Areas). See Annex 2 for a complete list.
d. areas that support significant concentrations of a species during any time in their lifecycle (e.g. migrations, feeding grounds, breeding areas).
--None found in project boundary.

8.2. Globally, regionally or nationally significant large landscape-level areas where viable populations of most if not all naturally occurring species exist in natural patterns of distribution and abundance;

--None found in project boundary for avifauna.

8.3. Threatened or rare ecosystems;

--The Mira Watershed is identified as susceptible to drought and desertification on p.87, PROGRAMA DE ACCIÓN NACIONAL DE LUCHA CONTRA LA DESERTIFICACIÓN Y MITIGACIÓN DE LA SEQUÍA QUITO, AGOSTO DEL 2004, Ministry of Environment, Ecuador.

8.4. Areas that provide critical ecosystem services (e.g., hydrological services, erosion control, fire control);

--The properties in Stratum 1 form part of the highest altitude catchment of of the Pachijal watershed. This watershed has been identified by the Environmental Secretariat of Quito´s Metropolitan District as among their highest conservation priorities. In 2009 MCF members participated in the creation of a management plan for this area and the adjacent Tandayapa Valley (included in supporting materials for the risk analysis done following the AFOLU Non-Permanence Risk Tool: VCS Version 3). Then, in 2010 Quito's Environmental Secretariat hired another consultant group to create a management plan for a larger

extension of the Pachijal river watershed. Both the 2009 and 2010-2011 management plans can be seen as working documents. This important remnant of montane and foothills cloud forests has regional relevance for not only biodiversity but also for the creation and storage of clean water so necessary for the region's growing population.

8.5. Areas that are fundamental for meeting the basic needs of local communities (e.g., for essential food, fuel, fodder, medicines or building materials without readily available alternatives); and:

--None found in project boundary. See Table 7 and supporting information in risk analysis done following the AFOLU Non-Permanence Risk Tool: VCS Version 3.

8.6. Areas that are critical for the traditional cultural identity of communities (e.g., areas of cultural, ecological, economic or religious significance identified in collaboration with the communities).

--None found in project boundary.

Gen	Clim	Comm	Bio
G2.		**Required**	

Baseline Projection

The project proponents must develop a defensible and well-documented 'without-project' reference scenario that must:

1. Describe the most likely land-use scenario in the absence of the project following IPCC 2006 GL for AFOLU or a more robust and detailed methodology, describing the range of potential land use scenarios and the associated drivers of GHG emissions and justifying why the land-use scenario selected is most likely.

--Demonstrated in section **2.4 Baseline Scenario**.

2. Document that project benefits would not have occurred in the absence of the project, explaining how existing laws or regulations would likely affect land use and justifying that the benefits being claimed by the project are truly 'additional' and would be unlikely to occur without the project.

--Demonstrated and explained in section **2.4 Baseline Scenario** and barrier analysis in section **2.5 Additionality.**

3. Calculate the estimated carbon stock changes associated with the 'without project' reference scenario described above. This requires estimation of carbon stocks for each of the land-use classes of concern and a definition of the carbon pools included, among the classes defined in the IPCC 2006 GL for AFOLU. The timeframe for this analysis can be either the project lifetime (see G3) or the project GHG accounting period, whichever is more appropriate.

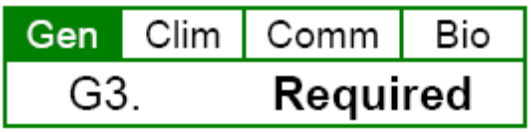
--Following methodology AR-AMS0007 / Version 01, project has determined that the without-project scenario would produce a negative evolution of carbon stocks in project boundary, and this is conservatively estimated as zero or flat baseline carbon stocks, **2.4 Baseline Scenario** and **3.1 Baseline Emissions**.

4. Describe how the 'without project' reference scenario would affect communities in the project zone, including the impact of likely changes in water, soil and other locally important ecosystem services.

--The without-project scenario would produce ever greater degradation of soils and watersheds, lowering the availability of these important resources. This decrease in water availability is felt in areas near the project boundary as commented by the General Manager of EMAPA-PVM, Ing. Fabián Coello in personal conversations with project proponent in 2010. Fabián mentioned that in both 2009 and 2007 their municipal supply (which comes from the Tatalá river, part of the Pachijal watershed) ran out and they had to distribute water to their customers with tanker trucks during the summer or dry-season months. This phenomenon is felt even more in adjacent Puerto Quito canton where many local villages also get supplied by tankers in the summer (Pers. Com. Edwin Bustamante, Municipal Councilman).

5. Describe how the 'without project' reference scenario would affect biodiversity in the project zone (e.g., habitat availability, landscape connectivity and threatened species).

--As above, gradual habitat degradation and desertification in the case of strata 4-5 clearly negatively impact available habitat, landscape connectivity and species of relevant conservation concern.



Project Design and Goals

The project must be described in sufficient detail so that a third-party can adequately evaluate it. Projects must be designed to minimize risks to the expected climate, community and biodiversity benefits and to maintain those benefits beyond the life of the project. Effective local participation in project design and implementation is key to optimizing multiple benefits, equitably and sustainably. Projects that operate in a transparent manner build confidence with stakeholders and outside parties and enable them to contribute more effectively to the project.

1. Provide a summary of the project's major climate, community and biodiversity objectives.

--Found in section **1.1 Summary Description of the Project**.

2. Describe each project activity with expected climate, community and biodiversity impacts and its relevance to achieving the project's objectives.

--Found in section **1.8 Description of the Project Activity**.

3. Provide a map identifying the project location and boundaries of the project area(s), where the project activities will occur, of the project zone and of additional surrounding locations that are predicted to be impacted by project activities (e.g. through leakage).

--Described and shown in section **1.9 Project Location** and in section **2.3 Project Boundary**.

4. Define the project lifetime and GHG accounting period and explain and justify any differences between them. Define an implementation schedule, indicating key dates and milestones in the project's development.

--Found in section 1.5 **Project Start Date** November 1st, 2011 and in **1.6 Project Crediting Period:** 20 year renewable crediting period beginning November 1st, 2011 and ending October 31st, 2031. *The period from June, 2011 through October preparations will be done for the plantations.*

Section **4.2 Monitoring plan in general** gives a chronogram of major project activities and also their monitoring.

5. Identify likely natural and human-induced risks to the expected climate, community and biodiversity benefits during the project lifetime and outline measures adopted to mitigate these risks.

--In stratum 5 there is some risk of damage to project plantations from fire. Project workers will create 5 meter firebreaks around plantation areas and will also seek support from adjacent fire and police stations. There has also been, coincidentally, a building social awareness and pressure against the use of fire as a land management tool in this area.

In stratum 3 there is some risk of abusive neighbors allowing their cattle to enter project lands, and property owner has already begun strengthening his fences and project proponent has discussed the issue with local city (canton) councilman Edwin Bustamante, so that municipal representatives can assist project in discussing the legality of the matter with project neighbors as a means of social dissuasion.

6. Demonstrate that the project design includes specific measures to ensure the maintenance or enhancement of the high conservation value attributes identified in G1 consistent with the precautionary principle.

--Clearly, native and mixed species forest plantations replacing grasslands comprised of non-native grasses enhance habitat for the high conservation values identified in **G1**.

7. Describe the measures that will be taken to maintain and enhance the climate, community and biodiversity benefits beyond the project lifetime.

--Many project participants have indicated their desire to maintain the forests created by the project on a permanent basis. Others have indicated their desire to eventually harvest some of the trees created. Project will encourage these participants to view their forests as something that can be managed sustainably with selective harvests. Over the first 20 years of project, participatory, sustainable management plans will be developed with project participants and will be subject to further project funding.

8. Document and defend how communities and other stakeholders potentially affected by the project activities have been identified and have been involved in project design through effective consultation, particularly with a view to optimizing community and stakeholder benefits, respecting local customs and values and maintaining high conservation values. Project developers must document stakeholder dialogues and indicate if and how the project proposal was revised based on such input. A plan must be developed to continue communication and consultation between project managers and all community groups about the project and its impacts to facilitate adaptive management throughout the life of the project.

--As described in section **6 Stakeholder comments** Mindo Cloudforest Foundation members live and work in project areas and the particular approach adopted by this project evolved out of years of conversations and input from different neighbors. More particularly, the 16 participating landowners, the direct and most tangible stakeholders, were interviewed and have been met with on numerous occasions. To arrive at current group of 16, many other properties were visited and not included for different reasons:

problems of eligibility, perceived problems with project permanence, and demands from landowners for non-native species plantations and silvopasture systems. In accordance with our funders' wishes, the project has looked for and found a group of participants who meet a narrow profile.

Other stakeholders include the students and staff of the Northern Technical University and as described in section 4. Monitoring they will be consulted and invited to participate in all aspects of project implementation. This creation of connectivity with the Belgian universities Louvain and Ghent will create growing opportunities for information interchanges, internships and further study.

9. Describe what specific steps have been taken, and communications methods used, to publicize the CCBA public comment period to communities and other stakeholders and to facilitate their submission of comments to CCBA. Project proponents must play an active role in distributing key project documents to affected communities and stakeholders and hold widely publicized information meetings in relevant local or regional languages.

--Project developer will communicate this information at beginning of public comment period, via personal phone calls and emails with the 16 participating landowners, via the MCF website www.mindocloudforest.org, and by notifying in writing the Parish Board of Salinas, the Parish Board of La Carolina, the Parish Board of Gualea and the Municipalities of San Miguel de Los Bancos, Pedro Vicente Maldonado and Puerto Quito. Also, a written announcement will be posted at main restaurant in San Gerónimo. This public location assures wide community distribution of the news.

10. Formalize a clear process for handling unresolved conflicts and grievances that arise during project planning and implementation. The project design must include a process for hearing, responding to and resolving community and other stakeholder grievances within a reasonable time period. This grievance process must be publicized to communities and other stakeholders and must be managed by a third party or mediator to prevent any conflict of interest. Project management must attempt to resolve all reasonable grievances raised, and provide a written response to grievances within 30 days. Grievances and project responses must be documented.

--To be developed.

11. Demonstrate that financial mechanisms adopted, including projected revenues from emissions reductions and other sources, are likely to provide an adequate flow of funds for project implementation and to achieve the anticipated climate, community and biodiversity benefits.

--This project has contracts for full-funding for first 20 years of project from project partner Groenhart, subcontracted by **Association for Forests in Flanders, Belgium (VBV**) who in turn has signed a contract with Belgian telecommunications company Telenet. Also, since 2010 project developer has received much smaller contributions from USA company Roastery 7, and project scope has been designed precisely to match these funding sources.

As mentioned above, during the initial 20 years of project all participants and project partners will be consulted and participatory management plans developed for a second crediting period. As budgets are created for these management plans, new funding will be sourced to allow for their enactment.

Gen	Clim	Comm	Bio
G4.	**Required**		

Management Capacity and Best Practices

The success of a project depends upon the competence of the implementing management team. Projects that include a significant capacity-building (training, skill building, etc.) component are more likely to sustain the positive outcomes generated by the project and have them replicated elsewhere. Best practices for project management include: local stakeholder employment, worker rights, worker safety and a clear process for handling grievances.

The project proponents must:

1. Identify a single project proponent which is responsible for the project's design and implementation. If multiple organizations or individuals are involved in the project's development and implementation the governance structure, roles and responsibilities of each of the organizations or individuals involved must also be described.

--In Ecuador, Mindo Cloudforest Foundation and Project Director, Brian Krohnke, are responsible for all aspects of project design and implementation. In section **4.4 Organizational Structure** there is a complete description of the different roles and responsibilities of the partner organizations.

Also, in Table 1 of the risk analysis done following the AFOLU Non-Permanence Risk Tool: VCS Version 3 a clear demonstration of the different project partners' experience and competencies is given.

2. Document key technical skills that will be required to implement the project successfully, including community engagement, biodiversity assessment and carbon measurement and monitoring skills. Document the management team's expertise and prior experience implementing land management projects at the scale of this project. If relevant experience is lacking, the proponents must either demonstrate how other organizations will be partnered with to support the project or have a recruitment strategy to fill the gaps.

--Also described in section **4.4 Organizational Structure**. Once the monitoring plan will be elaborated in more detail the needed skills will be documented and distributed amongst the actors involved.

3. Include a plan to provide orientation and training for the project's employees and relevant people from the communities with an objective of building locally useful skills and knowledge to increase local participation in project implementation. These capacity building efforts should target a wide range of people in the communities, including minority and underrepresented groups. Identify how training will be passed on to new workers when there is staff turnover, so that local capacity will not be lost.

--This will be developed in coming months as project hires new staff, and also will be detailed in monitoring plan to be developed by the partner organizations in conjunction with Mindo Cloudforest Foundation in coming months.

One area in which this project shows great potential for capacity building is via the relations to be constructed with students and staff of the Northern Technical University who will be consulted and invited to participate in all aspects of project implementation. This creation of connectivity with the Belgian universities Louvain and Ghent will create growing opportunities for information interchanges, internships and further study.

4. Show that people from the communities will be given an equal opportunity to fill all employment positions (including management) if the job requirements are met. Project proponents must explain how employees will be selected for positions and where relevant, must indicate how local community members, including women and other potentially underrepresented groups, will be given a fair chance to fill positions for which they can be trained.

--Currently the project has sub-contracted nursery production of trees by networking and discovering local competencies. The subcontractors are all residents of the project areas:

- Ángel Suco, Pedro Peñafiel, Ricardo Espinales and Agustina Arcos in strata 1-2
- Juan Barba, stratum 3
- Carlos José Enríquez, stratum 4
- Rocío Grijalva, stratum 5

Otherwise the project has only one employee, the Director. However, in August we will begin the search for a Forestry Engineer who will work full-time for the first three years of project implementation beginning in September, 2011. This position will be filled by placing classified ads in local newspapers and networking. In 2009 when we hired a Forestry Engineer to help write the second version of the PDD we also published ads in the local papers. Of 24 applicants, the top 4 were interviewed in person and the most qualified was hired, Ing. Leila López. These examples show the project´s openness and lack of gender bias. (Project developer has the CVs of the top four applicants mentioned on file and available for inspection.)

5. Submit a list of all relevant laws and regulations covering worker's rights in the host country. Describe how the project will inform workers about their rights. Provide assurance that the project meets or exceeds all applicable laws and/or regulations covering worker rights and, where relevant, demonstrate how compliance is achieved.

--In the folder "Other Reference Materials" please find the Ecuadorian Labor Code (Código de Trabajo).

All project personnel, Director, Forestry Engineer and maintenance laborers will sign legal individual work contracts and will have their rights explained to them verbally and also be given reference information for learning more about their rights on the internet. This is to include their inscription in the Ecuadorian Institute of Social Security from the first day of their employment, objectively demonstrated by an "Entrance Notification" (Aviso de Entrada). Also, monthly payroll receipts will indicate to staff the makeup and percentage components of their salaries, vacation pay, additional (13^{th} and 14^{th}) salaries, etc.

Temporary workers will be hired as part of sub-contracts with different "enganchadores" or labor crew organizers as described in Article 29 of the Labor Code. All of these workers will also have their rights explained to them verbally and receive written contracts. These contracts will be based on a piece-work basis as defined in the Labor Code. This is done to provide incentives for hard work and to guarantee the efficiency of field crews. To guarantee worker loyalty and to effectively compete for workers in rural settings where personnel can be scarce, the per-piece payment will be gauged so as to never be less than the legal minimum wage. The provision of written contracts to these temporary laborers goes beyond that required in the Labor Code Article 19 letter (b.

The specific text of these contracts will be prepared by MCF attorney Dr. César Molina and his staff and will be available for auditors´ inspection during Ecuador country visit. Also, during the preparation of all project work contracts, Dr. Molina and staff will be asked to review current labor legislation to guarantee two basic principles: workers´ rights and the protection of MCF´s long-term financial interests.

6. Comprehensively assess situations and occupations that pose a substantial risk to worker safety. A plan must be in place to inform workers of risks and to explain how to minimize such risks. Where worker safety cannot be guaranteed, project proponents must show how the risks will be minimized using best work practices.

--Reforestation field work by definition includes some heavy lifting and tough physical labor. Project will urge workers to use their best judgment to avoid dangerous situations and will rely on years of experience in rural Ecuador to proceed with solid common sense. Also, for project strata 1-3 there are hospitals with emergency services in both Nanegalito and Pedro Vicente Maldonado, never more than 1 hour from project work areas. For project strata 4-5 high quality medical services are available in Ibarra, 30 minutes from work areas in stratum 4 and 1 hour from stratum 5. By Ecuadorian law, workers and citizens receive free treatment at public hospitals.

7. Document the financial health of the implementing organization(s) to demonstrate that financial resources budgeted will be adequate to implement the project.

--Mindo Cloudforest Foundation has no long-term debt and substantial net worth. On following pages our preliminary economic reports for the 1st Semester, 2011.

Also, the project thanks to partners Groenhart and VBV in Belgium have the backing of Telenet, the leading Belgian telecommunications company with considerable resources already committed to the project and formidable communications ability within Belgium to help generate more interest in the project and locate further support going forward.

MINDO CLOUDFOREST FOUNDATION BALANCE GENERAL AL 30 DE JUNIO DEL 2011			
ACTIVOS			
ACTIVO CORRIENTE			**12,267.51**
EFECTIVO Y EQUIVALENTES AL EFECTIVO		12,267.51	
Caja Administrador	0.00		
Caja Milpe	315.00		
Caja Silanche	168.00		
Bancos Cta. 3455694604	8,870.18		
Bancos Cta. 3493216304	2,914.33		
CUENTAS Y DOCUMENTOS POR COBRAR			**22,285.78**
Cuentas por cobrar		0.00	
Impuestos Anticipados		16,837.18	
IVA en compras	3,191.24		
Retencion IVA 70%	3,427.20		
Retencion IVA 100%	69.72		
Retención en la Fuente 1%	29.40		
Retención en la Fuente 2%	37.06		
IVA Credito Tributario	10,082.56		
INVENTARIOS		5,448.60	
Inventario de libros	2,970.00		
Inventario de mercaderias	2,478.60		
ACTIVO NO CORRIENTE			**426,924.57**
ACTIVOS INTANGIBLES		5,555.00	
Marcas y patentes, sitios web	5,648.89		
Amortiza. Acum. Marcas y patentes	-93.89		
PROPIEDAD PLANTA Y EQUIPO		414,361.57	
Equipo de oficina y enseres	1,721.97		
Deprec. Acum. Oficina y enseres	-651.38		
Computador, GPS, software	3,693.30		
Depre. Acum,Equipo de Computo	-3,148.37		
Herremientas de campo	1,583.58		
Depre. Acum.Herramientas	-64.44		
Edifiaciones Milpe	56,856.43		
Deprec. Acum. Edificios	-8,803.04		
Terreno Milpe	218,707.43		
Terreno Rio Silanche	79,456.35		
Terrenos Reserva Oreothraupis	65,009.74		
ACTIVOS BIOLOGICOS		7,008.00	
Acacia Mangium	220.50		
Plantación de café en Silanche	6,760.00		
Insumos	27.50		
TOTAL ACTIVOS			**461,477.86**

PASIVOS			
PASIVO CORRIENTE			**8,981.05**
PROVEEDORES		0.00	
OBLIGACIONES PERSONAL		309.60	
Aporte patronal	174.96		
Aporte individual	134.64		
IMPUESTOS POR PAGAR SRI		8,191.45	
IVA en ventas	1,936.09		
10% Imp. Rte. Honorarios	2,948.06		
1% Otras Retenciones Aplicables	15.62		
1% Imp, Rta Transporte Privado	5.00		
2% Otras retenciones aplicables	29.93		
30% Retencion IVA Bienes	32.40		
70% Retención IVA Servicios	31.05		
100% Retencion IVA	3,193.30		
PROVISIONES		480.00	
Decimo Tercer Sueldo	340.00		
IESS por pagar	140.00		
TOTAL PASIVOS			**8,981.05**
PATRIMONIO			**452,496.81**
CAPITAL MIEMBROS		300.00	
Lain Douglas Cambel	50.00		
Paul Joseph Greenfield	50.00		
Juan Fernando Ventimilla	50.00		
Brian Krohnke	50.00		
Jozef Adelbertus Maria	50.00		
Paul Y A J Coopmans	50.00		
DONACIONES		447,991.44	
Donaciones Internacionales	436,925.98		
Revalorizacion de activos	11,065.46		
RESULTADOS DE OPERACIÓN		-4,205.37	
Utilidad del ejercicio	19,864.83		
Resultados acumulados años anteriores	-24,070.20		
TOTAL PASIVOS + PATRIMONIO			**461,477.86**

MINDO CLOUDFOREST FOUNDATION BALANCE DE PERDIDASY GANANCIAS AL 30 DE JUNIO DEL 2011			
INGRESOS			**48,085.65**
INGRESOS POR OPERACIONES		45,330.65	
Ventas Milpe	3,994.65		
Ventas Silanche	486.00		
Servicios Prestados	40,850.00		
INGRESOS NO OPERACIONALES		2,755.00	
Ventas de Libros	2,755.00		
	TOTAL INGRESOS		**48,085.65**
EGRESOS			**28,220.82**
COSTOS ADMINISTRATIVOS		25,704.24	
Honorarios profesionales	24,269.70		
Servicios ocasionales	1,434.54		
COSTOS GENERALES			
SERVICIOS BASICOS		102.29	
Energia Electrica y Agua	102.29		
COSTOS GENERALES		1,413.94	
Suministros de oficina	148.77		
Suministros y materiales de limpieza	56.25		
Mantenimiento y accesorios	322.66		
Gastos de movilización	639.85		
Correos	16.52		
Combustible y lubricantes	70.30		
Impuestos municipales	93.94		
Alimentacion	65.65		
COSTOS CARBONNEG		714.75	
Servicios ocacionales	714.75		
OTROS COSTOS		285.60	
Otros costos	285.60		
	TOTAL COSTOS		**28,220.82**
	UTILIDAD DEL EJERCICIO		**19,864.83**

Gen	Clim	Comm	Bio
G5.		**Required**	

Legal Status and Property Rights

The project must be based on a solid legal framework (e.g., appropriate contracts are in place) and the project must satisfy applicable planning and regulatory requirements.

During the project design phase, the project proponents should communicate early on with relevant local, regional and national authorities in order to allow adequate time to earn necessary approvals. The project design should be sufficiently flexible to accommodate potential modifications that may arise as a result of this process.

In the event of unresolved disputes over tenure or use rights to land or resources in the project zone, the project should demonstrate how it will help to bring them to resolution so that there are no unresolved disputes by the start of the project.

Based on information about current property rights provided in G1, the project proponents must:

1. Submit a list of all relevant national and local laws and regulations in the host country and all applicable international treaties and agreements. Provide assurance that the project will comply with these and, where relevant, demonstrate how compliance is achieved.

--To be prepared. However, there is no doubt as to the legality and desirability of planting native tree species on private lands in Ecuador,

2. Document that the project has approval from the appropriate authorities, including the established formal and/or traditional authorities customarily required by the communities.

--Request for formal Letter of Approval from the National Authority for the Clean Development Mechanism currently in process at Ministry of Environment. See section 1.1 Compliance with Laws, Statutes and Other Regulatory Frameworks for a discussion of the various meetings and relations with the Subsecretariat for Climate Change of the Ministry of Environment.

Also project developer has met with various Municipal and Parish Board representatives over the years, and all are excited about the project. As the project works on private lands with private landowners, there is no doubt as to the legality of planting native tree species.

3. Demonstrate with documented consultations and agreements that the project will not encroach uninvited on private property, community property, or government property and has obtained the free, prior, and informed consent of those whose rights will be affected by the project.

--Project will provide the contracts and agreements signed with each participating landowner for inspection by CCB auditors.

4. Demonstrate that the project does not require the involuntary relocation of people or of the activities important for the livelihoods and culture of the communities. If any relocation of habitation or activities is undertaken within the terms of an agreement, the project proponents must demonstrate that the agreement was made with the free, prior, and informed consent of those concerned and includes provisions for just and fair compensation.

--Project can demonstrate the agreements signed with each participating landowner where there is no mention of relocation of anybody as this will not occur as a result of this small-scale project.

5. Identify any illegal activities that could affect the project's climate, community or biodiversity impacts (e.g., logging) taking place in the project zone and describe how the project will help to reduce these activities so that project benefits are not derived from illegal activities.

--The only project activity is the cultivation of forest plantations. Poaching or illegal logging of project trees will be guarded against by each participating landowner, all of which have clearly demarcated property boundaries and fences where relevant and necessary.

6. Demonstrate that the project proponents have clear, uncontested title to the carbon rights, or provide legal documentation demonstrating that the project is undertaken on behalf of the carbon owners with their full consent. Where local or national conditions preclude clear title to the carbon rights at the time of validation against the Standards, the project proponents must provide evidence that their ownership of carbon rights is likely to be established before they enter into any transactions concerning the project's carbon assets.

--Currently, project funders don't have any plans to transact 'carbon credits' or VCUs of any nature. The voluntary heart of this project resides in project funders' desire to explain to their clients how they have 'neutralized' their emissions voluntarily.

Gen	Clim	Comm	Bio
CL1.	**Required**		

Net Positive Climate Impacts

The project must generate net positive impacts on atmospheric concentrations of greenhouse gases (GHGs) over the project lifetime from land use changes within the project boundaries.

The project proponents must:

1. Estimate the net change in carbon stocks due to the project activities using the methods of calculation, formulae and default values of the IPCC 2006 GL for AFOLU or using a more robust and detailed methodology. The net change is equal to carbon stock changes *with* the project minus carbon stock changes *without* the project (the latter having been estimated in G2). This estimate must be based on clearly defined and defendable assumptions about how project activities will alter GHG emissions or carbon stocks over the duration of the project or the project GHG accounting period.

--See section 3 Quantification of GHG Emission Reductions and Removals.

2. Estimate the net change in the emissions of non-CO2 GHG emissions such as CH4 and N2O in the *with* and *without* project scenarios if those gases are likely to account for more than a 5% increase or decrease (in terms of CO2-equivalent) of the project's overall GHG emissions reductions or removals over each monitoring period.

--Not estimated at more than 5%.

3. Estimate any other GHG emissions resulting from project activities. Emissions sources include, but are not limited to, emissions from biomass burning during site preparation, emissions from fossil fuel combustion, direct emissions from the use of synthetic fertilizers, and emissions from the decomposition of N-fixing species.

--This estimate will be performed during project monitoring phase. See 3.2.

These non-CO2 GHG emissions might be counted to zero according to the AR-AMS0007-version 01 methodology.

4. Demonstrate that the net climate impact of the project is positive. The net climate impact of the project is the net change in carbon stocks plus net change in non-CO2 GHGs where appropriate minus any other GHG emissions resulting from project activities minus any likely project-related unmitigated negative offsite climate impacts (see CL2.3).

--See section 3 Quantification of GHG Emission Reductions and Removals.

5. Specify how double counting of GHG emissions reductions or removals will be avoided, particularly for offsets sold on the voluntary market and generated in a country with an emissions cap.

--Ecuador has no emissions cap. Contractual obligations with project funders guarantee them all carbon rights to the project, so that there can be no double counting or reselling. And as explained in **G5** #6 funders´ only intention with these ´rights´ is purely notional and non-market oriented.

Gen	Clim	Comm	Bio
CL2.	**Required**		

Offsite Climate Impacts ('Leakage')

The project proponents must quantify and mitigate increased GHG emissions that occur beyond the project area and are caused by project activities (commonly referred to as 'leakage').

The project proponents must:

1. Determine the types of leakage that are expected and estimate potential offsite increases in GHGs (increases in emissions or decreases in sequestration) due to project activities. Where relevant, define and justify where leakage is most likely to take place.

--See section 3.3 Leakage. Following approved methodology and companion tools, it has been determined that leakage is insignificant and to be counted as zero.

2. Document how any leakage will be mitigated and estimate the extent to which such impacts will be reduced by these mitigation activities.

--No leakage mitigation activities are planned as leakage is determined insignificant.

3. Subtract any likely project-related unmitigated negative offsite climate impacts from the climate benefits being claimed by the project and demonstrate that this has been included in the evaluation of net climate impact of the project (as calculated in CL1.4).

--See above.

4. Non-CO2 gases must be included if they are likely to account for more than a 5% increase or decrease (in terms of CO2-equivalent) of the net change calculations (above) of the project's overall off-site GHG emissions reductions or removals over each monitoring period.

--Not estimated at greater than 5%.

Climate Impact Monitoring

Before a project begins, the project proponents must have an initial monitoring plan in place to quantify and document changes (within and outside the project boundaries) in project-related carbon pools, project emissions, and non-CO2 GHG emissions if appropriate. The monitoring plan must identify the types of measurements, the sampling method, and the frequency of measurement. Since developing a full monitoring plan can be costly, it is accepted that some of the plan details may not be fully defined at the design stage, when projects are being validated against the Standards. This is acceptable as long as there is an explicit commitment to develop and implement a monitoring plan.

The project proponents must:

1. Develop an initial plan for selecting carbon pools and non-CO2 GHGs to be monitored, and determine the frequency of monitoring. Potential pools include aboveground biomass, litter, deadwood, belowground biomass, wood products, soil carbon and peat. Pools to monitor must include any pools expected to decrease as a result of project activities, including those in the region outside the project boundaries resulting from all types of leakage identified in CL2. A plan must be in place to continue leakage monitoring for at least five years after all activity displacement or other leakage causing activity has taken place. Individual GHG sources may be considered 'insignificant' and do not have to be accounted for if *together* such omitted decreases in carbon pools and increases in GHG emissions amount to less than 5% of the total CO2-equivalent benefits generated by the project. Non-CO2 gases must be included if they are likely to account for more than 5% (in terms of CO2-equivalent) of the project's overall GHG impact over each monitoring period. Direct field measurements using scientifically robust sampling must be used to measure more significant elements of the project's carbon stocks. Other data must be suitable to the project site and specific forest type.

--See section 4 Monitoring.

2. Commit to developing a full monitoring plan within six months of the project start date or within twelve months of validation against the Standards and to disseminate this plan and the results of monitoring, ensuring that they are made publicly available on the internet and are communicated to the communities and other stakeholders.

--Project has committed to developing a full monitoring plan. See section 4 Monitoring.

Gen	Clim	Comm	Bio
CM1.		**Required**	

Net Positive Community Impacts

The project must generate net positive impacts on the social and economic well-being of communities and ensure that costs and benefits are equitably shared among community members and constituent groups during the project lifetime.

Projects must maintain or enhance the High Conservation Values (identified in G1) in the project zone that are of particular importance to the communities' well-being.

The project proponents must:

1. Use appropriate methodologies to estimate the impacts on communities, including all constituent socio-economic or cultural groups such as indigenous peoples (defined in G1), resulting from planned project activities. A credible estimate of impacts must include changes in community well-being due to project activities and an evaluation of the impacts by the affected groups. This estimate must be based on clearly defined and defendable assumptions about how project activities will alter social and economic well-being, including potential impacts of changes in natural resources and ecosystem services identified as important by the communities (including water and soil resources), over the duration of the project. The 'with project' scenario must then be compared with the 'without project' scenario of social and economic well-being in the absence of the project (completed in G2). The difference (i.e., the community benefit) must be positive for all community groups.

-- Project is committed to creating a full monitoring plan and will account for this. It must be considered that the 16 participating properties are rural and scarcely populated. Only in stratum 5, San Gerónimo, does the local population immediately abut project lands. Stakeholder comments (section 6) include several where local residents express their desire to see their '*caserío*' or little community become green again, cooler and less dusty.

2. Demonstrate that no High Conservation Values identified in G1.8.4-642 will be negatively affected by the project.

--On the contrary, project biodiversity monitoring, if assumptions are correct, will show that High Conservation Values are positively impacted by project.

Offsite Stakeholder Impacts

The project proponents must evaluate and mitigate any possible social and economic impacts that could result in the decreased social and economic well-being of the main stakeholders living outside the project zone resulting from project activities. Project activities should at least 'do no harm' to the well-being of offsite stakeholders.

The project proponents must:

1. Identify any potential negative offsite stakeholder impacts that the project activities are likely to cause.

--None identified. Project takes place on 16 different private land areas, and will employ more people than are currently employed on these lands.

2. Describe how the project plans to mitigate these negative offsite social and economic impacts.

--Not relevant. However, if negative impacts are identified, project will adapt to mitigate them.

3. Demonstrate that the project is not likely to result in net negative impacts on the well-being of other stakeholder groups.

--Project lands are but a small percentage of total lands of similar land-use characteristics in the region. No negative impacts will be experienced.

Community Impact Monitoring

The project proponents must have an initial monitoring plan to quantify and document changes in social and economic well-being resulting from the project activities (for communities and other stakeholders). The monitoring plan must indicate which communities and other stakeholders will be monitored, and identify the types of measurements, the sampling method, and the frequency of measurement. Since developing a full community monitoring plan can be costly, it is accepted that some of the plan details may not be fully defined at the design stage, when projects are being validated against the Standards. This is acceptable as long as there is an explicit commitment to develop and implement a monitoring plan.

The project proponents must:

1. Develop an initial plan for selecting community variables to be monitored and the frequency of monitoring and reporting to ensure that monitoring variables are directly linked to the project's community development objectives and to anticipated impacts (positive and negative).

--The community variables will be selected from two identified social groups: rural laborers from areas near project strata; members of the academic community (students and staff) of the local universities that will be invited to participate. See section 4 Monitoring.

2. Develop an initial plan for how they will assess the effectiveness of measures used to maintain or enhance High Conservation Values related to community well-being (G1.8.4-6) present in the project zone.

--To be completed.

3. Commit to developing a full monitoring plan within six months of the project start date or within twelve months of validation against the Standards and to disseminate this plan and the results of monitoring, ensuring that they are made publicly available on the internet and are communicated to the communities and other stakeholders.

--Project is committed to doing this.

Net Positive Biodiversity Impacts

The project must generate net positive impacts on biodiversity within the project zone and within the project lifetime, measured against the baseline conditions. The project should maintain or enhance any High Conservation Values (identified in G1) present in the project zone that are of importance in conserving globally, regionally or nationally significant biodiversity. Invasive species populations must not increase as a result of the project, either through direct use or indirectly as a result of project activities.

Projects may not use genetically modified organisms (GMOs) to generate GHG emissions reductions or removals. GMOs raise unresolved ethical, scientific and socio-economic issues. For example, some GMO attributes may result in invasive genes or species.

The project proponents must:

1. Use appropriate methodologies to estimate changes in biodiversity as a result of the project in the project zone and in the project lifetime. This estimate must be based on clearly defined and defendable assumptions. The 'with project' scenario should then be compared with the baseline 'without project' biodiversity scenario completed in G2. The difference (i.e., the net biodiversity benefit) must be positive.

--Monitoring of avifauna populations and species diversity in project area will follow established field techniques and be supervised by Paul Greenfield, MCF founding member and recognized national expert. The detailed monitoring plan for this will be developed within six-months of project start date.

2. Demonstrate that no High Conservation Values identified in G1.8.1-348 will be negatively affected by the project.

--Monitoring of avifauna populations and species diversity in project area will follow established field techniques and be supervised by Paul Greenfield, MCF founding member and recognized national expert. The detailed monitoring plan for this will be developed within six-months of project start date.

Project assumes that the planting of native tree species can only cause positive impacts on the High Conservation Values identified. However, this assumption will be tested during monitoring.

3. Identify all species to be used by the project and show that no known invasive species will be introduced into any area affected by the project and that the population of any invasive species will not increase as a result of the project.

--Please see Annex 4. The two non-native species that will be used by project (14% of total) are already present in project area and have not become invasive.

4. Describe possible adverse effects of non-native species used by the project on the region's environment, including impacts on native species and disease introduction or facilitation. Project proponents must justify any use of non-native species over native species.

--The use of casuarinas to create wind-blocks is a common practice in much of the Ecuadorian Sierra and they help create micro-climates that allow other, native species to become established and grow. Project has decided to use *Alnus nepalense*, because anecdotal evidence and local experience have shown that locally more prevalent *Alnus acuminata* has been suffering fungal attack in recent years and also several nurseries and local experts have reported their inability to find viable seeds for this second alder species.

5. Guarantee that no GMOs will be used to generate GHG emissions reductions or removals.

--Project will not use any GMOs and in fact GMOs are prohibited by the Ecuadorian constitution of 2008.

Gen	Clim	Comm	Bio
B2. **Required**			

Offsite Biodiversity Impacts

The project proponents must evaluate and mitigate likely negative impacts on biodiversity outside the project zone resulting from project activities.

1. Identify potential negative offsite biodiversity impacts that the project is likely to cause.

--None found.

2. Document how the project plans to mitigate these negative offsite biodiversity impacts.

--Not relevant.

3. Evaluate likely unmitigated negative offsite biodiversity impacts against the biodiversity benefits of the project within the project boundaries. Justify and demonstrate that the net effect of the project on biodiversity is positive.

--If there are no negative biodiversity impacts, clearly the net effect is positive.

Gen	Clim	Comm	Bio
B3. **Required**			

Biodiversity Impact Monitoring

The project proponents must have an initial monitoring plan to quantify and document the changes in biodiversity resulting from the project activities (within and outside the project boundaries). The monitoring plan must identify the types of measurements, the sampling method, and the frequency of measurement. Since developing a full biodiversity-monitoring plan can be costly, it is accepted that some of the plan details may not be fully defined at the design stage, when projects are being validated against the Standards. This is acceptable as long as there is an explicit commitment to develop and implement a monitoring plan.

The project proponents must:

1. Develop an initial plan for selecting biodiversity variables to be monitored and the frequency of monitoring and reporting to ensure that monitoring variables are directly linked to the project's biodiversity objectives and to anticipated impacts (positive and negative).

--Total bird lists from inventories in all strata.

--Particularly High Conservation Value species mentioned in optional Standard GL3 below.

2. Develop an initial plan for assessing the effectiveness of measures used to maintain or enhance High Conservation Values related to globally, regionally or nationally significant biodiversity (**G1.8.1-3)** present in the project zone.

--Project developer, MCF, its different members and colleagues, have years of birding reports and sighting data, forming a reliable baseline, especially for strata 1-3. Also, project participant Rafael Ferro, has been very active since 2007 in the *Grupo de Apoyo Local* (Local Support Group) of the Río Caoní IBA. One result of this is another bird-list of sightings that also provides us with baseline information for stratum 3.

During project design stage in 2009 and follow up visits in 2010-2011, project developer has created a basic birdlist for strata 4-5, and this list has since been reviewed and improved by recognized expert and authority on the Ecuadorian avifauna, Paul Greenfield.

While we have not developed the specific monitoring plan for this, the idea is simple: more native forests in strata 4-5 will lead to the presence of more bird species. Also greater forest connectivity in strata 1-3 will help assure long-term and more distributed presence of the species identified as High Conservation Values.

In the most basic sense, project monitoring for this standard will include the performance of point counts and the establishment of monitoring transects in relevant areas of the project boundary, and the keeping of annual avifauna census data for each strata.

3. Commit to developing a full monitoring plan within six months of the project start date or within twelve months of validation against the Standards and to disseminate this plan and the results of monitoring,

ensuring that they are made publicly available on the internet and are communicated to the communities and other stakeholders.

--This plan will be developed.

Gen	Clim	Comm	Bio	Gold
GL3. **Optional**				

Exceptional Biodiversity Benefits

All projects conforming to the Standards must demonstrate net positive impacts on biodiversity within their project zone. This Gold Level Exceptional Biodiversity Benefits criterion identifies projects that conserve biodiversity at sites of global significance for biodiversity conservation. Sites meeting this optional criterion must be based on the Key Biodiversity Area (KBA) framework of vulnerability and irreplaceability. These criteria are defined in terms of species and population threat levels, since these are the most clearly defined elements of biodiversity. These scientifically based criteria are drawn from existing best practices that have been used, to date, to identify important sites for biodiversity in over 173 countries.

Project proponents must demonstrate that the project zone includes a site of high biodiversity conservation priority by meeting either the vulnerability *or* irreplaceability criteria defined below:

1. Vulnerability. Regular occurrence of a globally threatened species (according to the IUCN Red List) at the site:

1.1. Critically Endangered (CR) and Endangered (EN) species - presence of at least a single individual; or

1.2. Vulnerable species (VU) - presence of at least 30 individuals or 10 pairs.

--Table below indicates the 12 Vulnerable and 3 Endangered IUCN Red List species present in some of the 16 participating properties. In reference materials please find folder “Endangered and Vulnerable Birds Fact Sheets” for corroboration. Project developer feels that the avifauna is a sufficiently reliable indicator of overall biodiversity health and presence. Any cursory study of the area can uncover many references to the high diversity of vascular plants, high mammalian diversity and general endemism.

English Name	Scientific Name	Endemism	IUCN Red List Status	Present in Stratum	Evidence
Gray-backed Hawk	*Leucopternis occidentalis*	Tumbesian endemic	Endangered	3	Records by members of GAL Recorded as rare on official site list R. Silanche
Plumbeous Forest-Falcon	*Micrastur plumbeus*	Chocó endemic	Vulnerable	2-3	Repeated, recent sight/audio records
Dark-backed Wood-Quail	*Odontophorus melanonotus*	Chocó endemic	Vulnerable	1-2	Generally recorded in the

					project area; Birds of Ecuador (2001)
Rufous-headed Chachalaca	*Ortalis erythroptera*	Tumbesian endemic	Vulnerable	3	Repeated recent sight/audio records
Brown Wood-Rail	*Aramides wolfi*	Chocó endemic	Vulnerable	3	Several sight/audio records
Banded Ground-cuckoo	*Neomorphus radiolosus*	Chocó endemic	Endangered	3	Very rare species, with a few recent sight/audio records within the project area
Cloud-forest Pygmy-Owl	*Glaucidium nubicola*	Chocó endemic	Vulnerable	1-2	Repeated recent records; Birds of Ecuador (2001)
Little Woodstar	*Acestrura bombus*	Tumbesian endemic	Vulnerable	2-3	Repeated recent records; mentioned Birds of Ecuador (2001)
Giant Antpitta	*Grallaria gigantea*	Northern Central Andes endemic	Vulnerable	1-2	Repeated recent records, photographs; mentioned Birds of Ecuador (2001)
Moustached Antpitta	*Grallaria alleni*	Northern Central Andes endemic	Vulnerable	2	Repeated recent records, photographs; mentioned Birds of Ecuador (2001)
Slaty Becard	*Pachyramphus spodiurus*	Tumbesian endemic	Endangered	3	Recorded as rare within the project area
Long-wattled Umbrellabird	*Cephalopterus penduliger*	Chocó endemic	Vulnerable	2	Lek in project area
Cerulean Warbler	*Dendroica cerulean*	Boreal migrant	Vulnerable	2	Sporadic, recent records yearly
Scarlet-breasted Dacnis	*Dacnis berlepschi*	Chocó endemic	Vulnerable	3	Recorded as rare, but present within project area
Tanager Finch	*Oreothraupis arremonops*	Chocó endemic	Vulnerable	1	Recorded as rare to Infrequent but present within project area

ANNEX 2 Bird Species List

List of Endemic Bird Species Including those of Particular Conservation Interest, *i.e.* IUCN Red List Vulnerable and Endangered Species

English name	*Latin name*	Notes
Tinamous	***Tinamidae***	
Berlepschi's Tinamou	*Crypturellus berlepschi*	Chocó endemic
Kites, Eagles, and Hawks	***Accipitridae***	
Gray-backed Hawk	*Leucopternis occidentalis*	Tumbesian endemic, endangered
Falcons and Caracaras	***Falconidae***	
Plumbeous Forest-Falcon	*Micrastur plumbeus*	Chocó endemic, vulnerable
New World Quails	***Odontophoridae***	
Dark-backed Wood-Quail	*Odontophorus melanonotus*	Chocó endemic, vulnerable
Guans and Chachalacas	***Cracidae***	
Rufous-headed Chachalaca	*Ortalis erythroptera*	Tumbesian endemic, vulnerable
Rails, Gallinules, and Coots	***Rallidae***	
Brown Wood-Rail	*Aramides wolfi*	Chocó endemic, vulnerable
Pigeons and Doves	***Columbidae***	
Dusky Pigeon	*Patagioenas goodsoni*	Chocó endemic
Pallid Dove	*Leptotila pallid*	Chocó endemic
Indigo-crowned Quail-Dove	*Geotrygon purpurata*	Chocó endemic
Parrots and Macaws	***Psittacidae***	
Red-masked Parakeet	*Aratinga erythrogenys*	Tumbesian endemic
Pacific Parrotlet	*Forpus coelestis*	Tumbesian endemic
Rose-faced Parrot	*Pionopsitta pulchra*	Chocó endemic
Cuckoos	***Cuculidae***	
Banded Ground-cuckoo	*Neomorphus radiolosus*	Chocó endemic, endangered
Typical Owls	***Strigidae***	
Colombian Screech-Owl	*Megascops colombianus*	Chocó endemic
Chocó Screech-Owl	*Megascops centralis*	Chocó endemic
Cloud-forest Pygmy-Owl	*Glaucidium nubicola*	Chocó endemic, vulnerable
Nightjars and Nighthawks	***Caprimulgidae***	
Chocó Poorwill	*Nyctiphrynus rosenbergi*	Chocó endemic
Hummingbirds	***Trochilidae***	
White-whiskered Hermit	*Phaethornis yaruqui*	Chocó endemic
Purple-chested Hummingbird	*Amazilia rosenbergi*	Chocó endemic
Empress Brilliant	*Heliodoxa imperatrix*	Chocó endemic
Purple-bibbed Whitetip	*Urosticte benjamini*	Chocó endemic
Velvet-purple Coronet	*Boissonneaua jardinii*	Chocó endemic
Brown Inca	*Coeligena wilsoni*	Chocó endemic
Gorgeted Sunangel	*Heliangelus strophianus*	Chocó endemic
Hoary Puffleg	*Haplophaedia lugens*	Chocó endemic
Violet-tailed Sylph	*Aglaiocercus coelestis*	Chocó endemic
Little Woodstar	*Acestrura bombus*	Tumbesian endemic, vulnerable
Trogons and Quetzals	***Trogonidae***	
Chocó Trogon	*Trogon comptus*	Chocó endemic
New World Barbets	***Capitonidae***	

Orange-fronted Barbet	*Capito squamatus*	Chocó endemic
Toucan Barbet	*Semnornis ramphastinus*	Chocó endemic
Toucans	***Ramphastidae***	
Pale-mandibled Araçari	*Pteroglossus erythropygius*	Chocó endemic
Plate-billed Mountain-Toucan	*Andigena laminirostris*	Chocó endemic
Chocó Toucan	*Ramphastos brevis*	Chocó endemic
Woodpeckers and Piculets	***Picidae***	
Lita Woodpecker	*Piculus litae*	Chocó endemic
Chocó Woodpecker	*Veniliornis chocoensis*	Chocó endemic
Scarlet-backed Woodpecker	*Veniliornis callonotus*	Tumbesian endemic
Guayaquil Woodpecker	*Campephilus gayaquilensis*	Tumbesian endemic
Ovenbirds	***Furnariidae***	
Pacific Hornero	*Furnarius cinnamomeus*	Tumbesian endemic
Double-banded Graytail	*Xenerpestes minlosi*	Chocó endemic
Pacific Tuftedcheek	*Pseudocolaptes johnsoni*	Chocó endemic
Uniform Treehunter	*Thripadectes ignobilis*	Chocó endemic
Stub-tailed Antbird	*Myrmeciza berlepschi*	Chocó endemic
Typical Antbirds	***Thamnophilidae***	
Esmeraldas Antbird	*Myrmeciza nigricauda*	Chocó endemic
Antthrushes & Antpittas	***Formicariidae***	
Giant Antpitta	*Grallaria gigantea*	N. Central Andes endemic, VU
Moustached Antpitta	*Grallaria alleni*	N. Central Andes endemic, VU
Yellow-breasted Antpitta	*Grallaria flavotincta*	Chocó endemic
Tapaculos	***Rhinocryptidae***	
Elegant Crescentchest	*Melanopareia elegans*	Tumbesian endemic
Tyrant Flycatchers	***Tyrannidae***	
Pacific Flatbill	*Rhynchocyclus pacificus*	Chocó endemic
Snowy-throated Kingbird	*Tyrannus niveigularis*	Tumbesian endemic, austral migrant
Slaty Becard	*Pachyramphus spodiurus*	Tumbesian endemic, endangered
Cotingas	***Cotingidae***	
Orange-breasted Fruiteater	*Pipreola jucunda*	Chocó endemic
Long-wattled Umbrellabird	*Cephalopterus penduliger*	Chocó endemic, vulnerable
Manakins	***Pipridae***	
Club-winged Manakin	*Machaeropterus deliciosus*	Chocó endemic
Thrushes	***Turdidae***	
Ecuadorian Thrush	*Turdus maculirostris*	Tumbesian endemic
Black Solitaire	*Entomodestes coracinus*	Chocó endemic
Crows, Jays & Magpies	***Corvidae***	
Beautiful Jay	*Cyanolyca pulchra*	Chocó endemic
New World Warblers	***Parulidae***	
Cerulean Warbler	*Dendroica cerulean*	Boreal migrant, vulnerable
Chocó Warbler	*Basileuterus chlorophrys*	Chocó endemic
Tanagers	***Thraupidae***	
Scarlet-breasted Dacnis	*Dacnis berlepschi*	Chocó endemic, vulnerable
Yellow-collared Chlorophonia	*Chlorophonia flavirostris*	Chocó endemic
Scarlet-and-white Tanager	*Erythrothlypis salmon*	Chocó endemic
Glistening-green Tanager	*Chlorochrysa phoenicotis*	Chocó endemic
Rufous-throated Tanager	*Tangara rufigula*	Chocó endemic

Gray-and-gold Tanager	*Tangara palmeri*	Chocó endemic
Blue-whiskered Tanager	*Tangara johannae*	Chocó endemic
Black-chinned Mountain-Tanager	*Anisognathus notabilis*	Chocó endemic
Moss-backed Tanager	*Bangsia edwardsi*	Chocó endemic
Ochre-breasted Tanager	*Chlorothraupis stolzmanni*	Chocó endemic
Scarlet-browed Tanager	*Heterospingus xanthopygius*	Chocó endemic
Dusky Bush-Tanager	*Chlorospingus semifuscus*	Chocó endemic
Yellow-green Bush-Tanager	*Chlorospingus flavovirens*	Chocó endemic
Emberizine Finches	***Emberizidae***	
Crimson-breasted Finch	*Rhodospingus cruentus*	Tumbesian endemic
Tanager Finch	*Oreothraupis arremonops*	Chocó endemic, vulnerable

Source: Mindo Cloudforest Foundation, 2011. Species endemism adopted from The Birds of Ecuador (Robert S. Ridgely and Paul J. Greenfield, Cornell University Press, 2001). IUCN Red List Endangered and Vulnerable status in turn was adopted from Birdlife International Factsheets, on file for the vulnerable and endangered species listed here.

ANNEX 3 Project Profile Suamox

Project profile for Suamox – Río Silanche Forest Corridor (Spanish)

Perfil de proyecto: IBA Río Caoní y el Corredor Biológico Rancho Suamox – Río Silanche

Antecedentes:
En conversaciones mantenidas entre Rafael Ferro, propietario del Rancho Suamox, y Brian Krohnke de Mindo Cloudforest Foundation (MCF) en el año 2008 durante la fase de levantamiento topográfico de Suamox para la iniciativa CarbonNeg, Rafael mencionó la posibilidad de crear un corredor boscoso al conectar los bosques riparios de las cuencas de los ríos Silanche y Caoní. Esta conectividad permitirá la compleción de un CORREDOR BIOLOGICO de más de 70 Km de longitud, incrementando el establecimiento de flora y fauna local al permitir el tránsito de especies de mamíferos, aves e insectos dispersores de semillas y agentes polinizadores. En aquel momento la idea parecía demasiada ambiciosa, pero al estudiar más el caso, nos dimos cuenta que esta futura realidad está casi completa y la parte gruesa del trabajo ya está financiada.

Luego de esta conversación Brian tomo varios puntos con GPS que indicaron que la brecha entre las propiedades consta de apenas 2 km aproximadamente. El sector del Santuario de Aves Río Silanche más cercano a Suamox es comprendido por bosques secundarios con muy buena diversidad de especies y un grado de conservación alto. El Rancho Suamox en la mayoría de su extensión es comprendido entre pastizales y remanentes de bosques secundarios, riparios en su mayoría. Ya en el año 2011 con la financiación de la iniciativa CarbonNeg[15] se tiene la oportunidad de reforestar los pastizales de Suamox con especies nativas, acelerando su recuperación ambiental y su conversión a bosque en un 100%. Los trabajos de reforestación se iniciarán en el mes de Diciembre del 2011 y los viveros ya están comenzados desde Julio, 2011.

La restauración de este corredor biológico tiene especial significancia ya que el Santuario de Aves Rio Silanche y el Rancho Suamox se encuentran dentro de la IBA EC040 del Rio Caoní, perteneciente a los Cantones Pedro Vicente Maldonado y Puerto Quito en el noroccidente de la Provincia de Pichincha. Una IBA o Área de Importancia para la Conservación de las Aves como definido por Birdlife International, es un espacio geográfico que cumple con varios requisitos objetivos en cuanto a su relevancia para la avifauna: tener especies en estado vulnerable o amenazado según la Lista Roja de la UICN; recibir aves migratorias durante parte del año, etc. Cabe destacar que los dos cantones donde se ubica esta IBA demuestran una tendencia al monocultivo de pastizales, palmito y palma africana principalmente, proceso tal que ha producido la fragmentación del bosque reduciéndolo en tan solo 50 años a un 5% del total originario.[16]

A partir del año 2007, con miembros de la comunidad local conocedores del territorio y con el apoyo de la ONG Aves & Conservación, se conformó el Grupo de Apoyo Local de la IBA del Rio Caoní, teniendo como un principal objetivo integrar los remanentes boscosos de los dos cantones y redefinir la extensión y cobertura de la IBA con más apego a la realidad local. Entre los resultados de este esfuerzo se ha dado una mayor relevancia a la conservación de la IBA, y se logró un registro de 455 especies de aves, contra los registros de 230 especies que tenía la comunidad científica anteriormente.[17] Al integrar el territorio se determino un área real de la IBA de 36.000 ha, y adicionalmente se elaboro un plan de estrategias de conservación, destacándose la necesidad de formar corredores biológicos que conecten

[15] Esta iniciativa de Mindo Cloudforest Foundation es un proyecto de reforestación con especies nativas para la restauración de bosques y captura de Gases del Efecto Invernadero que comienza a trabajar sobre 500 hectáreas en las provincias Pichincha e Imbabura.
[16] Datos de los departamentos de medio ambiente en los cantones referidos.
[17] Este total para la IBA se compara con la lista de especies observadas únicamente en el Santuario de Aves Río Silanche, una propiedad de 70 hectáreas: 274. Lista descargable en http://www.mcf.ec.

todos los remanentes boscosos, a través de programas de reforestación, bien sean estos públicos o privados.

Mapa de referencia de la IBA Río Caoní:

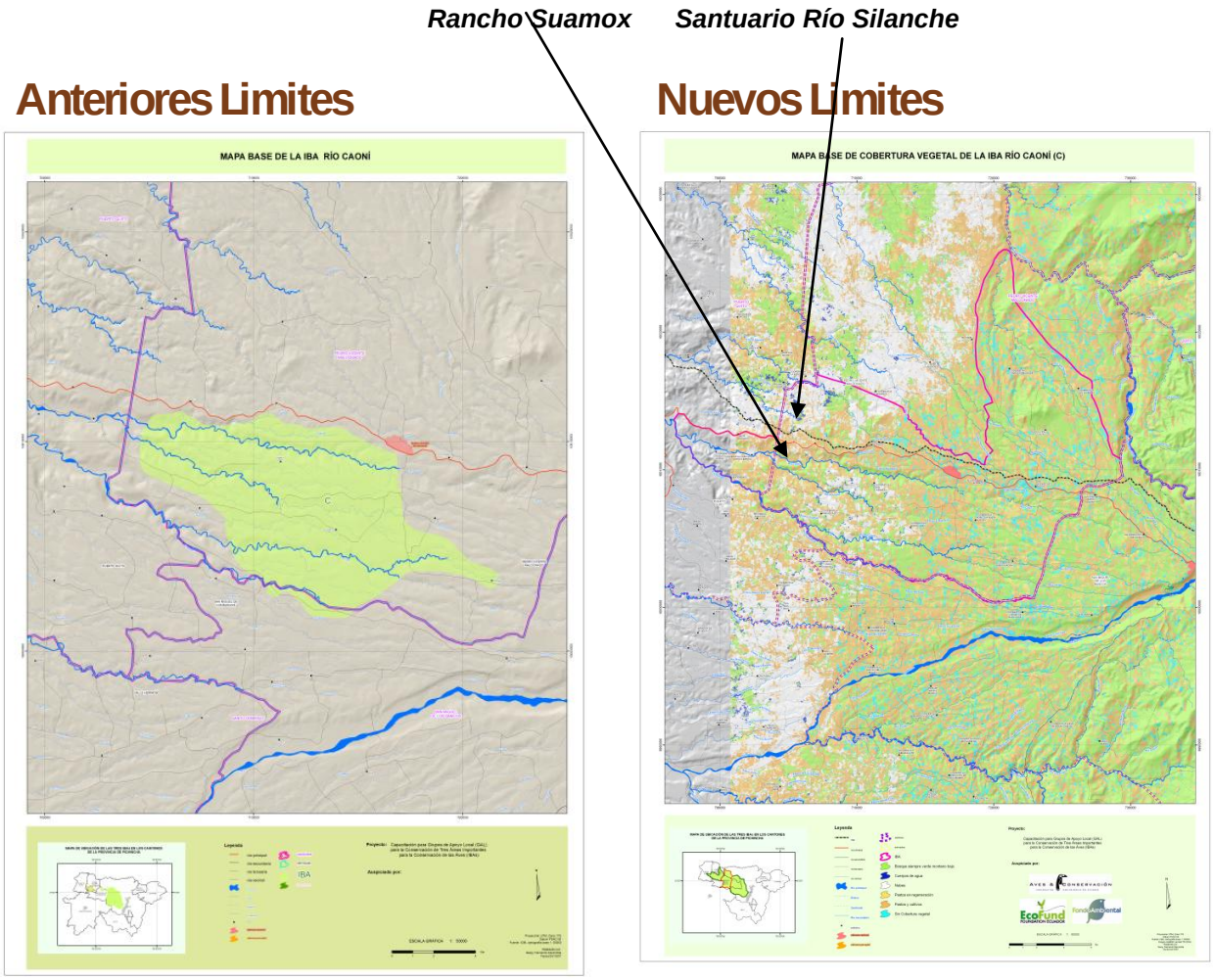


Ilustración 1

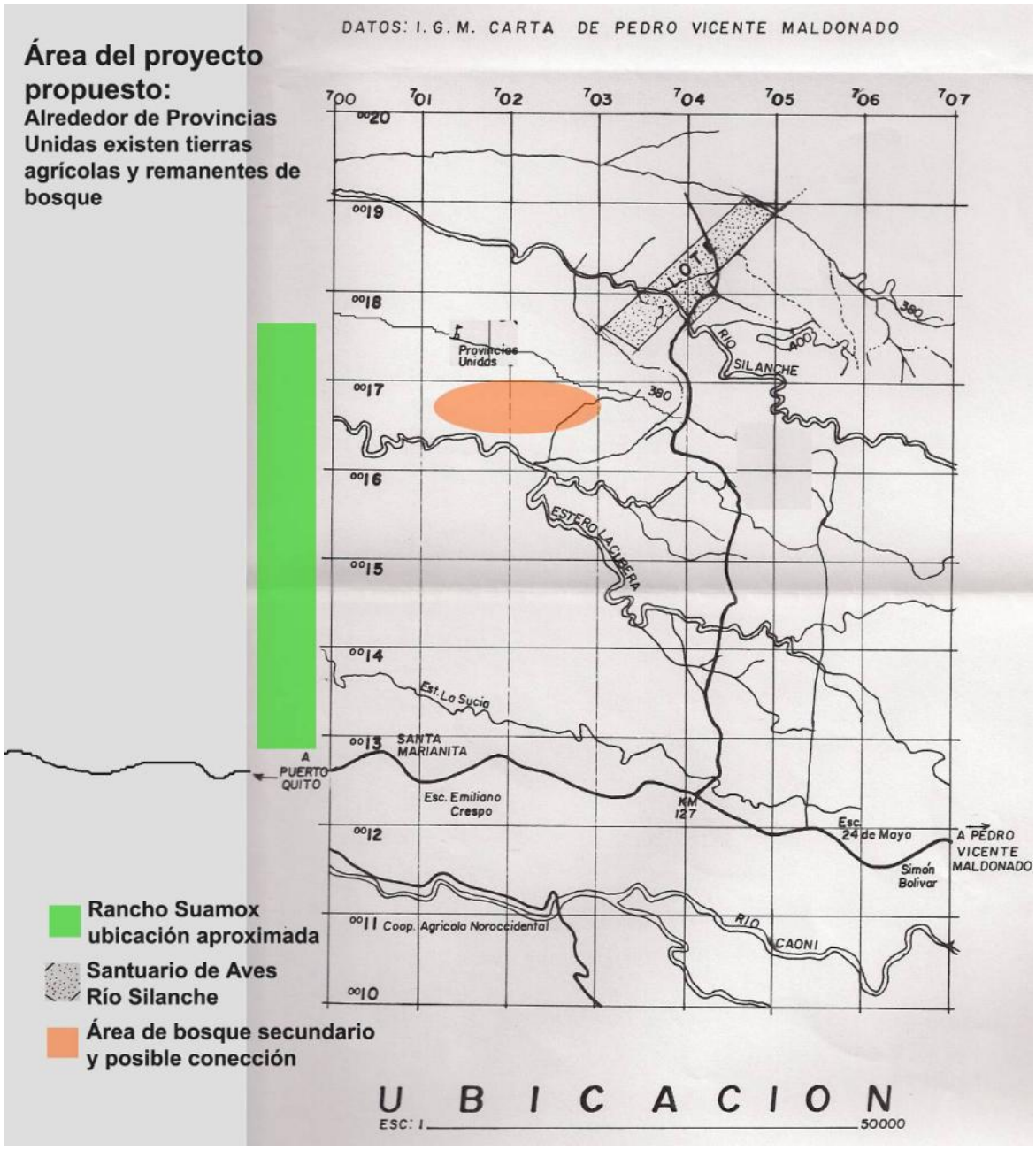


Ilustración 2

Problema que se soluciona con el proyecto:
El corredor planificado se construirá en un panorama de bosques remanentes cada vez más aislados, y vinculará una mancomunidad de los cantones Puerto Quito y Pedro Vicente Maldonado en un trabajo de restauración ecológica que contribuirá a la sostenibilidad de las poblaciones de avifauna, el futuro del sector de eco-turismo y la protección de fuentes de agua.

Situación legal y político de la propuesta:
Tanto el Municipio del Cantón Puerto Quito como el de Pedro Vicente Maldonado se han propuesto el tema de mejoramiento ambiental y la seguridad del recurso agua como actividades prioritarias como se evidencia con la Ordenanza XX de Puerto Quito aprobado en fecha XX para estimular la reforestación de los bosques ripiaros, ya que este territorio, tan reciente como la década de los sesenta fue en su gran mayoría bosque lluvioso y ahora posee apenas el 4% de sus bosques primarios, habiendo sido la conversión a cultivos de palma Africana, cacao, pastizales y palmito los motores de esta deforestación.

En el espacio que llamamos la brecha entre los bosques del corredor está ubicado el caserío Las Provincias del Cantón Puerto Quito y consta de XX familias, la iglesia XX y la escuela fiscal Martha Bucaram de Roldós con 11 estudiantes entre 5 y 13 años de edad.[1]

Enfoque del proyecto y acciones propuestas:
Crear e implementar un plan de manejo para el área del corredor, incluyendo el Rancho Suamox, el Santuario de Aves Río Silanche y las tierras privadas que se ubican entre estos dos territorios. No se busca alterar la tenencia de la tierra o mermar los ingresos económicos percibidos por la población local, sino incentivarles a ellos a que sean partícipes de varios cambios en el uso y la percepción de la tierra, creando nuevas oportunidades en el sector turístico y mejores ingresos a nivel de las fincas.

1. Realizar un levantamiento topográfico y crear un geodatabase en un Sistema de Información Geográfico del área del corredor con el apoyo de los departamentos catastrales de los dos municipios involucrados.
2. Realizar un levantamiento biológico del área del corredor con el apoyo de miembros del Grupo de Apoyo Local de la IBA.
3. Realizar un estudio socio-económico del área del corredor para conocer las necesidades y deseos de la población circundante.
4. Investigar sobre posibles acciones para el manejo do del corredor que incluya:
    a. El apoyo a actividades productivas amenas con el ambiente
    b. Concientización ambiental entre la población local y los estudiantes de la escuela Martha Bucaram de Roldós
    c. Capacitación en guianza y protección ambiental con la población local
5. Investigar las ordenanzas municipales existentes que puedan dar el sustento legal para acciones de conservación de los bosques existentes en el corredor y la protección de los bosques a ser reforestados.
6. Proponer restricciones en el uso del suelo de las tierras privadas ubicadas en la 'brecha' para evitar la ampliación de la frontera agrícola.
7. Facilitar y financiar la implementación de parcelas de reforestación que tiendan a ampliar el corredor creando áreas de amortiguamiento y cordones de conectividad a lo largo de los cerramientos de los pastizales y demás campos agrícolas.
8. Contratación de 1-2 guardabosques quienes serán los enlaces entre la comunidad, los municipios y los usuarios del recurso turístico fortalecido.

Plazo del proyecto:
Un año a partir de consecución de financiamiento, y con la actividad 8 continuando por cuatro años bajo la supervisión de los actores.

Costes del proyecto:

Act.	*Detalle*	*Costo unidad*	*Cantidad*	*Total*
1	*SIG*	*$5.000*	*1*	
2	*Info. Biológico*	*$2.000*	*1*	*$2.000*
3	*Info. Socio-econo*	*$2.500*	*1*	*$2.500*
4	*Plan de manejo*	*$8.000*	*1*	*$8.000*
5	*Invest. Legal*	*N/A*		
6	*Restricciones*	*N/A*		
7	*Reforestación*	*$10.000*	*1*	*$10.000*
8	*Guardabosques*	*$450*	*48*	*$21.600*
	TOTAL PROYECTO			*$49.600*

Posibles fuentes de financiamiento:

1. La fundación belga Groenhart quienes han apoyado diferentes actividades Mindo Cloudforest Foundation, incluyendo el levantamiento de información que dio el comienzo a la iniciativa CarbonNeg.

2. Neotropical Migratory Bird Conservation Act Grant: Estos fondos de contraparte son el producto de una ley estadounidense que obliga ese gobierno a invertir en proyectos en las Américas. Los requisitos principales son dos: que el área a ser intervenido tenga hábitat de aves migratorias y que un 75% del proyecto sea financiado por otras fuentes. En ambos cumplimos por las aves, el proyecto de reforestación y las inversiones y gastos operativos tanto de la familia Ferro en su Rancho Suamoz como de MCF en el Santuario de Aves Río Silanche.

ANNEX 4 List of Tree Species to be Planted by Strata

Lista de Especies Estratos 1-2 Santa Rosa, Sachatamia				113000	
Aliso de Nepal	Alnus nepalense	única no nativa en esta lista		10000	9%
Aliso Blanco	Alnus acuminata			8000	7%
Guabo	Inga sp			16000	14%
Sangre de Drago	Croton lecheri			4000	4%
Sange de Gallina	Clusiaceae vismia sp.			13000	12%
Tangaré	Carapa guianensis			4000	4%
Colcas	Melastomatacea sp			12000	11%
Canelo				4000	4%
Colorado fino				4000	4%
Cedro	Cedrela montana			6000	5%
Pache				4000	4%
Mora				4000	4%
Poroton	Erythrina sp			8000	7%
Guayabilla				4000	4%
Otras especies nativas				12000	11%
			TOTALES	113000	100%
Lista de Especies Estrato Suamox, 3		todas especies nativas		44000	
Cabeza de negro	Annona purpúrea			880	2%
Chontadura	Bactris gasipaes			880	2%
Yuca de Ratón	Gliricidia sepium			4400	10%
Leucaena	Leucaena sp.			4400	10%
Pambil	Iriiartea deltoida			880	2%
Laurel	Cordia allidora			2640	6%
Clavellín	Brownea hertae			880	2%
Guarumo	Secropia sp			880	2%
Mamey	Mamea americana			2640	6%
Sangre de gallina	Vismia obtusa			2640	6%
Manteca de puerco				880	2%
Mascarey	Hyeroina chocoensis			880	2%
Guaba de monte	Inga sp			2640	6%
Guayacán Pechiche				440	1%
Sande	Brosimum utile			440	1%
Caucho	Castilla elastica			440	1%
Moral fino	Machura tinctoria			440	1%
Moral Bobo				440	1%
Chíparo	Ficus sp.			440	1%
Pera de agua	Sysygium malaccense			880	2%
Fernán sánchez	Triplaris cuminngiana			2640	6%
Borojó	Borojoa patinoi			880	2%
Caimito	Chysophyllum caimito			880	2%
Sapán de paloma	Trema micrantha			2640	6%
Sapán	Trema integerrima			1760	4%

Tangaré	Carapa guianensis			1760	4%
Balsa	Ochroma pyramidale			880	2%
Copal				880	2%
Mambla				880	2%
Jagua				440	1%
Colorado fino				440	1%
Azufre	Symphonia globulifera			880	2%
			TOTALES	**44000**	**1**
				Cantidad	%
Lista de Especies Estrato Salinas, 4				110000	
Casuarina	Casuarina equisetifolia	única no nativa en esta lista		44000	40%
Cholán	Tecoma stans			16500	15%
Jacarandá	jacaranda copaiba			1000	1%
Ceibo	Ceiba pentandra				0%
Guarango	Caesalpinia spinosa			7000	6%
Molle	Shinus Molle			5000	5%
					0%
Cedro	cedrela montana			2000	2%
Guabo	inga sp...			7000	6%
Guayaba	Psidium guajava			5500	5%
Espino	acacia macracantha			10000	9%
Nogal	Juglans neotropica			2000	2%
Leucaena				10000	9%
			TOTAL PLANTAS	**110,000**	**100%**
Lista de Especies Estrato San Gerónimo, 5				**133,000**	
Nombre común	**Nombre científico**				
Mambla	Erythrina poepigiana	Todas especies nativas		1000	1%
Ville	Simarouba amara			1000	1%
Marañón	Anacardium excelsa			1000	1%
Cedro	Cedrela odorata			13200	10%
Cholán	Tecoma stans			1000	1%
Jacarandá	jacaranda copaiba			13200	10%
Ceibo	Ceiba pentandra			1000	1%
Guácimo				1000	1%
Acacia Amarilla	Acacia sp.			2000	2%
Leucaena	Leucaeana sp.			10000	8%
Samán	Samanea saman			1000	1%
Guabo	inga sp...			26400	20%
Zapote amarillo				1000	1%
Laurel	Cordia aliadora			19200	14%
Yuca de Ratón	Gliricidia sepium			44000	33%
			TOTAL PLANTAS	**133,000**	**100%**