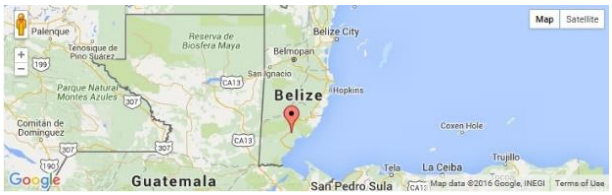
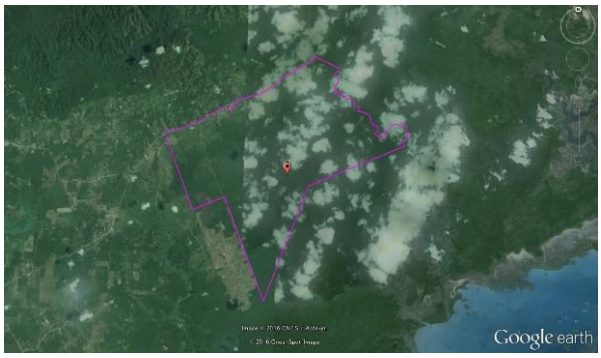
Boden Creek Ecological Preserve Forest Carbon Project

Distinctive features

The Boden Creek Ecological Preserve (BCEP) is a 5,213 ha private reserve located in southern Belize. Boden Creek Ecological Preserve (BCEP) is the owner and manager of the property. The property was purchased from the previous owner who was in the process of converting the property to a mix of agriculture (bananas and citrus primarily). BCEP leases the property to Belize Lodge and Excursions (BLE) for ecotourism.





The project area is 3,980 ha of the BCEP. The goals of the project are to conserve and protect the property to avoid emissions from planned deforestation and to protect biodiversity values, as well as to contribute to sustainable livelihoods through ecotourism. The project consists of protection of the property through patrols, outreach with and job creation for the local villages, and placing a restrictive covenant on the property deeds. The project achieved Climate, Community, and Biodiversity Standard Gold Level validation, reflecting its expected contribution to protecting the significant biodiversity resources conserved on the property and the critical location of the property in the immediate watershed of the Port Honduras Marine Sanctuary.

	Heading	Explanation
Locational factors		
	**Location**	Toledo District, Belize
	Size	Project area: 3,980 ha Reference area: 6 proxy areas. The range of size of proxy areas is 554 ha to 4,046 ha Leakage monitoring area: Size not provided in VCS PD Leakage management area: Size not provided in VCS PD Note: Of the total area of the property, 3,980 ha is available for the project. A reduction of 1,233 ha was made to account for land that was not forested at least 10 years prior to the start of the project plus land that is within a 1 chain buffer of perennial streams.
	Land cover	Land use land classification type of BCEP ▪Lowland Broad-Leafed Wet Forest: 4,792 ha ▪Forested Stream Buffer: 48 ha ▪Grassland: 117 ha ▪Wetland: 24 ha ▪Water: 16 ha ▪Settlements: 92 ha ▪Cropland: 122 ha ▪Total: 5,211 ha
	Agents and drivers of forest cover change	Agents: Previous property owner Underlying drivers: Markets for agricultural products [inferred from the VCS PD; drivers are not discussed] Proximate causes: Conversion to agriculture. The products could include cattle, citrus, bananas, aquaculture, cacao, rice and other products.
Basic project features		
	**Objectives**	The goal of the project is to develop the project as a carbon sink by means of conserving and protecting the property which will maintain the biodiversity values of the property and enhance the local economic environment with sustainable livelihoods through private-sector eco-tourism. The climate objective is to avoid emissions from deforestation during the project timeframe.
	Proponent/s	Boden Creek Ecological Preserve (BCEP) Owns the property and the entity charged with managing the property.
	Actors involved in project design and	Belize Lodge and Excursions (BLE) – has an ecotourism contract for use of the property from BCEP

	implementation and their roles	Forest Carbon Offsets LLC (FCO) – an agent of BCEP to develop BCEP as a carbon finance project Conservation Management Institute at Virginia Tech (CMI) – a subcontractor hired to conduct technical analysis on behalf of FCO
	Tenure and Carbon rights holder/s	Tenure: BCEP owns project site Carbon rights: BCEP has ownership of the carbon rights for the project area
	Upfront financing	There is no specific description of upfront finance.
	Start date	1/1/2005
	Crediting period	2005 to 2029 (25 years)
	Baseline emissions	
	**Methodology used**	VM0007 REDD Methodology Modules
	Reference data (unplanned deforestation/degradation)	Not applicable
	Reference data (planned deforestation/degradation)	Reference period: January 1995 through December 2004 Types of data used: Emrick and Dorr (2008) identified 10 general cover types at BCEP and created a preliminary vegetation map using a 2003 Quickbird image that covered approximately 50% of BCEP. A Landsat 5 TM, 30 meter, satellite image from April 28, 2011 used for to classify land cover as forest and non-forest. Classification was performed by photo interpreters familiar with Landsat imagery and possessing a priori knowledge of Belizean landuse/landcover. The accuracy assessment was performed using a high resolution satellite image from RapidEye (5 meter, color - infrared image from March 10, 2011). Six proxy areas ranging from 554 ha to 4,046 ha used to establish rate of deforestation
	Stratification of project area	One stratum – Lowland Broad Leafed Wet Forest
	Deforestation rate and location	**Historical: 10.8%** **Projected: 10.8%** **Likely baseline scenario** The baseline scenario is considered to be a continuation of the process of removing timber and converting the property to agriculture. **Modelling procedure**

	"REDD Methodological Module: Estimation of baseline carbon stock changes and greenhouse gas emissions from planned deforestation (BL - PL)"
Carbon pools	**Carbon pools included** ✓ × ▪Aboveground tree biomass ✓ ▪Belowground tree biomass ✓ ▪Non-tree woody biomass × ▪Litter × ▪Dead wood × ▪Soil × ▪Wood product×s **Estimation method** For above ground tree (> 5cm diameter at breast height) and below-ground biomass: ▪Measurement – Mean carbon pool in 2011 was based on field measurements conducted in 2009 and 2011. 26 nested forest inventory plots were randomly allocated, and DBH and height measured for each tree. ▪Allometrics – Chave et. al. (2005) for wet forest stands (without Height) used ▪Below ground biomass was estimated based on above ground biomass using the equation found in Pearson et al (2005). ▪An uncertainty level of 25.33% was calculated using module Estimation of uncertainty for REDD project activities (X - UNC).
Carbon stock changes	Assumed that converted forest is replaced by citrus plantations with 37 tons C/ha
GHG emissions	CH4 and N2O emissions from land clearing and burning are included. N2O emissions from utilizing chemical fertilizer in citrus agriculture included.
Net emissions without project	1,758,938 mtCO2e

Project GHG emissions reduction strategy

Scope	Avoided planned deforestation
Activities	▪Conduct ecotourism activities at the site to generate jobs for local people ▪Control access to the site through regular patrols ▪Continue to conduct outreach with the local communities ▪Place a restrictive covenant on the property ▪Monitor results
Leakage mitigation strategy	The project includes no specific leakage avoidance activities

Additionality	▪Alternative land use scenarios identified: 1. Conversion to Agriculture, 2. Purchase of the Land to Operate Ecotourism Lodges, 3. Purchase of the Land as Conservation Area. 1 considered most likely. 2 is not profitable ▪Common Practice Analysis · The practice of converting land to industrial agriculture is commonplace in the region. · Two other nearby properties owned by nonprofits are of similar size and are managed as protected areas. Both nearby properties are supported by an international donor base not available for the project site making the situations quite dissimilar.
Non-permanence risk mitigation strategy	The project includes no specific Non-permanence risk mitigation strategy.

With-project emissions

Effectiveness of measures	Project assumed to prevent 100% of the deforestation in the project area
Carbon stock changes	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. ▪Based on Hughes et al (1999) 6.3% was used to estimate biomass accumulation within the project area for the recovering secondary forests impacted by Hurricane Iris. ▪Steady state maximum for carbon stocks in tropical forest in southern Belize is 318 C tons/ha (Gibbs et al 2007).
GHG emissions	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
Leakage	**Types:** Activity shifting leakage [not explained in detail in VCS PD] **Deduction:** 3.5%
Non-permanence risk	**Buffer:** 15%
Ex-ante estimated net greenhouse gas emissions reductions	**Total over crediting period:** 1,442,957 mtCO2e **Annual average:** 57,718 mtCO2e **Annual average per ha:** 14.5 mtCO2e
Monitoring of carbon stock	**Parameters** ▪ i. tCO2-e in tree biomass

	changes and emissions	▪ ii. Forest cover, deforestation and burnt area within project area **Methods** ▪ i. Field measurements using nested fixed area plots ▪ ii. Remote sensing in combination with GPS data collected during ground truthing **Frequency** ▪ i. No information on intent to remeasure. Partial measurements made in 2009 and full measurements of all plots made in 2011. ▪ ii. Each monitoring event
Stakeholder identification and engagement		
	**Stakeholders identified**	Three communities located in the Project Zone. The three communities do not reside in the Project area. ▪**Indian Creek Village:** Indian Creek Village is a 100% Ke'kchi Maya village recognized by the Belize government as a community in 1969. ▪**Golden Stream Village:** Golden Stream Village is a 53% Ke'kchi Maya / 47% Mopan Maya village recognized by the Belize government as a community around 1986. ▪**Pine Hill Mennonite Community:** The Pine Hill Mennonite Community is reclusive and interacts minimally with others from outside their community. The community is a Kleine Gemeinde Mennonite community. It is a recent Mennonite settlement, begun in 1996, located on a privately owned block west of BCEP.
	Identification process	Literature review and on site consultations.
Full and effective participation		
	**Access to information and consultation**	BCEP provided opportunities for local stakeholders to access information such as Information posted on the website, direct email and phone contact with Belize economic and ecology specialist, visiting villages, holding public meeting and sharing PDD.
	Participation in design, implementation and monitoring	BCEP has engaged local stakeholders in designing the Project with various onsite consultations. Members of the local communities are the primary employees of BCEP participating in permanent sample plot measuring, setting up remote large mammal camera traps, setting up acoustic recording devices, conducting forest patrols, educating other local community members about forest protection, and engaging in other knowledge transfer activities.
	Feedback and grievance redress procedures	The BAPPA (Belize Association of Private Protected Areas) has tentatively agreed to serve as an independent 3rd party in country to receive and document grievances related to the project. BAPPA will tentatively 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.
	Worker relations and safety	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 employee with an emphasis on guaranteeing workplace safety according to Belizean law. Each employee signs a work contract that certifies that safety information has been communicated.
Communities		
	**Without-project scenario**	BCEP would sell the property which would most likely lead to rapid conversion to citrus and/or aquaculture. The most substantial direct impact of the baseline scenario would be a substantial reduction in number and quality of jobs with a near total loss of jobs for women. The without project scenario is expected to increase the quantity of chemical fertilizers, insecticides, and herbicides used on the BCEP property. Since the BCEP property forms part of the local water board district for both Indian Creek Village and Golden Stream Village, converting the BCEP property to citrus and aquaculture would most likely have an adverse impact on the local communities' health, and was identified as a concern by local communities during stakeholder meetings.
	With-project scenario	**Expected net benefits** Employment levels/livelihoods is the most important and most direct benefit to the communities. BCEP has developed private sector non-farm rural labor employment opportunities that provide specific skill training in the following roles: ▪Business management (e.g. labor allocation, scheduling, planning, payroll, supplies, regulation compliance) ▪Ecotourism services ▪Rangers and patrols ▪Assisting forest carbon data collection ▪Assisting biodiversity data collection The BCEP leadership has also committed to a program of supporting high school scholarships. BCEP provided an informal right-of-way easement for the Pine Hill Mennonite Community to cross BCEP property allowing the community access to the local market. **Possible negative impacts on other stakeholders and mitigation strategy**

	One source of complaints in the past at BCEP/BLE has been late payment of wages. This is being addressed by the project by means of a payroll fund that can be used to stabilize income when the ecotourism operation goes through unstable periods. This will also be addressed by a method of electronic payments so delays in handling paper checks are eliminated. ▪Impact on High Conservation Values: The only community HCV identified is the Nim Li Punit archaeological site. This site is in the Project Zone, but not in the Project area. This site is owned and operated by the Government of Belize. The with project scenario will result in significant increases in visitation by tourists, and presumably a higher likelihood that the Government of Belize will maintain and protect the site. Looting of archaeological sites is still a problem in Belize. The without project scenario would not have a direct negative impact on the HCV, but a reduction in visitation would not be good for future allocations of resources to the site by the Government of Belize. ▪Offsite Stakeholder Impacts: The Project is not expected to have negative social impacts on the communities outside of the Project Area. ▪Plans to Mitigate Potential Offsite Impacts: It is not expected that the Project will negatively impact any of offsite communities. In the case of any potential negative impacts, representatives of the impacted community will bring it to the attention of the conflict resolution coordinator.
Impact monitoring	Within twelve months of Project validation a monitoring plan will be developed and implemented. **Indicators** ▪ Annual employment of local community personnel in annual work-hours actualized for the Project ▪ Number of full-time-equivalent jobs that pay at least 2.5 times the poverty rate with 100% timely payroll according to the Belize Labor Act ▪ Number of potential jobs provided by citrus plantations ▪ Continued existence of Nim Li Punit archaeological site **Methodologies** ▪ Monitoring of payroll records, annual audits, and records maintained by the Belize Labor Department. ▪ Monitoring of national census data **Frequency** No information
Biodiversity and ecosystem services	
Without–project scenario	The without project scenario presumes that the property is in large part converted to agricultural uses removing all

	native habitat from approximately half the property in one large block. Patrols to eliminate hunting and illegal removal of forest cover would not occur, and expectations are that significant negative impacts to hunted species and predators that rely on hunted species would result. Habitat for forest species is unavailable in agricultural habitats (citrus, aquaculture, and pasture), and while some species do occur in agricultural settings, there is little or no overlap in the biodiversity of the forest and the biodiversity of agricultural fields/plantations.
With-project scenario	**Expected net benefits** By providing patrols to eliminate hunting and illegal removal of tree cover, existing populations and habitat will remain on the site. The with project scenario will also maintain existing HCVs by means of regular patrols. **Possible negative offsite impacts and mitigation** The Project does not anticipate any offsite negative biodiversity impacts. Most offsite impacts will be positive since larger habitat and forest areas will improve the long-term viability of populations offsite. Avoiding conversion to citrus or aquaculture also avoids release of sediment and agricultural chemicals into waterways. **Mitigation of Potential Negative Offsite Biodiversity Impacts** If any negative impact is identified, the BCEP team and the community representative will develop solutions.
Impact monitoring	**Indicators** ▪ i. Bat Species Assemblage: Diversity indices, species richness, species heterogeneity, species evenness, and relative activity indices ▪ ii. Medium-Large Mammal Assemblage: Diversity indices, species richness, species heterogeneity, species evenness, relative trap success, and population size analysis for individually identifiable species (e.g. jaguar) ▪ iii. avian and mammalian IUCN listed species **Methodologies** ▪ i. Sampling array of remote acoustical detectors ▪ ii. Sampling array of camera traps (15-20 stations minimum of 750 trap nights) ▪ iii. Opportunistic observations **Frequency** A full biodiversity monitoring plan will be prepared and made public within 12 months of validation. Once approved, the plan will be executed on Boden Creek Ecological Preserve for the initial monitoring period. The same repeatable methodologies will be followed up

	again at least every 5 years by qualified trained biologists from the date of registration with the CCBA.

Progress

Validation	VCS validation report issue date: 24 June 2011 CCBA validation report issue date: 14 July 2010
Verification	VCS verification period and report issue date: January 1, 2005 to December 31, 2010; 21 July 2011 CCBA verification period and report issue date: not verified.
Credits issued	Number: 133,808 As of: 14 February 2016

Further information

- VCS Project Database:
  http://www.vcsprojectdatabase.org/#/project_details/647
- CCBA Projects
  http://www.climate-standards.org/?s=boden+

Documents reviewed

VCS documents

- Project description,
  http://www.vcsprojectdatabase.org/services/publicViewServices/downloadDocumentById/6983
- Validation report,
  http://www.vcsprojectdatabase.org/services/publicViewServices/downloadDocumentById/6984
- Monitoring report,
  http://www.vcsprojectdatabase.org/services/publicViewServices/downloadDocumentById/7054
- Verification report,
  http://www.vcsprojectdatabase.org/services/publicViewServices/downloadDocumentById/7055

CCB documents

- PDD,
  https://s3.amazonaws.com/CCBA/Projects/Boden_Creek_Ecological_Preserve_Project/CCB_Gold_BCEP_Project_Design_Document_ver_1_021010.pdf
- Validation plan,
  https://s3.amazonaws.com/CCBA/Projects/Boden_Creek_Ecological_Preserve_Project/CCB_FCO_BodenCreek_RPT_ValidationReport_071410.pdf
- Monitoring report,
  https://s3.amazonaws.com/CCBA/Projects/Boden_Creek_Ecological_Preserve_Project/BCEP_CCB_Monitoring_Plans_Final.pdf