Project Name: Laguna Seca Forest Carbon Project

Project Location: Belize, Orange Walk District

Project Proponent: The Forestlands Group LLC, Kaarsten Turner Dalby, kaarsten@forestlandgroup.com, (303) 838-2512

Auditor: Environmental Services Inc., Shawn McMahon, smcmahon@ESINC.CC, 330-833-9941

Project start date: January 1, 2011

GHG accounting period: January 1, 2011 through December 31, 2040

Lifetime: 30 years

Full validation or a gap validation: full validation

History of CCB Status, where appropriate, including issuance date(s) of earlier Validation/Verification Statements: not applicable

Edition of the CCB Standards being used for this validation: Version 2

Brief summary of the project’s expected climate, community and biodiversity benefits:

This project intends to protect 8,293 ha of mature tropical forest in Belize at imminent threat of conversion to sugar cane. This area is a rare example of protected forest with complete neotropical biodiversity. The project will provide climate benefits by avoiding emissions associated with land clearing and agriculture, gold level biodiversity benefits by protecting habitat for multiple species on the IUCN Endangered list, and community benefits by committing to annual support of a scholarship fund for community members to attend high school.

Optional Gold Level criteria are being used and a brief description of the attributes that enable the project to qualify for each relevant Gold Level:

Gold Level based on exceptional biodiversity benefits including multiple IUCN Endangered species

Date of completion of this version of the PDD, and version number, as appropriate:

Version 1.1 5/26/14

Expected schedule for verification, if known: Schedule not known at this time.
LAGUNA SECA FOREST CARBON PROJECT

Document Prepared By Forest Carbon Offsets LLC

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<table>
<thead>
<tr>
<th>Project Title</th>
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</thead>
<tbody>
<tr>
<td>Version</td>
<td>1.1</td>
</tr>
<tr>
<td>Date of Issue</td>
<td>26/05/2014</td>
</tr>
<tr>
<td>Prepared By</td>
<td>Jeff Waldon, Chief Technical Officer, Forest Carbon Offsets LLC</td>
</tr>
</tbody>
</table>
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<th>Description</th>
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<td>8.3</td>
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<tr>
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<td></td>
</tr>
</tbody>
</table>
1 GENERAL

1.1 Summary Description of the Project (G3)

The goal of the project is to protect the property as a carbon sink, maintain the biodiversity values of the property, and enhance the local economic environment with sustainable livelihoods. The climate objective is to avoid emissions from deforestation during the project timeframe. The project area was slated for conversion to sugarcane agriculture.

The project consists of protection of the property through 2038 (30 years) through patrols and placing a restrictive covenant on the property deeds for the life of the project. Gallon Jug Agroindustry Ltd. (TFG) owned and managed the property prior to implementation of the project. Gallon Jug Agroindustries implemented the project, and then sold the property to The Forestlands Group (TFG). Forest Carbon Offsets LLC (FCO) was an agent of TFG to develop the carbon finance project, and continues to serve in that capacity for TFG. The Conservation Management Institute at Virginia Tech (CMI) was the subcontractor originally hired to conduct technical analyses on behalf of FCO in 2011. A more recent update to the inventory data plus additional community input data was developed by ERA/Offsetters of Vancouver, Canada.

This project started in 2009 to protect 8,293 ha of tropical forests in Belize, Central America. The entire property consists of 133,000 acres (53,846 ha). Near the center of the property, 1,214 ha have been managed as a cattle and coffee farm. An exceptional ecotourism lodge (Chan Chich Lodge) is on the property as well. The property was selectively logged multiple times through the 1960’s when it was purchased (fee simple) in the 1980’s by Sir Barry Bowen, a well known businessman and former Belizean Senator. The property was managed for conservation with the exception of the farm. Due to the untimely death of the owner and the global economic recession, the property was proposed for development and conversion to sugar cane for a new sugar/electricity facility in northern Belize. Carbon finance allowed the owners to avoid going forward with the sugarcane project, and instead sell a large portion of the property, including the entire project area, to the The Forestland Group, LLC of Chapel Hill, NC.

Biodiversity at Gallon Jug is well documented and world-renowned. The densest population of large cats in Central America has been documented on the property primarily due to superb habitat and a rigorous prohibition on hunting. In addition to large cats there are notable populations of Ocellated Turkeys, White Tail Deer, White Lipped Peccary, and Great Currasow all of which are prized by hunters. The property has been identified as a key biodiversity area (KBA) in Belize and Central America (Meerman 2007)) and is contiguous with two other protected areas, the Rio Bravo Conservation and Management Area, and the Maya Biosphere Reserve in Guatemala. The project proponents will support the community through contributions to the Gallon Jug-Chan Chich High School Scholarship Fund, a scholarship fund to cover high school tuition for children in the community.

The “without project” scenario for this project is conversion to agricultural for sugarcane. Additionality is proven by virtue of the financial statements of the former owner and written plans for conversion. Road access is adequate. Topography is minimal. Soils are good as evidenced by the existing cattle operation already on the property and past efforts to evaluate sugarcane.
Impacts to biodiversity and the local community would be drastic, largely negative and potentially impact the surrounding properties.

The "with project" scenario would maintain the current management regime which consists of very low impact timber harvesting and conservation of the property. FSC certification will be achieved in 2015. The hunting prohibition would be maintained and patrols increased. Support for the community would be maintained and increased by virtue of additional jobs for protection of the property, a new health clinic, a fire fighting unit, and a scholarship program for members of the community to attend high school. Climate, biodiversity and community value monitoring would commence.

Climate, Community, and Biodiversity Standard Gold Level is achieved by virtue of the significant biodiversity resources conserved on the property including habitat for multiple IUCN listed species and most notably IUCN-Endangered Baird’s tapir (Tapirus bairdii), Yucatan black howler monkey (Alouatta pigra) and Geoffroy’s spider monkey (Ateles Geoffroyi).

Forest Carbon Offsets LLC (FCO) is the Project developer. The Project follows the carbon accounting principles of conservatism, accuracy, completeness, transparency, consistency, and relevance. Validation under the Verified Carbon Standard is and the Climate, Community, and Biodiversity Alliance Standard is sought. After validation, registration of voluntary emission reduction credits will be conducted with Markit Environmental Registry.

1.2 Project Location (G1 & G3)

The Project area is located at Latitude 17°34’15.65” N and Longitude 89°03’06.30” W in the Orange Walk District, Belize 47.5 km northwest of Belmopan, Belize. The Project boundary encompasses 8,293 ha of which 8,293 ha are available and suitable for conversion to agricultural uses in the absence of finance from a carbon trade scheme under this project document. A one-chain buffer surrounding perennial streams is excluded from consideration.

Belize is a neotropical country that experiences a pronounced dry and wet season. The project site receives an average of 162.5 cm/year of rainfall (Miller and Miller 2011). Rainy season typically begins in late May and continues through November. Temperatures throughout Belize vary across different districts with mean annual temperatures ranging from 27°C along the coast to 21°C in the hills. Hurricanes and tropical storms peak in September and can have a significant effect on rainfall totals (Belize National Meteorological Service 2011).

Soils in the project area consist of the Yaxa Suite and specifically soils that are formed under constant lime enrichment (Baillie et. al. 1993). Elevation ranges from 10-20 m (Miller and Miller 2011).
Due to the remote nature of the property, and the fact that only two other landowners, Rio Bravo Conservation Area and the Yalbac Ranch, have common boundaries, the project zone for this project consists of the property plus the Rio Bravo Conservation Area and the Yalbac Ranch property. Rio Bravo is managed by the Programme for Belize\(^1\) a nonprofit established for that purpose. The Yalbac Ranch is owned and operated for timber production by the Forestlands Group LLC\(^2\), a US based timber company.

### 1.3 Conditions Prior to Project Initiation (G1)

In the 1960’s, the property was owned by the Belize Estates Company. Belize Estates harvested timber using selective harvesting. Gallon Jug was a Belize Estates logging camp. The property was purchased by Sir Barry Bowen of Bowen and Bowen Ltd. in the 1980’s. The property was divided into four parcels, approximately 400,000 acres became the Rio Bravo Conservation Area to the north and east. Bowen & Bowen Ltd. retained 133,000 acres at Gallon Jug and cleared 3000 acres for farming. The remainder was sold to private owners.

Farming at Gallon Jug has focused on cattle and sugar cane. Selective harvesting of timber has occurred historically. A small mill was built on site and products are sold primarily for the domestic market with small lots of export grade mahogany sold internationally. Evaluations of other crops have been conducted, notably test plots of sugarcane in the 1990’s. Chan Chich

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\(^1\) Programme for Belize [http://www.pfbelize.org/](http://www.pfbelize.org/)

Lodge, an ecotourism operation, was built in the late 1980’s and has been recognized as a top-tier international destination for birdwatching and nature tourism.

Due to the vigorous prohibition on hunting and the large unbroken tract of nearly mature forest, the biodiversity of the project area is exceptional. The project owners have supported a biodiversity research effort on the property since the 1980’s. Important publications have been produced on neotropical biodiversity as a result of this work.

The forest consists of tropical evergreen seasonal broadleaf lowland forest over calcareous soils: Central-western Variant, locally known as “high forest” and tropical evergreen seasonal broadleaf lowland swamp forest: High Variant locally known as bajo forest (Meerman and Sabido 2001). High forest is typical of Central America with a very diverse species assemblage. Bajo forest consists of many of the same species, but due to poor soil drainage, slower growth characteristics are prevalent.

In areas where drainage is poor, bajo forest forest is prevalent. Periodic storms (hurricanes and the remnants of hurricanes) impact the forest causing small scale blowdowns. Very infrequent large hurricane events can cause wider damage. The last hurricane to cause widespread damage was Hurricane Hattie in 1961. Minor damage occurs more frequently e.g. Hurricane Richard in the fall of 2010, which is quickly recovered by fast growing plant colonizers and the natural ecological response to canopy gaps in this sort of forest system (Bridgewater 2011). The area receives between 1000-1500 mm of rainfall each year.

In 2010, the CEO and a strong advocate for conservation of the property, Sir Barry Bowen passed suddenly in a small airplane accident. Leadership of Bowen & Bowen Ltd. transferred to Michael Bowen ably assisted by Alexander Bowen, Manager for Gallon Jug Agroindustries Ltd. Before he passed, Sir Barry Bowen made the decision to set aside a planned sugarcane project and instead sign with FCO to develop a carbon sequestration project thereby conserving the forest and the biodiversity found there. After Sir Barry’s passing, Bowen & Bowen Ltd. sold a large portion of the property, including the designated sugarcane project area, to TFG. TFG pledged to maintain the carbon project while conducting low intensity selective harvesting. The value of the carbon project was considered an asset during the sale negotiations.

Project Area Basic Ecotypes

There are several classification systems that can be used to map the vegetative communities within the Project area. The most useful is the basic ecotype classification described in the Meerman and Sabido (2001) which identifies two distinct ecosystems within the Project area (Figure 2).

1. Tropical evergreen seasonal broadleaf lowland forest over calcareous soils: Central-western variant (hereafter referred to as “high bush”)

This type is found at an elevation under 100 m on mostly well-drained soils over calcareous rock where average rainfall is less than 2000 mm/year with a pronounced dry season. Forest to 25 m tall on mostly well-drained limestone soils.
2. Tropical evergreen season broadleaf lowland swamp forest: High variant (hereafter referred to as “bajo”)

This type at an elevation under 250m on ill-drained soils over calcareous rock where average rainfall is less than 2000 mm/year with a pronounced dry season. This forest type is low in stature with a broken canopy with a distinct deciduous element.

Carbon Stocks within the Project Area

The approach to measuring carbon stocks in the Project area is based upon the Sourcebook for Land Use, Land-Use Change and Forestry Projects (Pearson et al 2005). These methods comply with the Intergovernmental Panel on Climate Change’s 2006 Guidelines for National GHG Inventories for Agriculture, Forestry and Other Land Use. The overarching methodology for determining climate benefits is VDM0007 REDD Methodology Modules (REDD-MF), v1.1.

Carbon Pools

The carbon pools selected for measurements were the above ground tree > 5 cm DBH and below-ground biomass. Aboveground non-tree biomass (lianas and palms), down or standing dead wood, and leaf litter were not measured, which resulted in a conservative estimation of carbon stocks.

Table 2: Selected Carbon Pools and Sources of Greenhouse Gas Emissions

<table>
<thead>
<tr>
<th>Carbon pools</th>
<th>Included / excluded</th>
<th>Justification / explanation of choice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Above ground tree biomass</td>
<td>Included</td>
<td>A major component of project.</td>
</tr>
<tr>
<td>Above ground non-tree biomass</td>
<td>Excluded</td>
<td>Palms were excluded for the lack of a qualifying method for estimating biomass.</td>
</tr>
<tr>
<td>Below ground biomass</td>
<td>Included</td>
<td>A major component of project calculated as a ratio of above ground tree biomass.</td>
</tr>
<tr>
<td>Dead-wood</td>
<td>Excluded</td>
<td>Excluded to be conservative and make the monitoring cost-effective.</td>
</tr>
<tr>
<td>Harvested wood products</td>
<td>Excluded</td>
<td>The standard practice in Belize for conversion of forest to agricultural lands is to remove valuable timber species and then bulldoze and burn the remaining trees. This pool was analyzed for significance and found to be de minimis.</td>
</tr>
<tr>
<td>Litter</td>
<td>Excluded</td>
<td>Excluded to be conservative and make the monitoring cost-effective.</td>
</tr>
<tr>
<td>Soil organic carbon</td>
<td>Excluded</td>
<td>Excluded to be conservative and make the monitoring cost-effective.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sources</th>
<th>Gas</th>
<th>Included / excluded</th>
<th>Justification / explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biomass burning</td>
<td>CO₂</td>
<td>Excluded</td>
<td>CO₂ emissions are accounted for by biomass changes in the above ground and below ground biomass pools.</td>
</tr>
<tr>
<td></td>
<td>CH₄</td>
<td>Included</td>
<td>Analyzed and found to be de minimis.</td>
</tr>
<tr>
<td></td>
<td>N₂O</td>
<td>Included</td>
<td>Analyzed and found to be de minimis.</td>
</tr>
<tr>
<td></td>
<td>CO₂</td>
<td>Excluded</td>
<td>Conservatively omitted from the baseline and project scenarios.</td>
</tr>
</tbody>
</table>

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3 See Verified Carbon Standard Methodologies [http://www.v-c-s.org/methodologies/VM0007](http://www.v-c-s.org/methodologies/VM0007)
**Combustion of fossil fuels**

- CH$_4$: Excluded
- N$_2$O: Excluded

**Use of fertilizers**

- CO$_2$: Excluded
- CH$_4$: Excluded
- N$_2$O: Included. The baseline scenario of sugarcane agriculture would utilize chemical fertilizer.

**Field Measurements**

Using a GIS of the compartments, 40 plots were randomly allocated. The methods for measuring the carbon pools at TFG were based on the *Sourcebook for Land Use, Land-Use Change and Forestry Projects* (Pearson et al 2005). Because destructive sampling was not practical to measure above ground carbon stocks, published allometric equations were used to determine aboveground biomass based upon the DBH of hardwood trees. The forest inventory techniques were used to collect the appropriate field data following Pearson et al (2005).

Every tree tallied was marked with a metal identification tag and given a unique identification number for future monitoring. Raw data were entered into a spreadsheet for data analysis and carbon calculations.

**Carbon Stock Calculations**

The moist hardwood equation in Pearson et. al. (2005) was used to determine above-ground biomass. For below-ground biomass, the regression equation from Pearson et al (2005) was used. The weighted average aboveground and belowground biomass was determined to be 144.8 mtCO$_2$/ha. The bajo component of the project site was conservatively excluded from the calculations because of the high variability of the forest in that type, and 124 ha was removed leaving 8,169 ha for calculation of avoided emissions. Three plots that fell within the Bajo type, plots 9, 13, and 40 were also excluded from the calculations.
Figure 1: Location of forestry plots in the Lower Wamil. Streams are shown with a 66 foot buffer from the center of the stream on both sides. Plots do not represent actual size, yellow asterisks are used as a general indicator of plot location.

Table 3: Equations used for calculating biomass.

<table>
<thead>
<tr>
<th>Classification</th>
<th>Equation</th>
<th>Maximum DBH or height</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moist hardwood above ground biomass</td>
<td>$\text{AGB} = \text{SpecGravity} \times \exp\left(-1.499 + (2.148 \times \ln(\text{dbh})) + (0.207 \times \ln(\text{dbh})^2 - (0.0281 \times \ln(\text{dbh})^3)\right)$</td>
<td>148 cm</td>
</tr>
<tr>
<td>Belowground biomass</td>
<td>$\text{BGB} = \exp(-1.0587 + 0.8836 \times \ln(\text{AGB}))$</td>
<td></td>
</tr>
</tbody>
</table>

Communities Located in the Project Zone

Due to the remote nature of the property, the only community in the project zone is the community of farm workers and managers that live on the farm at the center of the property, at Chan Chich Lodge and in Sylvester Village. The only employment in the community is through Gallon Jug Agroindustries.
Table 1: Orange Walk District 2009 midyear population estimates

<table>
<thead>
<tr>
<th></th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orange Walk District</td>
<td>40,200</td>
<td>40,600</td>
<td>80,800</td>
</tr>
<tr>
<td>Orange Walk Urban</td>
<td>24,000</td>
<td>25,100</td>
<td>49,200</td>
</tr>
<tr>
<td>Blue Creek</td>
<td>9,700</td>
<td>10,200</td>
<td>19,900</td>
</tr>
<tr>
<td>Belmopan</td>
<td>9,800</td>
<td>10,100</td>
<td>20,000</td>
</tr>
<tr>
<td>Orange Walk Rural</td>
<td>16,200</td>
<td>15,400</td>
<td>31,600</td>
</tr>
</tbody>
</table>

Based on direct observations of workers in the project zone, the workers in the area are a typical mix of Belizeans of Mayan or Hispanic decent working for the basic wage guaranteed in Belize according to the Belize minimum wage laws. A wide variety of age groups work in the area. Women are hired at Chan Chich Lodge and for processing of farm products.

A stakeholder analysis was performed. This analysis follows the procedural steps found in the “Community Development Toolkit” methodology at http://www.icmm.com/page/629/community-development-toolkit-c (Teets, Emrick, and Schneider 2012).

Current Land Use and Land Tenure in the Project Zone

The Project does not encroach upon community property. The property is privately held and no approvals are required from the Government of Belize or the local communities. There are no ongoing property disputes with the Project property (Maya Atlas 1997).

Within the project zone, timber harvesting and milling are the primary activity at Yalbac Ranch. Rio Bravo Conservation Area hosts visitors, students, and researchers at the La Milpa Field Station and the Hillbank Field Station serving as an educational, research, and ecotourism destination. Programme for Belize, the NGO that manages Rio Bravo, in collaboration with The Nature Conservancy, is currently undergoing validation for a VCS forest carbon project.

Copies of current land titles for the project area will be made available for review by the auditors of the project.

Current Biodiversity within the Project Zone

The TFG property has been the site of multiple biodiversity studies since the 1980’s conducted by Bruce and Carolyn Miller formerly with the Wildlife Conservation Society and others (Miller and Miller 2011, Kricher 1997). The property provides habitat for large predators such as the jaguar, puma, and ocelot along with a diverse array of prey species (Miller and Miller 2011). The property also provides suitable habitat for the IUCN-EN Geoffroy’s spider monkey, along with many more species of concern.
The current threats to the biodiversity in the Project area and Project zone in the “without-Project” scenario are:

- Lack of protection from illegal hunting.

Hunting associated with the illegal collection of xate (Chamaedorea spp.) particularly for large animals and collection of parrots has been identified as a conservation concern in Belize (Young 2008, Bridgewater 2011, and UNDP 2010). Due to the close proximity of the border with Guatemala, this threat is a concern although no evidence of illegal xate harvesting has been observed to date.

- Loss of broadleaf forest habitat.

The primary threat facing the biodiversity of the site in the baseline scenario would be the removal of habitat. The baseline scenario would convert the habitat from a primary forest to a sugarcane plantation. None of the at risk species identified for the property can complete their life cycles in a sugarcane plantation due to a change in habitat and disturbance by the sugarcane workers (IUCN 2012).

Table 5 outlines the species of special concern in the Project zone documented by Miller and Miller (2011). All species listed on the Belize National List of Critical Species, and the IUCN Red List are included. IUCN species of Least Concern are included only if listed by the Belize National List of Critical Species. All species listed in Table 5 were documented by TFG, its associated researchers, staff and/or consultants onsite.

### Table 5: IUCN red list species documented in the Project area (Miller and Miller 2011)

<table>
<thead>
<tr>
<th>Common name</th>
<th>Scientific name</th>
<th>IUCN</th>
<th>BZE</th>
<th>With-Project</th>
<th>Without-Project</th>
<th>Observed on site</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Amphibians and Reptiles</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regulose rainfrog</td>
<td>Craugastor sabrinus</td>
<td>EN</td>
<td>DD</td>
<td>No change</td>
<td>Loss of habitat</td>
<td>Yes</td>
</tr>
<tr>
<td>Morelet’s Crocodile</td>
<td>Crocodylus moreletii</td>
<td>CD</td>
<td>CD</td>
<td>No change</td>
<td>Loss of habitat</td>
<td>Yes</td>
</tr>
<tr>
<td>Central American River Turtle</td>
<td>Dermatemys mawii</td>
<td>CR</td>
<td>EN</td>
<td>No change</td>
<td>Loss of habitat</td>
<td>Yes</td>
</tr>
<tr>
<td>Three-keeled musk turtle</td>
<td>Staurotypus triporcatus</td>
<td>NT</td>
<td>NT</td>
<td>No change</td>
<td>Loss of habitat</td>
<td>Yes</td>
</tr>
<tr>
<td>Species</td>
<td>Scientific Name</td>
<td>IUCN</td>
<td>CCB</td>
<td>Change</td>
<td>Threats</td>
<td>Status</td>
</tr>
<tr>
<td>---------</td>
<td>----------------</td>
<td>------</td>
<td>-----</td>
<td>--------</td>
<td>---------</td>
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</tr>
<tr>
<td>Mud turtle</td>
<td><em>Kinosternon acutum</em></td>
<td>NT</td>
<td>NT</td>
<td>No change</td>
<td>Loss of habitat</td>
<td>Yes</td>
</tr>
<tr>
<td>Furrowed wood turtle</td>
<td><em>Rhinoclemmys areolata</em></td>
<td>NT</td>
<td>DD</td>
<td>No change</td>
<td>Loss of habitat</td>
<td>Yes</td>
</tr>
<tr>
<td>Common slider</td>
<td><em>Trachemys scripta</em></td>
<td>NT</td>
<td>DD</td>
<td>No change</td>
<td>Loss of habitat</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Mammals</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>nine-banded armadillo</td>
<td><em>Dasypus novemcinctus</em></td>
<td>DD</td>
<td>DD</td>
<td>No change</td>
<td>Loss of habitat</td>
<td>Yes</td>
</tr>
<tr>
<td>Thomas’ bat</td>
<td><em>Centronycteris centralis</em></td>
<td>VU</td>
<td>VU</td>
<td>No change</td>
<td>Loss of habitat</td>
<td>Yes</td>
</tr>
<tr>
<td>Peter’s ghost-faced bat</td>
<td><em>Mormoops megalolophya</em></td>
<td></td>
<td>VU</td>
<td>No change</td>
<td>Loss of habitat</td>
<td>Yes</td>
</tr>
<tr>
<td>Great false vampire bat</td>
<td><em>Vampyrus spectrum</em></td>
<td>NT</td>
<td>VU</td>
<td>No change</td>
<td>Loss of habitat</td>
<td>Yes</td>
</tr>
<tr>
<td>Van Gelder’s bat</td>
<td><em>Bauerus dubiaquercus</em></td>
<td>NT</td>
<td>NT</td>
<td>No change</td>
<td>Loss of habitat</td>
<td>Yes</td>
</tr>
<tr>
<td>Mexican dog-faced bat</td>
<td><em>Cynomops mexicanus</em></td>
<td>VU</td>
<td>VU</td>
<td>No change</td>
<td>Loss of habitat</td>
<td>Yes</td>
</tr>
<tr>
<td>Yucatan Black Howler</td>
<td><em>Alouatta pigra</em></td>
<td>EN</td>
<td>VU</td>
<td>No change</td>
<td>Illegal hunting. Direct mortality from wildfires.</td>
<td>Yes</td>
</tr>
<tr>
<td>Baird’s tapir</td>
<td><em>Tapirus bairdii</em></td>
<td>EN</td>
<td>VU</td>
<td>No change</td>
<td>Harvey’s bat has no change.</td>
<td>Yes</td>
</tr>
<tr>
<td>Geoffrey’s spider monkey</td>
<td><em>Ateles geoffroyi</em></td>
<td>EN</td>
<td>VU</td>
<td>No change</td>
<td>Loss of habitat</td>
<td>Yes</td>
</tr>
<tr>
<td>Southern river otter</td>
<td><em>Lutra longicaudis</em></td>
<td>DD</td>
<td>VU</td>
<td>No change</td>
<td>Habitat loss in riparian areas.</td>
<td>Yes</td>
</tr>
<tr>
<td>Jaguar</td>
<td><em>Panthera onca</em></td>
<td>NT</td>
<td>NT</td>
<td>No change</td>
<td>Loss of prey species due to illegal hunting. Direct mortality from wildfires.</td>
<td>Yes</td>
</tr>
<tr>
<td>Margay</td>
<td><em>Leopardus wiedii</em></td>
<td>NT</td>
<td>VU</td>
<td>No change</td>
<td>Loss of prey species due to illegal hunting. Loss of riparian habitat. Direct mortality from wildfires.</td>
<td>Yes</td>
</tr>
<tr>
<td>White-lipped peccary</td>
<td><em>Tayassu pecari</em></td>
<td>NT</td>
<td>VU</td>
<td>No change</td>
<td>Habitat loss in riparian areas. Illegal hunting. Direct mortality from wildfires.</td>
<td>Yes</td>
</tr>
<tr>
<td>Ocelot</td>
<td><em>Leopardus pardalis</em></td>
<td>LC</td>
<td>VU</td>
<td>No change</td>
<td>Loss of prey species due to illegal hunting. Loss of riparian habitat. Direct mortality from wildfires.</td>
<td>Yes</td>
</tr>
</tbody>
</table>
A system of key biodiversity areas (KBA) was identified in Meerman (2007). The project site is identified as part of the Selva Maya KBA. Ecosystems of the project site are best described in Meerman and Sabido (2001) as lowland broadleaf forest and shrublands. Communities include *Tropical evergreen seasonal broadleaf lowland forest over calcareous soils: central-western variant* and *Tropical evergreen seasonal broadleaf lowland swamp forest: high variant*.

High Conservation Values within the Project Zone

An assessment and evaluation of High Conservation Values with the Project zone and Project area is shown in Table 6.

**Table 6: High Conservation Values within the Project area and Project zone**

<table>
<thead>
<tr>
<th>High Conservation Values</th>
<th>Project Description</th>
</tr>
</thead>
</table>
| 8.1. Globally, regionally or nationally significant concentrations of biodiversity values; | A. Protected areas in the Project zone include Rio Bravo Conservation Area.  
B. IUCN listed species are documented to occur on the site.  
C. Project area includes Key Biodiversity Area (Meerman 2007).                                                                                   |
| a. Protected areas                                                                        |                                                                                                                                                                                                                     |
| b. Threatened species                                                                     |                                                                                                                                                                                                                     |
| c. Endemic species                                                                        |                                                                                                                                                                                                                     |
| d. Areas that support significant concentrations of a species during any time in their lifecycle |                                                                                                                                                                                                                     |
| 8.2. Globally, regionally or nationally significant large landscape-level areas where    | Project site resides within the Mesoamerican Biological Corridor (CCAD 1996).  Project site within Conservation International Biodiversity Hotspot (Brooks et al 2002).                                   |
| viable populations of most if not all naturally occurring species exist in natural patterns of distribution and abundance; |                                                                                                                                                                                                                     |
8.3. Threatened or rare ecosystems; Large private property within the regional Selva Maya.

8.4. Areas that provide critical ecosystem services. Connects Maya Biosphere Reserve with Rio Bravo Conservation Area.

8.5. Areas that are fundamental for meeting the basic needs of local communities. The property is the only source of income for the community.

8.6. Areas that are critical for the traditional cultural identity of communities. None noted.

This Project addresses multiple High Conservation Values in the form of threatened species (8.1.b), protected areas (8.1.a), and globally and regionally significant large landscape-level areas where viable populations of most if not all naturally occurring species exist in natural patterns of distribution and abundance (8.2). The threatened species are listed in Table 5.

The Project helps comprise the Mesoamerican Biological Corridor (8.2), and is a part of a Conservation International Biodiversity Hotspot. The Mesoamerican Biological Corridor spans across eight countries from the southern Mexico to northern Panama.

Although no high value community/cultural sites are known to occur within the project site, ancient Mayan sites (plaza ruins, cenotes, causeways, etc…) are very common throughout the area, and an archaeological survey has not been done on the site. It is presumed that at least minimal Mayan archaeological sites occur on the site. Historically, looting of Mayan archaeological sites was common.

1.4 Project Proponent (G4)

Gallon Jug Agroindustry Ltd. Belize was the owner of the property at the time of project initiation. Gallon Jug Agroindustry Ltd. is a subsidiary of Bowen & Bowen Ltd. Belize. Gallon Jug Agroindustry Ltd. hired FCO to develop the strategy, implementation, and monitoring of the carbon credits generated by this project. Gallon Jug Agroindustry Ltd. sold the property and the carbon project to The Forestlands Group LLC (TFG) in 2012, and TFG is now the project proponent.

FCO hired CMI Virginia Tech to collect initial data, develop the monitoring protocol and conduct the baseline study for the monitoring program. TFG later hired ERA/Offsetters to collect update the vegetation database and collect more input from local communities. Decisions on implementation of the project activities are the responsibility of TFG.

Contact Information:

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Forest Carbon Offsets LLC
600 Cameron St.
Alexandria, VA 22314 USA
Telephone: +1 703-795-4512
Email: info@forestcarbonoffsets.net

Kaarsten Turner Dalby
The Forestland Group LLC
6949 Highway 73 Suite
Evergreen, CO 80439 USA
Telephone: +1 303-838-2512
Email: kaarsten@forestlandgroup.com
1.5 Other Entities Involved in the Project (G4)

ERA/Offsetters provided the most recent technical support for field data collection, remote sensing, GIS, and modelling.

Steve Dettman, Senior Forester, Ecosystem Services
ERA/Offsetters
Suite 1000 - 675 West Hastings Street
Vancouver BC, V6B 1N2 Canada
Telephone: +1 503.758.5320
Email: steve.dettman@offsetters.ca

Technical and Management Expertise

The key technical skills to implement the Project are:

- The business skills required to successfully manage a large and complex operation,
- The managerial skills to manage the property effectively,
- The diplomatic skills to successfully interact with the local communities, and
- The technical skills to conduct monitoring on a periodic basis.

Forestland Group, LLC (“TFG”), formed in 1995, is an independent timberland investment management organization (“TIMO”) which emphasizes naturally regenerating hardwood and some softwood forests. TFG currently manages approximately 3.4 million acres in 20 U.S. states as well as in Belize, Canada, and Costa Rica. The firm manages its investments through a series of limited partnerships and private REITs with a mix of both institutional and high-net-worth investors encompassing some 130 different entities. Headquartered in Chapel Hill, North Carolina, TFG has a corporate office near Boston and an array of forest management offices near its land bases. TFG was a pioneering TIMO with respect to managing its portfolio as a Certified Resource Manager under the Forest Stewardship CouncilTM FSC® C018151 guidelines.

TFG’s staff includes some of the nation’s leaders in forestry, forest finance, and conservation. In addition, TFG and its affiliated entities contract with independent forestry, environmental, and natural resource consulting firms to more effectively manage its timber and non-timber assets. More information regarding TFG may be found at the company website. TFG is the largest private landowner in Belize.

Forest Carbon Offsets, LLC managerial experience is considerable with current biographies available at www.forestcarbonoffsets.net. FCO has experience with carbon offset projects in Belize having successfully registered the first Reduced Emissions from Deforestation and Degradation in Belize and in the western hemisphere.

1.6 Project Start Date (G3)

Project start date is 1/1/2011. Project start date is based on the signed contract between the former landowners and FCO to begin the project.

1.7 Project Crediting Period (G3)

Project crediting period start date is January 1, 2011. Project end date is December 31, 2040. Project length is 30 years.
2 DESIGN

2.1 Sectoral Scope and Project Type

This project is certified as compliant with the Verified Carbon Standard Version 3.4 as an Agriculture, Forestry, or Land Use (AFOLU) Project using a strategy of Reduced Emissions from Deforestation and Degradation (REDD). This project is not a grouped project.

2.2 Description of the Project Activity (G3)

The major project activities are:

- control access to the site through regular patrols;
- conduct low intensity, FSC-certified timber harvesting operations;
- place a restrictive covenant on the property; and
- monitor results.

The project will use carbon financing to protect the forest and avoid conversion to sugar cane. Donations made to the Gallon Jug-Chan Chich High School Scholarship Fund will provide benefits to the community, making it possible for school children to attend high school. Project activities are expected to be positive for communities and biodiversity as a result.

The primary technology employed to achieve the desired result is patrols of the property to prevent incursions and illegal logging plus monitoring of the results. The following activities will occur:

- rangers and patrols,
- monitoring
  - forest carbon data collection,
  - biodiversity data collection,
  - remote sensing
- accounting,
- personnel management,
- road maintenance, and
- restrictive covenants.

Monitoring will occur regularly with verification audits no less frequently than every 5 years. The lifetime of the project activities extends throughout the life of the project (through 2038).

2.3 Management of Risks to Project Benefits (G3)

Risks to the Project from instability in the Government or a change in leadership at TFG are considered minimal.

To the best of FCO’s knowledge no oil or mineral resources occur on the Project site. Government sponsored extraction of petroleum is occurring in the area. If oil or gas is discovered on the site, it may belong to the Government of Belize. Similar sites in Belize where oil extraction
is taking place have minimal above ground disturbance. Section 26 paragraph 6 of the National Petroleum Act states:

(6) Subject to this Act, where, in the course of conducting petroleum operations pursuant to a contract, the rights of the owner or lawful occupier of any land are disturbed or damage to any crops, trees, buildings, stock, works or other property thereon is caused, the contractor is liable to pay the owner or lawful occupier fair and reasonable compensation in respect of the disturbance or damage according to the respective rights or interests of the owner or lawful occupier concerned. The amount of compensation payable shall be determined by agreement between the parties or if the parties are unable to reach agreement or the agreed compensation is not paid, the matter may be treated in accordance with the Arbitration Act.

Based on this, the contractor for the Government extracting the oil may be responsible for compensating the owner of the credits for any reversals suffered as a result of the oil extraction process.

The project area exhibits low risk from hurricanes (Konrad 1996), but occasional blow downs do occur. Recovery rates from hurricanes can be quite high (Bridgewater 2011).

The broadleaf forest slated for conversion is fire resistant (Meerman and Sabido 2001). The project proponents plan to train a fire crew and have equipment on hand to fight wildfires.

Risks to biodiversity resulting from illegal hunting activities is considered minimal due to access constraints. Planned patrols should detect and curtail any illegal hunting activities that may occur.

TFG intends for this Project to be a focal point for forest protection in the Selva Maya region and ecosystem demonstrating how carbon sequestration, biodiversity, and community benefits can be achieved concurrently. Because of the Project's profile within Belize it is expected that the Project will act as a catalyst for other projects regionally. Discussions with the Belize Association of Private Protected Areas (BAPPA) have already resulted in contacts regarding additional conservation projects throughout Belize.

Specifically,

1. the project proponents will make a presentation to BAPPA to explain the process so other projects can be catalyzed;
2. the stakeholders will become more educated about the benefits of the project; and
3. capacity built in human and physical capital will remain after the end of the project making the continuation of the project highly likely.

2.4 Measures to Maintain High Conservation Values (G3)

The high conservation values on the site are all biodiversity components. Conserving and protecting the forest should maintain the HCVs. Patrols to prevent illegal hunting and maintaining existing high quality habitat should result in maintenance of HCVs.

2.5 Project Financing (G3 & G4)

The Forestland Group LLC is a United States registered private limited liability company and, as such, is governed by the corporation laws of the United States which ensure that, at all times, the
company remain financially solvent and able to meet its liabilities. It is sufficiently capitalized to ensure completion of the Project.

Carbon financing received after contractual obligations will fund TFG to pay for the management and monitoring activities. TFG’s management and financial plan were made available to the auditors during the site visit to the project performed by the audit team.

Primary expenses are to pay land taxes, for patrols, and pay for biodiversity, carbon sequestration, and community monitoring expenses and to pay for the educational initiatives. Some income is expected from timber harvesting. A complete financial plan was made available to the auditor during the validation audit.

### 2.6 Employment Opportunities and Worker Safety (G4)

All local, district, and national workplace standards will be met at the moment of hiring of each staff member. Local regulations and safety concerns will be discussed with each staff with an emphasis on guaranteeing workplace safety according to Belizean law. Safety information is available in Table.

#### Table 10: Staff safety

<table>
<thead>
<tr>
<th>Hazard</th>
<th>Safety strategy and equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poachers</td>
<td>Radios. Minimum two person crews.</td>
</tr>
</tbody>
</table>
Lightning strike  Develop procedures for avoiding lightning strikes. Radio.

TFG employs and trains local staff from northern Belize and elsewhere in Central America. Staff will be trained in the following roles:

- Rangers and patrols.
- Assisting forest carbon data and biodiversity data collection.
- Firefighting

![Forest monitoring crew comprised of CMI and GJ staff (June 2011)](image)

Figure 3: Forest monitoring crew comprised of CMI and GJ staff (June 2011)

All staff are local and are representative of the general population in the area consisting of Belizeans of Mayan and Hispanic heritage plus immigrants from surrounding countries.

Staff retention has not been a problem in the past at GJ. Jobs at GJ are considered to be better than average and the managers are well-regarded in the community. Some staff turnover is inevitable over such a long time period however, and when there is staff turnover, measures will be taken not to lose local capacity and skills by providing orientation and training to new staff.

The Project employs individuals from the local communities patrolling and monitoring the Project area. Employment opportunities will be advertised. Employment at GJ will follow Belize labor law and codes. Women and underrepresented minorities will be encouraged to apply for the positions. Staff will be chosen based on capacity to meet the needs of GJ so that GJ can perform its business mission.

2.7 Stakeholders (G3)

FCO and TFG have actively engaged local stakeholders in soliciting comments on the design of the CCB Project with various onsite consultations. Stakeholder and community outreach was undertaken by FCO utilizing the services of CMI in January of 2012 (Teets, Emrick, and Schneider 2012) and TFG utilizing the services of ERA/Offsetters in January of 2014 (Offsetters 2014a). Stakeholders were identified using the procedural steps found in the “Community Development Toolkit” methodology at [http://www.icmm.com/page/629/community-development-toolkit-c](http://www.icmm.com/page/629/community-development-toolkit-c). Stakeholder meetings were held at Sylvester Village, at the Gallon Jug Farm, at the TFG lumber camp, and at Chan Chich Lodge. An informational poster was developed and posted. Informational handouts were developed and distributed.
Local stakeholders are primarily GJ and TFG staff. TFG staff will be actively engaged in Project activities including permanent sample plot measurements, setting up remote large mammal camera traps, conducting forest patrols, and engaging in other knowledge transfer activities. Post CCB validation, TFG will provide an annual update in written form to all stakeholders describing Project status as a method to continue communication and consultation between stakeholders and Project managers. Furthermore, TFG will continue and improve upon its current enacted policy to proactively seek stakeholder consultation whenever possible through regular meetings and a survey of attitudes regarding the project.

Project zone stakeholder groups are:

- TFG owners and staff.
- Gallon Jug residents.
- Rio Bravo Conservation Area.
- Belize Forestry Department Ministry of Natural Resources REDD Coordinator.
- UNFCCC Belize Focal Point and Designated National Authority.

Figure 4: Community meeting at the Gallon Jug coffee warehouse (January 17, 2012).
Public Comment Period

Public comment was sought through the following avenues:

- Direct email and phone contact with Rio Bravo, Yalbac Ranch, Belize Forestry Department Ministry of Natural Resources REDD Coordinator, Gallon Jug-Chan Chich High School Scholarship Fund and UNFCCC Belize Focal Point and Designated National Authority.
- The PDD was made available on the CCBA webpage and open to public comments (http://www.climate-standards.org/projects/index.html).
- Posters placed at Gallon Jug Post Office and Sylvester Village Store.

Conflict Resolution Tools
BAPPA has agreed to serve as an independent 3rd party in country to receive and document grievances related to the CCB Project. BAPPA will serve as a mediator keeping all parties informed of the status of grievances and their resolution. A record of grievances and their resolution will be a part of the monitoring process for future verifications. Stakeholder grievances related to employment will be handled according to Belizean law through the Belize Labor Department. Non-employee stakeholders need to be informed that they should contact BAPPA. BAPPA can be contacted at:

office@wildtracksbelize.org

BAPPA’s office will do the following:

- A BAPPA representative meets with the landowner annually to review the project plan.
- A BAPPA representative attends an annual stakeholder meeting for the project.
- BAPPA is available by phone or email throughout the year to independently field complaints.
- BAPPA queries appropriate government offices once per year to get a report on any biodiversity or labor violations that might have occurred.
- BAPPA writes a report for the landowner annually on their findings. That report will go to the landowner and the project developer and become a part of the verification process for the project.
- If there is a dispute that requires more detailed involvement by BAPPA, the landowner will contract with BAPPA as needed/available for further help in resolving the dispute.

The BAPPA representative will resolve disputes by collecting and documenting the complaint and whatever information about the situation that can be independently determined. The BAPPA representative will determine if the complaint is reasonable and if so, determine a likely strategy for addressing the complaint. The complaint and the proposed strategy will be presented to TFG. TFG will address the complaint or propose a different strategy for addressing the complaint within 30 days.

2.8 Commercially Sensitive Information

Land titles, baseline and project business plan, protective covenant, and economic analysis.

3 LEGAL STATUS

3.1 Compliance with Laws, Statues, Property Rights and Other Regulatory Frameworks (G4 & G5)

TFG has a history of compliance with and currently complies with all applicable local, district, and national labor standards. TFG follows all applicable environmental laws including the Belize Environmental Protection Act Chapter 328, Revised Edition 2000. Belize has the following relevant labor laws:

- International Labour Organization Conventions Act,
- Labour Act,
- Labour (Subsidiary Laws),
- Protection Against Sexual Harassment Act,
- Protection Against Sexual Harassment Commencement Act Order,
• Public Safety Act,
• Trade Unions Act,
• Trade Unions Regulations,
• Trade Unions and Employers Organizations (Registration, Status and Recognition) Act, and
• Trade Unions and Employers Organizations (Registration, Status and Recognition) Act (Commencement) Order.

The project team conducted an exhaustive law review including:


This is a revised edition of the law, prepared by the Law Revision Commissioner under the authority of the Law Revision Act, Chapter 3 of the Laws of Belize, Revised Edition 1980 - 1990.


This is a revised edition of the Subsidiary Laws, prepared by the Law Revision Commissioner under the authority of the Law Revision Act, Chapter 3 of the Substantive Laws of Belize, Revised Edition 2000.

• Forest Fire Protection Act, Chapter 212, Revised Edition 2000.
• Water and Sewage Act, Chapter 222.

Defines riparian protection as "that the flow of the stream does not fall below the minimum quantity necessary to secure the interest of public health and the protection of the rights of riparian and other land-owners." (p. 46)

• Water Industry Act, Chapter 222.
• Belize Agricultural Health Authority Act, Chapter 211.
• Fisheries Act, Chapter 210.
• Timber Industry Act, Chapter 341.
• Land Utilization Act, Chapter 188.

The Minister may, for the better utilization of land, make regulations:

- to demarcate areas, water catchment areas or watersheds and prohibiting the clearing of any vegetation within those areas;
- to provide for such other measures as may be required to prevent soil erosion; restricting the construction of buildings within stipulated distances from the middle line of any road or street;
- to demarcate specific areas as special development areas and to stipulate the type of development that will be permitted within those areas;
- for the clearing of any forest or the felling of any trees; and
- to provide for all such other things as may be necessary for the better carrying out of the provisions of this Part of the Act.
National Institute of Culture and History Act, Chapter 331, Revised Edition 2000


All lands cleared over 300 acres in Belize are subject to the Environmental Impact Assessment (Amendment) Regulations 2007 law. There are no published reports of environmental impact assessments (EIAs) being conducted for agricultural land clearing in and there are no published reports of EIAs being declined in Belize.

This law has clearly not been a barrier to clearing land for other activities as evidenced by the extensive land clearing that has gone on in the country since 2007 (Cherrington et. al. 2010). Given the monumental effort Belize is undergoing to support agriculture\(^5\) and the national policy supporting the expansion of agriculture\(^6\) including technical, financial, and international development assistance, it is unlikely that any restriction would be placed on land clearing for agriculture if an EIA or study were required. If an EIA or environmental study were required it would be conducted and approved given that no EIAs have been publicly declined.

From this analysis, it is clear that the tropical hardwood component of the TFG property could easily be converted legally to an agricultural plantation after performing the necessary EIA in accordance to generally accepted practices in Belize. The only caveat is that there should be a one-chain riparian buffer on either side of permanent streams (personal communication with the Ministry of Natural Resources and Environment, Belize). There are no property disputes within the Project area.

3.2 Evidence of Right of Use (G5)

The property is owned in fee simple ownership under the laws of Belize. Titles have been produced and reviewed by the auditors.

3.3 Emissions Trading Programs and Other Binding Limits (CL1)

Not applicable.

3.4 Participation under Other GHG Programs (CL1)

This is the first and only application for this project to a GHG program. Indicate whether the project has been registered, or is seeking registration under any other GHG programs. Where the project has been registered under any other GHG program, provide the registration number and details.

3.5 Other Forms of Environmental Credit (CL1)

No other environmental credit has been created by this project. The co-benefits of the project have been proposed for validation to the Climate, Community, and Biodiversity Alliance using the

---


Climate, Community and Biodiversity Standard 2nd Edition. Gold level validation is proposed based on exceptional biodiversity benefits.

3.6 Projects Rejected by Other GHG Programs (CL1)

This is the first and only application for this project to a GHG program.

3.7 Respect for Rights and No Involuntary Relocation (G5)

Free, Prior, and Informed Consent

TFG owns the property fee simple. Fee simple ownership in Belize represents absolute ownership of real property. The Project does not encroach upon private property, community property, or government property. According to the Maya Atlas: The Struggle to Preserve Maya Land in Southern Belize (Maya Atlas 1997), the property has not been associated with any Maya communal land claims.

Involuntary Relocations

FCO has verified by direct observation that the Project site does not have human inhabitants besides farm laborers, management, owners, and their families. Moreover, FCO has observed that the Project does not involve the relocation or inward migration of any people. If immigration were to occur, the Project’s monitoring teams will work with all stakeholders using appropriate tools to engage towards a resolution.

3.8 Illegal Activities and Project Benefits (G5)

Project will include regular patrols to address illegal hunting, timber poaching, or wood gathering. No evidence of these activities was detected during site visits.

4 APPLICATION OF METHODOLOGY

4.1 Title and Reference of Methodology

This project is designed for validation under the Verified Carbon Standard Version 3.4, AFOLU Requirements Version 3.3 and utilizing methodology VM0007 REDD Methodology Modules (http://www.v-c-s.org/methodology_rmm.html). In particular the following methodology modules were used for this project:

<table>
<thead>
<tr>
<th>Title</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>REDD Methodology Modules (REDD-MF)</td>
<td>1.3</td>
</tr>
<tr>
<td>Methods for Monitoring of GHG Emissions and Removals (M-MON)</td>
<td>2.1</td>
</tr>
</tbody>
</table>
### 4.2 Applicability of Methodology

Based on the methodology and the reference for the methodology, VCS “Tool for AFOLU Methodological Issues”, this project qualifies because of a reduction in emissions of carbon dioxide from planned deforestation in the baseline scenario. This methodology is applicable because:

- land in the project area qualified as forest at least 10 years before the project start date based on definition of forest land in FAO Forest Resource Assessment of 2000 (FAO 2001) and remote sensing analysis;
- no peat soils are present on the project site;
• project proponents can show ownership of the project site and ownership of the carbon rights for the project area;
• baseline deforestation in the project area falls within the category of planned deforestation (VCS category APD);
• baselines shall be renewed every 10 years after the start of the project except where triggers lead to a more frequent renewal;
• no areas registered under the CDM or any other carbon trading scheme are included within the project site; validation under the Climate, Community, and Biodiversity Alliance for co-benefits has been disclosed;
• the baseline condition is conversion of the property to a permanent deforested state of sugar cane agriculture;
• no reforestation is proposed for the project; and
• leakage avoidance activities do not include either agriculture lands flooded to increase production, or intensifying livestock production.

The project is considered under the category “Avoided Planned Deforestation”. This project qualifies because:

• Conversion of forest lands to a deforested condition is legally permitted,
• Documentation is available to clearly demonstrate with credible evidence that the land would have been converted to non-forest use if not for the REDD project, and
• Post deforestation land use does not include reforestation.

4.3 Methodology Deviations

A correction to the methodology tool used for determining emissions from fertilizer use “Estimation of direct nitrous oxide emission from nitrogen fertilization” was required. This A/R Methodological Tool is encompassed as a module within the methodology. The units described for nitrogen content (NC_SFI and NC_OF) are listed as grams of nitrogen per 100 grams of fertilizer. This was corrected to be a unitless ratio in the calculation.

4.4 Project Boundary (G1)

<table>
<thead>
<tr>
<th>Source</th>
<th>Gas</th>
<th>Included?</th>
<th>Justification/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline Aboveground tree biomass</td>
<td>CO₂</td>
<td>Yes</td>
<td>Required pool</td>
</tr>
<tr>
<td></td>
<td>CH₄</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td></td>
<td>N₂O</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Baseline Belowground tree biomass</td>
<td>CO₂</td>
<td>Yes</td>
<td>Significant pool calculated based on aboveground biomass pool.</td>
</tr>
<tr>
<td></td>
<td>CH₄</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td></td>
<td>N₂O</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other</td>
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</table>
## Source Description

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<th>Gas</th>
<th>Included?</th>
<th>Justification/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soil Carbon</td>
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<td>This pool is conservatively excluded.</td>
</tr>
<tr>
<td></td>
<td>CH₄</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td></td>
<td>N₂O</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Dead Wood</td>
<td>CO₂</td>
<td>No</td>
<td>This pool is conservatively excluded.</td>
</tr>
<tr>
<td></td>
<td>CH₄</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td></td>
<td>N₂O</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Harvested Wood Products</td>
<td>CO₂</td>
<td>No</td>
<td>The standard practice in Belize for conversion of forest to agricultural lands is to remove valuable timber species and then bulldoze and burn the remaining trees. This pool was analyzed for significance and found to be de minimis.</td>
</tr>
<tr>
<td></td>
<td>CH₄</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td></td>
<td>N₂O</td>
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<td></td>
<td>Other</td>
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<td>Excluded to be conservative and make the monitoring cost-effective.</td>
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<tr>
<td></td>
<td>CH₄</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td></td>
<td>N₂O</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Soil organic carbon</td>
<td>CO₂</td>
<td>No</td>
<td>Excluded to be conservative and make the monitoring cost-effective.</td>
</tr>
<tr>
<td></td>
<td>CH₄</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td></td>
<td>N₂O</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Fuel Wood Collection</td>
<td>CO₂</td>
<td>No</td>
<td>No fuel wood collection was occurring prior to the project and presumably none would occur in the baseline scenario. An analysis was conducted based on local population data and found that this pool is de minimis and therefore excluded.</td>
</tr>
<tr>
<td></td>
<td>CH₄</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td></td>
<td>N₂O</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Biomass Burning</td>
<td>CO₂</td>
<td>No</td>
<td>CO₂ emissions are accounted for by biomass changes in the above ground and below ground biomass pools.</td>
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<tr>
<td></td>
<td>CH₄</td>
<td>Yes</td>
<td>CH₄ and N₂O emissions from land clearing and burning are included in the emissions change model for the baseline. No biomass burning is proposed as a project activity.</td>
</tr>
<tr>
<td></td>
<td>N₂O</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>No</td>
<td></td>
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<tr>
<td>Combustion of Fossil Fuels</td>
<td>CO₂</td>
<td>No</td>
<td>Conservatively omitted from both the baseline and project scenarios.</td>
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<tr>
<td></td>
<td>CH₄</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td></td>
<td>N₂O</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>
**Source** | **Gas** | **Included?** | **Justification/Explanation**
--- | --- | --- | ---
**Use of Fertilizers** | CO₂ | No | Conservatively omitted from both the baseline and project scenarios. |
| CH₄ | No | Conservatively omitted from both the baseline and project scenarios. |
| N₂O | Yes | The baseline scenario of sugar cane would utilize chemical fertilizer. |
| Other | No | |
**Aboveground tree biomass** | CO₂ | Yes | Required pool |
| CH₄ | No | |
| N₂O | No | |
| Other | No | |
**Belowground tree biomass** | CO₂ | Yes | Significant pool calculated based on aboveground biomass pool. |
| CH₄ | No | |
| N₂O | No | |
| Other | No | |
**Project Leakage** | CO₂ | Yes | Activity and market shifting leakage addressed using methodology module LK-ASP. |
| CH₄ | No | |
| N₂O | No | |
| Other | No | |
**Timber Harvest** | CO₂ | No | Based on project plan, timber harvest is considered de minimis and excluded. |
| CH₄ | No | |
| N₂O | No | |
| Other | No | |

### 4.5 Baseline Scenario (G2)

In order to estimate potential carbon stock changes over the life of the project, a detailed description of a plausible and realistic baseline scenario is required. Based upon analysis of alternative land use scenarios, the conversion to agriculture is the most likely land use in the baseline scenario. Of the various agricultural conversion options common in the area, sugar cane conversion is the most likely based on the history and plans of the property owner. The methodology provides a systematic procedure for determining the most likely baseline in module BL-PL. Where a known agent of deforestation can be identified, if a “valid and verifiable” plan for deforestation is presented, that plan becomes the most likely baseline scenario.
4.6 Additionality (G2)

The property owner has a conversion plan that has been evaluated and a pilot project conducted to convert land to sugar cane. The equipment and manpower required was on site. Conversion of the forest includes harvesting merchantable trees, bulldozing, piling, and burning the remaining vegetation, and planting the site to sugar cane. Management of the sugar cane includes annual application of fertilizer.

No part of the project area is currently restricted from development due to government regulation or other legal requirement.

Additionality Analysis

Per instructions from the methodology, the following analysis is conducted to determine alternative baseline scenarios according to the procedure presented in “VT0001 Tool for the Demonstration and Assessment of Additionality in VCS Agriculture, Forestry and Other Land Use (AFOLU) Project Activities”

This tool is applicable because a) the proposed project activities will not violate any Belizean law, and b) the use of this tool results in identification of the most plausible baseline scenario of the several possible baseline scenarios identified below.

Step 1: Identification of alternative land use scenarios to the AFOLU project activity.

Some of the alternative land uses are more likely and pose a much larger deforestation threat than others. The following is a “ranking” of the most likely alternative land uses. Each alternative is considered legal in Belize.

Sub-step 1a. Identify credible alternative land use scenarios to the proposed VCS AFOLU project activity.

1. Conversion to Agriculture

The most likely alternative land use scenario is the conversion to agriculture, and it is the most pervasive driver for deforestation and land use change in the region. The conversion of forestland in Belize to agriculture is both a national and regional trend. The FAO (2010) estimated that by 1997 about 385 thousand hectares, or about 16.9%, of the national land area had been converted from forest to agricultural land. By 2004, an additional 56 thousand ha had been converted (FAO 2010). Conversion of forest land for agriculture is occurring in Belize near the project area and forest cover declined 21% (6,123 acres/year) from 1980 to 2010 in the Orange Walk District (Cherrington et.al. 2010) almost exclusively from agricultural development.

Suitability of soils for conversion to agriculture, particularly sugar cane, was evaluated on site by planting and harvesting sugar cane over many years in small plots. This is a planned deforestation project and the plan calls for sugar cane conversion. Conversion of land for agriculture is considered legal. Analysis of the financial plan for the project and the baseline
indicates that a sugar cane project would generate net positive financial flows far in excess of the project.

A land clearing permit is required for clearings of over 300 acres. An environmental impact analysis (EIA) is required. Based on analysis of the EIA database for Belize, the EIA process is not a barrier for the project\textsuperscript{7}. Confirmation of the legality of conversion can be obtained by communicating with the Belize National REDD coordinator at the Belize Forest Department\textsuperscript{8}.

2. Purchase of the Land to Operate an Ecotourism Lodge

One alternative land use would be the conversion of the property for ecotourism. The proponent is already engaged in this strategy on another part of the property. This strategy is employed by several lodges in Belize. This strategy is considered unlikely for the obvious reason that one lodge is already located on the property. Since the maximum capacity of the existing lodge has not been reached, it is unlikely that a second lodge would be successful in the same area. A different sort of lodge, not ecotourism, is an option, but given the remoteness of the area, and the great cost involved, this option is considered unlikely to succeed.

3. Purchase of the Land as a Conservation Area

There are privately owned protected areas in the area and throughout Belize. Most landowners that own these properties are members of the Belize Association of Private Protected Areas (BAPPA). Landowners purchase properties for conservation for a variety of reasons. Some establish nonprofit companies to hold the property and some simply hold onto the property out of a desire to protect the biodiversity or other values of the site. There is no inherent financial income stream from owning a private protected area while there are several required expenses. The initial purchase price, annual taxes, maintenance, and protection from trespass are all expenses that can run into the millions of dollars. Landowners that pursue this strategy are required to be relatively wealthy or have outside sponsors or pursue a strategy of income generation that is consistent with conservation such as ecotourism. Purchasing land for conservation purposes is legal.

4. Continuation of the preproject land use

The project area has been in forest as far as the historical record goes back. The baseline plan calls for clearing that forest to generate income from sugar cane to sustain the property owner and staff. Current income from the project area is zero, while property taxes are still a required expense. Therefore continuation of the preproject land use is unsustainable.

5. Project activity on the land within the project boundary performed without being registered as the VCS AFOLU project

This alternative land use is essentially continuation of the preproject land use with the added expenses of patrols and monitoring. Income from the project area is zero, while expenses for this

\textsuperscript{7} See Belize Department of the Environment web site http://www.doe.gov.bz/EIAs.html.

\textsuperscript{8} As of September 2011, the REDD Coordinator, Belize Forest Department, is Mr. Leon Westby (leewest6@hotmail.com).
scenario include property taxes, patrols, and monitoring. Therefore conducting the project without registration as a VCS AFOLU project is also unsustainable.

Sub-step 1b. Consistency of credible land use scenarios with enforced mandatory laws and regulations.

All the alternatives presented are legal and permissible under Belizean law. Clearing of land over 300 acres is legal and permissible but requires an environmental impact statement and a permit.

Step 2. Investment Analysis

Sub-step 2a. Determine appropriate analysis method

The project will generate some financial benefit other than VCS related income from timber harvesting. Therefore investment comparison analysis or benchmark analysis is required.

Sub-step 2b. Option 2. Apply investment comparison analysis.

NPV (7%) for the baseline scenario, sugarcane development, is significantly more than the NPV (7%) of the project scenario excluding carbon finance. Since the NPV of the baseline scenario is significantly higher than the NPV of the project scenario, the project is financially additional. Financial plans of the project proponent are confidential and have been disclosed to the auditors.

Step 4. Common Practice Analysis

Multiple private properties are listed as private protected areas in Belize through the Belize Association of Private Protected Areas. The essential distinction between the project and other lands managed as private protected areas is that the other lands are able, at least in some cases, to support the annual costs of management through outside means e.g. ecotourism, private funds, or outside donors/nongovernmental organizations. Those sources of income are not available to this landowner and therefore the project activity is additional.

5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS (CLIMATE)

5.1 Project Scale and Estimated GHG Emission Reductions or Removals

<table>
<thead>
<tr>
<th>Project</th>
<th>X</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large project</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Years</th>
<th>Estimated GHG emission reductions or removals (tCO2e)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>276,471</td>
</tr>
</tbody>
</table>
## 5.2 Leakage Management (CL2)

Leakage was determined using module "Estimation of emissions from activity shifting for avoided planned deforestation (LK-ASP)". Because this is a planned deforestation project and the agent of deforestation is known, no deductions are taken for leakage. Monitoring of the landowners property will occur as indicated in LK-ASP and M-MON.

Since leakage can only occur on property owned by the project proponent in Belize, the primary leakage management strategy is to protect the rest of the property from conversion or fire damage.

Also in this case since timber harvest will continue in the project scenario, no leakage can occur from timber harvest.
5.3 Baseline Emissions (G2)

In order to estimate GHG loss under the baseline scenario the following variables are required:

1. area of forest available for conversion,
2. baseline carbon stocks,
3. deforestation/conversion rates,
4. carbon stocks in agro-ecosystems,
5. fate of commercial timber and long-lived wood products,
6. losses of biomass attributable to fuel-wood collection,
7. avoided emissions from fertilizer use,
8. avoided emissions from biomass burning, and
9. avoided emissions from transportation fuel use.

1. Area of forest available for conversion

Of the total area of the property, 8293 ha are slated for conversion to sugar cane. In the baseline, all 8293 ha are converted to sugar cane. A 1-chain buffer around perennial streams is excluded to comply with directives from the Belize Forest Department.

2. Biomass Baseline Carbon Stocks

Two strata were identified, a “bajo” type consisting of 124 ha and a broadleaf type consisting of 8,169 ha. Given the small size and high variability of the vegetation in the bajo type, that strata is conservatively excluded from the calculations. Three plots that fell in the bajo strata were removed.

Baseline biomass carbon stocks consisted of above ground biomass and below ground biomass of the broadleaf component of the sugar cane conversion area. The mean carbon pool in 2013 was based on field measurements conducted in 2013 and independently verified. The moist forest allometric equation for biomass prediction published in Pearson et. al. (2005) was used to predict above ground biomass Table 4. A factor of 50% was used to convert biomass to carbon. A pantropic equation utilizing specific density was chosen because higher priority equations were unavailable or unsuitable for the forest on the project area. Accuracy of the equation was validated using the procedure described in module CP-AB “Estimation of carbon stocks in the above- and belowground biomass in live tree and non-tree pools”.

Table 4: Equations used for calculating biomass.

<table>
<thead>
<tr>
<th>Classification</th>
<th>Equation</th>
<th>Maximum DBH or height</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Moist hardwood above ground biomass

\[ \text{AGB} = \frac{(0.2035 \times (\text{DBH}^{2.3196})}{1000} \]

**148 cm**

### Palm above ground biomass

- **If height is > 10 meters:**
  \[ \text{AGB} = 0.182 + (0.498 \times 10) + (0.049 \times (10^2)) \times \frac{1}{1000} \]

- **If height is 5-10 meters:**
  \[ \text{AGB} = 0.182 + (0.498 \times H) + (0.049 \times (H^2)) \times \frac{1}{1000} \]

- **If height is less than 5 meters:**
  \[ \text{AGB} = 0 \]

### Belowground biomass

\[ \text{BGB} = \exp(-1.0587 + 0.8836 \times \ln(\text{AGB})) \]

Below ground biomass was estimated based on above ground biomass using the equation found in Pearson et al (2005).

An uncertainty level of 7.13% was calculated using module “Estimation of uncertainty for REDD project activities (X-UNC)”. Aboveground and belowground biomass attributed to non-tree biomass (palms and lianas) and soil carbon were included and calculated AGB based on peer-reviewed equations in the Good Practice Guide – International Panel on Climate Change (Annex 4.A.t page 4.114).

A conservative growth rate of 1%/year was applied to account for the recovery process of Belizean mid-succession forests (Bridgewater 2011 and Guariguata and Ostertag, 2001) which is consistent with growth rates in other neotropical forests (Chave et. al. 2001). Future monitoring events should indicate higher growth and more carbon sequestration than indicated at validation.

### 3. Rate of Deforestation and Agricultural Conversion

Based on the plan for deforestation developed by the landowner, the rate of conversion is 10%/year. This rate was determined to be feasible and in line with common practice.

### 4. Carbon stocks in agro-ecosystems

The available literature on steady state C stocks for sugar cane varies widely depending upon geographic location. Based on test plots at Gallon Jug, yields of 19 tons/ac or 47 tons/ha are achievable. With better seedstock and irrigation, the project plan calls for a yield of 25 tons/ac or 56.2 mt of cane/ha. The carbon footprint of sugar has been studied extensively and in every case, excluding the impacts of land use change, the emissions from sugar production are above
zero (Plassmann et al 2010 and Yutitham et al 2011). For calculation purposes, an indisputably conservative assumption of 0 is applied.

5. Fate of Forest Resources Lost to Agricultural Conversion (Long-lived Wood Products)

The standard practice in Belize for conversion of forest to agricultural lands is to remove valuable timber species (commercially valuable and over 25 cm dbh) and then bulldoze and burn the remaining trees. An analysis was conducted using module CP-W “Estimation of carbon stocks in the long-term wood products pool” based on the inventory data and found that the available timber for a long-lived wood products pool was de minimis.

6. Loss of biomass attributable to fuel-wood collection

No fuel wood collection was occurring prior to the project and presumably none would occur in the baseline scenario.

7. Avoided emissions from fertilizer use

Avoided emissions from fertilizer use for the baseline was calculated using CDM A/R Methodological tool “Estimation of direct nitrous oxide emission from nitrogen fertilization” (Version 01). In the baseline scenario, fertilizer would be applied at the rate of 100 lbs/acre of 15:45:45 fertilizer at planting and 160 lbs of 80:0:80 fertilizer each year thereafter, based on experience of the pilot sugar cane project.

8. Avoided emissions from biomass burning

In the baseline scenario, land clearing would include piling and burning of biomass on the site. An analysis of emissions from biomass burning was conducted to determine CH4 and N2O using module “Estimation of greenhouse gas emissions from biomass burning (E-BB)”. Avoided emissions from CO2 release are omitted because they are accounted for by biomass changes in the above ground and below ground biomass pools. Avoided emissions attributable to CH4 and N2O are included.

9. Avoided emissions from transportation fuel use

Emissions from transportation fuel use are conservatively omitted in both the baseline and project scenarios.

5.4 Project Emissions (CL1)

GHG emissions and/or removals for the project are described for the same pools and variables as the baseline scenario with the addition of activity shifting leakage which only applies to the project scenario.

1. Area of forest available for conversion

Same as baseline.
2. Baseline carbon stocks

Same as baseline.

3. Deforestation/conversion rates

A selective harvesting schedule is planned that will be certified by the Forest Stewardship Council. Timber extraction was analysed using indisputably conservative assumptions regarding impact the forest and relying on research in the immediate area (Whitman et. al. 1997) and found to be de minimis using module T-SIG.

4. Carbon stocks in agro-ecosystems

N/A, no conversion is allowed in the project.

5. Fate of commercial timber and long-lived wood products

Analysis of planned commercial timber extraction was analysed with module T-SIG and found to be de minimis.

6. Losses of biomass attributable to fuel-wood collection

No reductions or removals are planned for the life of the project.

7. Avoided emissions from fertilizer use

No fertilization is anticipated as a project activity.

8. Avoided emissions from biomass burning

N/A, no conversion is allowed in the project. In the event of ex-post fires occurring, the REDD Methodological Module: Estimation of greenhouse gas emissions from biomass burning (E-BB) Sectoral Scope 14 will be applied.

9. Avoided emissions from transportation fuel use

Emissions from transportation fuel use are conservatively omitted in both the baseline and project scenarios.

5.5 Leakage (CL2)

Leakage was determined using module “Estimation of emissions from activity shifting for avoided planned deforestation (LK-ASP)”. The deforestation agent was determined to be the former landowner.

Step 1 Option 1.2 (option 1.1 is infeasible): Determine the baseline rate of forest clearance for the deforestation agent: Total area deforested by the deforestation agent over the previous 5 years is zero. WoPR is set to 8293 ha.
Step 2: Estimate new projection of forest clearance by the baseline agent of deforestation with project implementation if no leakage occurring: NewR is equal to zero.

Step 3: Monitor all areas deforested by baseline agent of deforestation through the year in which planned deforestation was forecast to occur: All areas owned by the landowner in Belize are monitored for deforestation. Result is zero hectares.

Step 4: Monitor greenhouse gas emissions outside the project boundary by baseline agent of deforestation: Logging, fertilizer use and biomass burning will be monitored on all lands owned by the landowner in Belize.

Monitoring of the landowner’s property will occur as indicated in LK-ASP and M-MON using a combination of government records (timber royalty reports), remote sensing, and ground observations.

Two areas of leakage for non-CO2 gases are required for monitoring, use of nitrogen fertilizer and biomass burning. Records will be kept of nitrogen fertilizer use to prove that fertilizer use has not increased as a result of the project.

5.6 Summary of GHG Emission Reductions and Removals (CL1 & CL2)

<table>
<thead>
<tr>
<th>Years</th>
<th>Estimated baseline emissions or removals (tCO2e)</th>
<th>Estimated project emissions or removals (tCO2e)</th>
<th>Estimated leakage emissions (tCO2e)</th>
<th>Total Uncertainty Reduction</th>
<th>Estimated net GHG emission reductions or removals (tCO2e)</th>
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<tbody>
<tr>
<td>2011</td>
<td>254,577</td>
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<td>0</td>
<td>30,815</td>
</tr>
</tbody>
</table>
## 5.7 Climate Change Adaptation Benefits (GL1)

Support of high school education for community members will make it more likely that the upcoming generation will fully understand the implications of climate change and their role in adapting and mitigating the predicted effects.

## 6 COMMUNITY

### 6.1 Net Positive Community Impacts (CM1)

The following analysis follows the Social Impact and Opportunities Assessment procedure found at [http://www.icmm.com/page/629/community-development-toolkit-c](http://www.icmm.com/page/629/community-development-toolkit-c) and developed by the International Council of Mining and Metals.

**Step 1:** Review social baseline study and determine areas of concern to the communities, potential impacts, as well as areas where the project might present opportunities.

After interviewing stakeholders, a list of community opportunities for the project scenario and list of concerns for the baseline scenario were developed.

**Step 2:** Assess potential impacts and opportunities and identify areas needing impact management programs.

No negative impacts were suggested by the stakeholders for the project scenario.

**Step 3:** Propose measures to manage and if necessary mitigate the identified impacts and enhance opportunities.

No negative impacts of the project were suggested.

**Step 4:** Reassess the impacts and opportunities, taking proposed management measures into account.
Opportunities suggested by the stakeholders are reflected in the project plan.

Step 5: Work with community and other partners on participatory development plans that address community priority programs (enhancing opportunities) as well as required mitigation programs (mitigating impacts).

The community suggested the project plan components:

<table>
<thead>
<tr>
<th>Short term</th>
<th>Long term</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continued employment opportunities</td>
<td>Health clinic on property</td>
</tr>
<tr>
<td>Increased employment opportunities</td>
<td>Start high school</td>
</tr>
<tr>
<td>Provide transportation to town</td>
<td></td>
</tr>
<tr>
<td>Scheduled preventative health care</td>
<td></td>
</tr>
<tr>
<td>Easier way to cash paychecks</td>
<td></td>
</tr>
<tr>
<td>Housing improvements/maintenance</td>
<td></td>
</tr>
<tr>
<td>Increased pay</td>
<td></td>
</tr>
<tr>
<td>Fully fund school</td>
<td></td>
</tr>
</tbody>
</table>

No high school currently exists for the community and the only current option is to attend boarding school in other nearby towns that could be more than 2 hours away. Plans by the project proponents to include assisting community with tuition for high school students by means of contributions to the Gallon Jug-Chan Chich High School Scholarship Fund for the purpose of providing tuition assistance to high school students to travel to nearby towns and attend boarding school.

Step 6: Review management measures and programs

Table 12a: Project Scenario Impacts to Existing Community and Stakeholders

<table>
<thead>
<tr>
<th>Impact Area</th>
<th>Positive or Negative Impact</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Livelihoods</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Predicted impacts</td>
<td>Neutral N/A</td>
<td>Neutral N/A</td>
</tr>
<tr>
<td>- Predicted impacts after mitigation measures</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Community Relations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Predicted impacts</td>
<td>Positive N/A</td>
<td>High N/A</td>
</tr>
<tr>
<td>- Predicted impacts after mitigation measures</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Predicted impacts</td>
<td>Positive N/A</td>
<td>High N/A</td>
</tr>
<tr>
<td>- Predicted impacts after mitigation measures</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Health</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Predicted impacts</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>- Predicted impacts after mitigation measures</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Infrastructure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Predicted impacts</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>
A comparison of the project vs. baseline scenarios indicates significant net positive benefits for the community. Community benefits will accrue primarily in two ways, livelihoods supported directly by the project and additional educational opportunities made available to the community.

Livelihoods

The current plan calls for support of 4.3 full time equivalents additional to existing staff.
Education

The project plan calls for making funding available to provide scholarships for attending high school for all qualifying children in the community.

![Gallon Jug Community School](image)

**Figure 7: Gallon Jug Community School**

6.2 Negative Offsite Stakeholder impacts (CM2)

The Project is not expected to have any negative offsite impacts.

6.3 Exceptional Community Benefits (GL2)

N/A

7 BIODIVERSITY

7.1 Net Positive Biodiversity Impacts (B1)

The biodiversity objective for the Project is to maintain existing biodiversity and HCVs to the extent possible barring setbacks from natural processes.

<table>
<thead>
<tr>
<th>Common name</th>
<th>Scientific name</th>
<th>Habitat (extracted from IUCN Redlist Database)</th>
<th>With-Project</th>
<th>Without-Project</th>
</tr>
</thead>
</table>

Table 13: Comparison of Baseline and Project Biodiversity based on IUCN Redlist (2012) for selected species found at Laguna Seca.
<table>
<thead>
<tr>
<th>Species</th>
<th>Scientific Name</th>
<th>Habitat Description</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baird’s tapir</td>
<td><em>Tapirus bairdii</em></td>
<td>“wet tropical rainforest, riparian woodland, monsoon deciduous forest, dry deciduous forest, montane cloud forest and paramo”</td>
<td>Habitat exists. Illegal hunting.</td>
</tr>
<tr>
<td>Southern river otter</td>
<td><em>Lutra longicaudis</em></td>
<td>“Rest and den sites are found in areas with dense vegetation”— associated with dense mature forest with thick undergrowth extending close to shore. Both the above-ground root systems of mature or fallen trees and the dense vegetation cover are important components of <em>L. provocax</em> habitat; absence of these key features may result in absence of otters, even if abundance of prey is not limiting”</td>
<td>Habitat exists. Habitat loss in riparian areas.</td>
</tr>
<tr>
<td>Margay</td>
<td><em>Leopardus wiedii</em></td>
<td>“The margay is strongly associated with forest habitat/tree cover, both evergreen and deciduous, although it has been occasionally reported outside forested areas”</td>
<td>Habitat exists. Habitat loss. Loss of prey species due to illegal hunting.</td>
</tr>
<tr>
<td>Geoffreys’s Spider Monkey</td>
<td><em>Ateles geoffroyi</em></td>
<td>“Spider monkeys travel and forage in the upper levels of the forest. They spend much time in the canopy and also use the middle and lower strata but are rarely seen in the understory. In accordance with their use of the highest levels of the forest, they are highly suspensory.”</td>
<td>Habitat exists. Habitat loss.</td>
</tr>
<tr>
<td>Yucatan Black Howler Monkey</td>
<td><em>Alouatta pigra</em></td>
<td>“This species occurs in primary terra firma rain forest, riparian forest, seasonally flooded riparian areas, and swamps.”</td>
<td>Habitat exists. Habitat loss.</td>
</tr>
<tr>
<td>Great curassow</td>
<td><em>Crax rubra</em></td>
<td>“It is restricted to undisturbed humid evergreen forest (also seasonally dry forest in some areas) and mangroves. It is primarily a lowland species but has been recorded at altitudes of up to 1,900 m in Panama.”</td>
<td>Habitat exists. Habitat loss. Illegal hunting.</td>
</tr>
<tr>
<td>Ocellated turkey</td>
<td><em>Meleagris ocellata</em></td>
<td>It occupies non-flooded mature forest, but associates with seasonally flooded habitat and open areas when breeding</td>
<td>Habitat exists. Habitat loss. Illegal hunting.</td>
</tr>
</tbody>
</table>

The biodiversity objective for the Project is to maintain existing biodiversity and HCVs to the extent possible barring setbacks from natural processes. A complete synthesis of information about the biodiversity of the site and a proposal for a biodiversity monitoring program is contained in Miller and Miller (2011).

**Project Scenario**

The Project scenario presumes that with proper protection of the site, the exceptional existing biodiversity of the site will be maintained. Monitoring surveys of large/medium mammals and bats will provide valuable information on several IUCN species. Patrols to eliminate potential hunting and illegal removal of tree cover will ensure existing populations and habitat will remain on the site. Any potential impacts to populations or habitat will be from natural causes only. The following surveys will be conducted:

- Large-medium mammals will be surveyed using remotely-triggered camera traps.
- Bats will be surveyed using acoustic monitoring.
• Anecdotal observations of other species will be noted with particular emphasis on species of High Conservation value (those listed on the IUCN Red List and the Belize National List of Critical Species (Table ).

Baseline Scenario

The baseline scenario presumes that the property will receive less protection for HCVs and that significant habitat loss will occur. Removal of the tropical forest will eliminate habitat for many species (IUCN 2012) and severely degrade the value of riparian corridors within the property. Travel corridors across the property will be eliminated reducing genetic interchange between surrounding protected areas.

No GMO Pledge

No genetically modified organisms will be used on the project

7.2 Negative Offsite Biodiversity Impacts (B2)

The Project does not anticipate any offsite negative biodiversity impacts. Offsite impacts will be positive since larger habitat and forest areas will improve the long-term viability of populations offsite through connectivity of off-site habitats on surrounding conservation lands.

If any negative impact is identified, the TFG team and the stakeholder representative will address such problems with fast and effective solutions. The issue will be discussed and mitigation actions will be designed.

7.3 Exceptional Biodiversity Benefits (GL3)

The Project scenario will maintain existing HCVs by means of regular patrols and protection of habitat. This Project addresses multiple High Conservation Values (Table 6) Climate, Community, and Biodiversity Standard Gold Level is achieved by virtue of the significant biodiversity resources conserved on the property including habitat for multiple IUCN listed species and most notably IUCN-Endangered Baird’s tapir (Tapirus bairdii), Yucatan black howler monkey (Alouatta pigra) and Geoffroy’s spider monkey (Ateles geoffroyi).

8 MONITORING

8.1 Description of the Monitoring Plan (CL3, CM3 & B3)

Monitoring events will be conducted by TFG and/or a qualified contractor. FCO will be available as needed/desired by TFG for advice and consultation. A complete monitoring plan for climate, community, and biodiversity benefits will be made available publicly (online) within 12 months of validation of the project.

The overall objectives of the monitoring plan are to detect any reversals in forest cover for baseline renewal after 10 years. To accomplish this, a system of permanent plots has been established and remote sensing will be used to produce a forest/nonforest map. The plot data will be used as ground truth for the mapping work as well as to confirm growth rate assumptions. The map will be produced for each verification audit and the plots will be measured annually and
a report of the results produced for each verification audit. There may be years when all plots are not measured due to weather or other factors that cause remeasurement to be too costly or unsafe. In that case enough plots will be measured to support the required precision goals of the methodology or the verification audit will be delayed until such time as enough plots can be remeasured to meet those guidelines.

Fuel wood collection was analyzed and considered de minimis prior to project start and is considered de minimis during the project and will not be monitored during the project.

Nitrogen fertilizer use will be monitored to detect increases of fertilizer use over preproject levels.

All data collected as part of monitoring will be archived electronically in Excel compatible spreadsheets or Arc/View compatible (.shp) files and kept at least for two years after the end of the project, and held by TFG at the TFG office in Belize. All of the data will be monitored if not indicated otherwise in tables below.

Monitoring data will be collected periodically, except in cases where some plots are inaccessible due to high water or other factor making access unsafe, and summarized for periodic 3rd party independent audits. Audits will occur no less frequently than every 5 years. It is the responsibility of the landowner to conduct monitoring either utilizing contractors or in-house staff.

Updating of Strata

The ex-post stratification shall be updated if the following conditions occur:

• unexpected disturbances occurring during the crediting period (e.g. due to fire, pests, storms, or disease outbreaks), affecting differently various parts of an originally homogeneous stratum; and
• unplanned forest management activities (illegal reversals) that affect the existing stratification.

Established strata may be merged if reason for their establishing said strata have disappeared. Line diagrams may be used to display the GHG collection and management system.

Community and Biodiversity Benefits

Community benefits will be monitored through community meetings and records of funds transfers to the Gallon Jug-Chan Chich High School Scholarship Fund⁹.

Biodiversity will be monitored using a combination of techniques such as camera traps, bat acoustic surveys, and time-constrained searches for monkeys, and track transects.

⁹ https://sites.google.com/site/gallonjugschool/gallonjug-chanchichscholarshipfund
### 8.2 Data and Parameters Available at Validation (CL3)

<table>
<thead>
<tr>
<th>Data Unit / Parameter:</th>
<th>Project Forest Cover Monitoring Map</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data unit:</td>
<td>Ha</td>
</tr>
<tr>
<td>Description:</td>
<td>Map showing the location of forest land within the project area at the beginning of each monitoring period. If within the Project Area some forest land is cleared, the benchmark map must show the deforested areas at each monitoring event</td>
</tr>
<tr>
<td>Source of data:</td>
<td>Remote sensing in combination with GPS data collected during ground-truthing</td>
</tr>
<tr>
<td>Value applied:</td>
<td>100%</td>
</tr>
<tr>
<td>Justification of choice of data or description of measurement methods and procedures applied:</td>
<td>Required by methodology. The minimum map accuracy should be 90% for the classification of forest/non-forest in the remote sensing imagery. If the classification accuracy is less than 90% then the map is not acceptable for further analysis. More remote sensing data and ground-truthing data will be needed to produce a product that reaches the 90% minimum mapping accuracy. Must be monitored at least every 5 years or if verification occurs on a frequency of less than every 5 years examination must occur prior to any verification event</td>
</tr>
<tr>
<td>Any comment:</td>
<td>If stratification is required in the future due to a reversal, then new strata will be identified using module X-STR.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Data Unit / Parameter:</th>
<th>ADefPA,i,t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data unit:</td>
<td>Ha</td>
</tr>
<tr>
<td>Description:</td>
<td>Area of recorded deforestation in the project area at time ( t ) (if any occurs)</td>
</tr>
<tr>
<td>Source of data:</td>
<td>Remote sensing imagery</td>
</tr>
<tr>
<td>Value applied:</td>
<td>0</td>
</tr>
<tr>
<td>Justification of choice of data or description of measurement methods and procedures applied:</td>
<td>Required by methodology. Head’s up delineation using GIS and landsat imagery (or higher resolution) using multiple images to get a cloud free image. Must be monitored at least every 5 years or if verification occurs on a frequency of less than every 5 years examination must occur prior to any verification event</td>
</tr>
</tbody>
</table>
### Data Unit / Parameter: $A_{\text{burn,i,t}}$

**Data unit:** Ha  
**Description:** Area burnt at time $t$ (if any occurs)  
**Source of data:** Remote sensing imagery  
**Value applied:** 0  
**Justification of choice of data or description of measurement methods and procedures applied:** Required by methodology. Head's up delineation using GIS and landsat imagery (or higher resolution) using multiple images to get a cloud free image. Areas burnt shall be monitored at least every 5 years or if verification occurs on a frequency of less than every 5 years examination must occur prior to any verification event.

---

### Data Unit / Parameter: $CAB,\text{tree,i,}$

**Data unit:** t CO2-e ha-1  
**Description:** Carbon stock in aboveground biomass in trees in the project case in stratum $i$.  
**Source of data:** Field measurements applied with allometric equation published in Pearson et. al. (2005).  
**Value applied:** In 2009, 141.9 t CO2-e ha-1  
**Justification of choice of data or description of measurement methods and procedures applied:** Required by methodology. See field methods section. Must be monitored at least every 5 years or if verification occurs on a frequency of less than every 5 years examination must occur prior to any verification event.

---

### Data Unit / Parameter: $DBH,\text{tree,i,}$

**Data unit:** Cm  
**Description:** Diameter at 1.3 meters above the ground of each tree on each plot.
**Source of data:** Field measurements

**Value applied:** See database of tree measurements.

**Justification of choice of data or description of measurement methods and procedures applied:** Required by methodology. See field methods section of monitoring plan. Must be monitored at least every 5 years or if verification occurs on a frequency of less than every 5 years examination must occur prior to any verification event.

**Any comment:** Key variable used to calculate with project carbon stocks and year by year growth rate.

**Data Unit / Parameter:** $N_2O_{direct-N,I,t}$

**Data unit:** mtCO2e

**Description:** Leakage related to non CO2 emissions from increased use of nitrogen fertilizer

**Source of data:** Landowner records

**Value applied:** 0

**Justification of choice of data or description of measurement methods and procedures applied:** Required by methodology. This is a source of potential leakage that monitors an increase of nitrogen fertilizer application elsewhere on the landowner’s property.

**Any comment:**

**Data Unit / Parameter:** Species List

**Data unit:** Species

**Description:** List of detected species known to occur on the site.

**Source of data:** Pictures, acoustic recordings, tracks, observations by trained observers.

**Value applied:** Presence/Absence

**Justification of choice of data or description of measurement methods and procedures applied:** Must be monitored at least every 5 years or if verification occurs on a frequency of less than every 5 years examination must occur prior to any verification event.

**Any comment:**
## 8.3 Data and Parameters Monitored (CL3, CM3 & B3)

<table>
<thead>
<tr>
<th>Data Unit / Parameter:</th>
<th>Project Forest Cover Monitoring Map</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data unit:</td>
<td>Ha</td>
</tr>
<tr>
<td>Description:</td>
<td>Map showing the location of forest land within the project area at the beginning of each monitoring period. If within the Project Area some forest land is cleared, the benchmark map must show the deforested areas at each monitoring event</td>
</tr>
<tr>
<td>Source of data:</td>
<td>Remote sensing in combination with GPS data collected during ground truthing</td>
</tr>
<tr>
<td>Description of measurement methods and procedures to be applied:</td>
<td>The minimum map accuracy should be 90% for the classification of forest/non-forest in the remote sensing imagery. If the classification accuracy is less than 90% then the map is not acceptable for further analysis. More remote sensing data and ground truthing data will be needed to produce a product that reaches the 90% minimum mapping accuracy.</td>
</tr>
<tr>
<td>Frequency of monitoring/ recording:</td>
<td>Must be monitored at least every 5 years or if verification occurs on a frequency of less than every 5 years examination must occur prior to any verification event</td>
</tr>
<tr>
<td>Value applied:</td>
<td>100%</td>
</tr>
<tr>
<td>Monitoring equipment:</td>
<td>Computer and appropriate analytical software.</td>
</tr>
<tr>
<td>----------------------------</td>
<td>------------------------------------------------------</td>
</tr>
<tr>
<td>QA/QC procedures to be applied:</td>
<td>Based on plot remeasurements.</td>
</tr>
<tr>
<td>Calculation method:</td>
<td>Head’s up delineation using GIS and landsat imagery (or higher resolution) using multiple images to get a cloud free image.</td>
</tr>
<tr>
<td>Any comment:</td>
<td>If stratification is required in the future due to a reversal, then new strata will be identified using module X-STR.</td>
</tr>
</tbody>
</table>

**Data Unit / Parameter:** \( A_{\text{DefPA},i,t} \)

**Data unit:** Ha

**Description:** Area of recorded deforestation in the project area at time \( t \) (if any occurs)

**Source of data:** Remote sensing imagery

**Description of measurement methods and procedures to be applied:** Head’s up delineation using GIS and landsat imagery (or higher resolution) using multiple images to get a cloud free image.

**Frequency of monitoring/recording:** Must be monitored at least every 5 years or if verification occurs on a frequency of less than every 5 years examination must occur prior to any verification event

**Value applied:** 0

**Monitoring equipment:** Computer and appropriate analytical software.

**QA/QC procedures to be applied:** Remeasurement of permanent plots.

**Calculation method:** Head’s up delineation using GIS and landsat imagery (or higher resolution) using multiple images to get a cloud free image.

**Any comment:** This is presumed to be zero ex ante.

**Data Unit / Parameter:** \( A_{\text{burn},i,t} \)

**Data unit:** Ha

**Description:** Area burnt at time \( t \) (if any occurs)

**Source of data:** Remote sensing imagery

**Description of measurement methods and procedures to be applied:** Head’s up delineation using GIS and landsat imagery (or higher resolution) using multiple images to get a cloud free image.

**Frequency of monitoring/recording:** Areas burnt shall be monitored at least every 5 years or if verification occurs on a frequency of...
<table>
<thead>
<tr>
<th>Data Unit / Parameter:</th>
<th>$\text{CAB}, \text{tree}, i,$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data unit:</td>
<td>$\text{t CO}_2\text{-e ha}^{-1}$</td>
</tr>
<tr>
<td>Description:</td>
<td>Carbon stock in aboveground biomass in trees in the project case in stratum $i$.</td>
</tr>
<tr>
<td>Source of data:</td>
<td>Field measurements applied with allometric equation published in Pearson et. al. (2005)</td>
</tr>
<tr>
<td>Description of measurement methods and procedures to be applied:</td>
<td>See field methods section.</td>
</tr>
<tr>
<td>Frequency of monitoring/recording:</td>
<td>Must be monitored at least every 5 years or if verification occurs on a frequency of less than every 5 years examination must occur prior to any verification event.</td>
</tr>
<tr>
<td>Value applied:</td>
<td>In 2009, 141.9 $\text{t CO}_2\text{-e ha}^{-1}$.</td>
</tr>
<tr>
<td>Monitoring equipment:</td>
<td>Computer and spreadsheet software.</td>
</tr>
<tr>
<td>QA/QC procedures to be applied:</td>
<td>Independent 3rd party audit of field measurements utilizing remeasurement of a sample of plots.</td>
</tr>
<tr>
<td>Any comment:</td>
<td>Key variable used to calculate with project carbon stocks and year by year growth rate.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Data Unit / Parameter:</th>
<th>$\text{DBH}, \text{tree}, i,$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data unit:</td>
<td>Cm</td>
</tr>
<tr>
<td>Description:</td>
<td>Diameter at 1.3 meters above the ground of each tree on each plot.</td>
</tr>
<tr>
<td>Source of data:</td>
<td>Field measurements</td>
</tr>
</tbody>
</table>
### Description of measurement methods and procedures to be applied:
See field methods section of monitoring plan.

### Frequency of monitoring/recording:
Must be monitored at least every 5 years or if verification occurs on a frequency of less than every 5 years examination must occur prior to any verification event.

### Value applied:
See database of tree measurements.

### Monitoring equipment:
Diameter tape incremented in centimetres. Measuring tape to determine inclusion of trees on plots. GPS to navigate to permanent plots.

### QA/QC procedures to be applied:
Independent 3rd party audit of field measurements utilizing remeasurement of a sample of plots. Field observation sheets will include DBH of each tagged tree for evaluation of reasonableness of measurement based on feasible growth rate.

### Calculation method:
Direct observation.

### Any comment:
Key variable used to calculate with project carbon stocks and year by year growth rate.

<table>
<thead>
<tr>
<th>Data Unit / Parameter:</th>
<th>$\text{N}<em>2\text{O}</em>{\text{direct-N},\text{t}}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data unit:</td>
<td>mtCO2e</td>
</tr>
<tr>
<td>Description:</td>
<td>Leakage related to non CO2 emissions from increased use of nitrogen fertilizer</td>
</tr>
<tr>
<td>Source of data:</td>
<td>Landowner records</td>
</tr>
<tr>
<td>Value applied:</td>
<td>0</td>
</tr>
<tr>
<td>Justification of choice of data or description of measurement methods and procedures applied:</td>
<td>Required by methodology. This is a source of potential leakage that monitors an increase of nitrogen fertilizer application elsewhere on the landowner’s property.</td>
</tr>
<tr>
<td>Any comment:</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Data Unit / Parameter:</th>
<th>Species List</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data unit:</td>
<td>Species</td>
</tr>
<tr>
<td>Description:</td>
<td>List of detected species known to occur on the site.</td>
</tr>
</tbody>
</table>
### Source of data:
Pictures, acoustic recordings, tracks, observations by trained observers.

### Value applied:
Presence/Absence

### Justification of choice of data or description of measurement methods and procedures applied:
Must be monitored at least every 5 years or if verification occurs on a frequency of less than every 5 years examination must occur prior to any verification event.

### Any comment:
.

### Data Unit / Parameter:
**Contributions to Gallon Jug-Chan Chich High School Scholarship Fund**

### Data unit:
BZ dollars

### Description:
Documentation of donations.

### Source of data:
Written receipts.

### Value applied:
Dollar amount

### Justification of choice of data or description of measurement methods and procedures applied:
Must be monitored at least every 5 years or if verification occurs on a frequency of less than every 5 years examination must occur prior to any verification event.

### Any comment:
LITERATURE CITED


