Avoiding Planned Deforestation and Degradation in the Valdivian Coastal Reserve

Distinctive features

The Avoiding Planned Deforestation and Degradation in the Valdivian Coastal Reserve, Chile is located within the Valdivian Coastal Reserve (VCR), which is situated approximately 40 km southwest of Valdivia in Region XIV, in the coastal range of south-central Chile. The VCR represents one of the last large fragments of Valdivian Temperate Forest, and holds significant ecological value. The area is home to numerous endemic species and globally-significant ecosystems and vegetation, such as Olivillo coastal forest (Aextoxicon punctatum) and Alerce (Fitzroya cupressoides); the latter is one of the world's largest and longest-lived tree species.

The project is managed by The Nature Conservancy (TNC), which holds private rights over the VCR area. Prior to 2003, the property was owned and managed by an industrial timber company, which had been converting native forests to Eucalyptus plantations. TNC acquired the property for a price of US $6,375,000 from the bankrupt timber company in 2003 and officially cancelled the legal permits to convert native forest to eucalyptus plantations by sending notice to the National Forest Corporation (Corporación Nacional Forestal: CONAF) at the end of 2004.

Registered by VCS, the project has generated net GHG emission reductions of 461,402 tCO2e during the first verification/reporting period (04 November 2003 to 03 November 2011). TNC has also submitted the project documents to CCBA for validation and verification.

Two activities are combined under the project: 1. Avoiding Planned Deforestation (APD) by stopping construction of a coastal highway through the property; 2. Avoiding Planned Degradation (APD) by stopping conversion of native forest to Eucalyptus plantations. The carbon credits generated are expected to help finance the establishment of an endowment for long-term operations, and to help pay off the original acquisition costs of the property, which were covered by the loan from TNC's internal Land Purchase Fund. The project also has been financially supported by grants from TNC donors, the World Wildlife Fund (WWF) and Conservation International (CI).

	Heading	Explanation
Locational factors		
	**Location**	Located within the Valdivian Coastal Reserve (VCR), which is situated approximately 40 km southwest of Valdivia city in Region XIV, the coastal range of south-central Chile
	Spatial boundaries	Project area: 1,273 ha Reference area: None. Proxy areas used. Leakage monitoring area: Leakage zone set for monitoring deforestation resulting from new road construction/improvement. Size not given. Leakage management area: None specified.
	Land cover	Mature temperate rainforest, 60% of the VCR is covered by primary forest
	Agents and drivers of forest cover change	Agents: ▪Government of Chile Ministry of Public Works (MOP), with forest clearance directly carried out by the Chile Army Corps of Engineers (CMT) ▪An industrial timber company Underlying drivers: *Not described* Proximate causes: ▪Road clearance operations (Construction of a coastal highway (Carretera Costera) traversing the property) ▪Conversion of native forest to Eucalyptus plantations
Basic project features		
	**Objectives**	The overall objective is to establish a protected status for 1,273 ha of the Valdivian Coastal Reserve (VCR), and to continually protect and soundly manage the property. The specific objectives of the project include: ▪Protecting biodiversity ▪Improving the well-being and sustainability of rural and indigenous communities surrounding the VCR ▪Protecting long term forest carbon stock, achieving sustainable long-term financing for the VCR ▪Demonstration of a successful private sector funding strategy for climate change mitigation ▪Building climate change mitigation capacity within the Chilean government and other institutions ▪Helping to influence future climate change mitigation policies and laws ▪Testing scientific methodologies for quantifying avoided emissions and other impacts

		▪Improving voluntary carbon market accounting standards ▪Creation of a reference center at Universidad Austral as part of a global REDD network.
	Proponent/s	The Nature Conservancy (TNC)
	Tenure/Carbon rights	**Tenure** The project proponent owns the full tittle for the VRC **Carbon rights** The project proponent has the right to develop and sell carbon credits generated through their activities on the VCR property, as owner of the land
	Actors involved in project design and implementation and their roles	▪TNC - responsible for project development, implementation management, monitoring and reporting ▪Universidad de Austral, Valdivia, Chile - consultants for research and GIS mapping to develop the project design ▪TerraCarbon LLC - technical lead on development of the project description ▪SERVAL, Ltda. - implementation of the biomass inventory in 2011
	Upfront financing	▪TNC's internal Land Purchase Fund to acquire the VRC property ▪Grant funding of $2.3 million (2003-2011) including a $1 million from WWF and $750,000 from Conservation International
	Start date	04 November 2003
	Crediting period	20 years
	Baseline emissions	
	**Methodology**	VCS Methodology VMD0007: "REDD Methodology Modules (REDD-MF)" v1.3 (developed by Avoided Deforestation Partners.org)
	Reference data (unplanned deforestation/degradation)	Not applicable
	Reference data (planned deforestation/degradation)	▪Reference / proxy areas: • For baseline deforestation due to highway construction, already constructed part of the same highway outside the project area, was selected to examine historic construction rate and width of forest clearance • For baseline degradation due to forest plantation, 5 proxy areas deforested by the same class of deforestation agent (industrial timber company) were chosen opportunistically within the VCR to

	assess the potential risk of abandonment of commercial Eucalyptus plantation land use ▪Imagery: Classified satellite imagery and aerial photographs used to check project area eligbility
Stratification of project area	Mature temperate rainforest: Only one forest stratum applied as no consistent differences in biomass stocks was evident between forest types (mature and successional areas) based on the inventory results
Deforestation rate and location	**Historical (planned)** ▪Deforestation: The government of Chile had already expropriated lands for the highway construction outside the project area as of the project start date. The observed historical rate of construction was 3.3 km per year. The average width of cleared area was 45 meters (22.5 m either side of the road axis) ▪ Degradation: Management plans and permits authorized conversion of specific stands in specific years (1,187 ha from 2003 to 2008) **Projected** ▪Expected rate of deforestation and degradation determined based on known rates (i.e. observed and planned highway construction rate and approved forest management plan) ▪ Deforestation in the project area would not take place until road construction reaches the border of the project area in 2006 **Likely baseline scenario** The construction of the coastal highway (86 ha of deforestation) following the operational plan of the Ministry of Public Works (MOP) and execution of existing permits to convert native forest to Eucalyptus plantations (1,187 ha of degradation) by a commercial forestry company **Modelling procedure** *Planned deforestation by road construction* ▪The project conservatively applies a construction rate of 3.3 km per year based on the observed historic rate of construction. Sampling found the average width cleared area was 45 meters. Post deforestation carbon stocks in included pools is zero. ▪Estimation of forest biomass stocks in native forest was made from direct inventory. Estimation of forest biomass stocks in Eucalyptus plantations was made from direct inventory of commercial volumes (inside bark) of the VCR. *Planned degradation* ▪The rate and area of conversion of native forest to plantations in the project area were derived from the

	forest management plans/permits. The likelihood of deforestation is set to 100%. There is considered to be no risk of abandonment, as project areas converted to Eucalyptus plantations are expected to remain financially viable and in production in the baseline. ▪Post-conversion, the project area will be Eucalyptus globulus plantations managed on 15-year rotations for pulp and chip production. Estimation of post-conversion carbon stocks were derived from data collected from Eucalyptus stands in the VCR. Growth rates of Eucalyptus globulus were inferred from the most recent (2007) inventory, with an area-weighted average of 16.2 m3/ha/yr mean annual increment in growing stock on stands aged 6-17 years. ▪Wood products were incorporated into the long-term average baseline post-conversion stocks, calculated using module CP-W Option 1, Direct Volume Extraction Estimation. Only one wood product class (paper and paper board) is extracted in the baseline.
Carbon pools	**Carbon pools included** ▪Aboveground tree biomass ✓ ▪Aboveground non-tree woody biomass × ▪Belowground tree biomass ✓ ▪Litter × ▪Dead wood ✓ ▪Soil × ▪Wood products ✓ **Estimation method** ▪Forest biomass stock in native forest Estimation was made from direct inventory of the VCR in 2010/2011.The inventory design was random and stratified sampling with 2 strata defined by age class (i.e. mature and successional).The inventory employed clusters of 5 temporary variable plots (for point sampling) with wedge prisms, arranged in a cross configuration oriented in the cardinal directions, using a double sampling approach (Avery and Burkhart 1994, Iles 2003, Marshall et al 2004) to produce estimates of live tree basal area and live tree biomass-basal area ratios (BBAR, expressed in t C/m^2). The sample size was 65 clusters (33 and 32 clusters in the mature and successional strata, respectively). Basal Area Factor (BAF) of 13.77 m^2/ha was used to sample tree basal area. Tree biomass of living and standing dead woods was estimated with measured diameter at breast height (dbh), using the allometric equation developed by Gayoso et al (2002), which was developed specifically for the project region and forest type (the minimum dbh was set at 5 cm). A root-shoot ratio of 0.2869 was used

	to calculate below ground tree biomass. For lying dead wood, the minimum diameter was set at 15 cm, as consistent with Schlegel and Donoso (2008), using line intersect sampling along the axes configuring the cluster (i.e. total sample = 200 meters at each cluster). Lying dead woods were classified into 3 classes of density and decomposition. All biomass values were converted to carbon fraction using the ratio of 0.47, as recommended by IPCC (2006). ▪Forest biomass stock in Eucalyptus plantations The estimation was made from direct inventory of commercial volumes of the VCR in 2007. The inventory design was systematic and stratified sampling with 2 strata defined by age class (i.e. mature and successional). A biomass expansion factor of 1.74 for *Eucalyptus globulus* developed by Gayoso (2008) was used to estimate total above ground biomass from commercial stem biomass. Carbon in living aboveground biomass was estimated applying wood specific gravity of *Eucalyptus gobulus* of 0.5 g/cm^3 and a carbon fraction of fry biomass of 0.47 as recommended by IPCC (2006). Below ground biomass was estimated by applying root-shoot rate of 0.2159 for *Eucalyptus sp.* developed by Gayoso (2008). Biomass of standing and lying dead wood was estimated as zero, as they are not common in managed stands in the project region. ▪Long-lived wood products Carbon sequestered in long-lived wood products is calculated using module CP-W Option 1, Direct Volume Extraction Estimation, referencing volume estimates from the 2007 inventory of VCR Eucalyptus stands. The wood gravity of 0.5 g/cm^3 for *Eucalyptus globulus* and the carbon fraction of biomass of 0.47 were *applied for the estimation*
Carbon stock changes	▪Assumed that all forest is removed in first 4 years of project. ▪Stocks of belowground biomass and dead wood are emitted from the year of conversion/deforestation at a linear rate equal to 1/10 of the initial stock annually, for 10 years. ▪Post-conversion, the project area will be Eucalyptus globulus plantations managed on 15-year rotations for pulp and chip production. ▪At each harvest, expected to occur at age 15, on average 243m^3 of wood/ha would be extracted for wood product, and 209.4 t CO2/ha would be sequestered as the long-term average baseline post-conversion stocks ▪Carbon stock in area deforested for road construction assumed to be zero.

	GHG emissions	▪Emission sources (i.e. biomass burning, fossil fuel combustion or use of fertilizers) are conservatively excluded from the baseline for this project ▪CO_2 emissions by biomass burning are considered in carbon stock change and emissions from biomass burning will be monitored ex post.
	Net emissions without project	607,369 tCO_2e (2004-2013)
Project GHG emissions reduction strategy		
	**Scope**	Avoided planned deforestation and planned degradation
	Activities	The project consists of the following main activities to protect the VCR : ▪Acquisition of the Valdivian Coastal Reserve (VCR) and establishment of protected status ▪Advocacy to stop construction of the coastal highway (Carretera Costera) ▪Stopping conversion of native forest to Eucalyptus plantations ▪Ongoing protection and management activities, including the development and implementation of a Conservation Plan (in 2005) and a Management Plan (in 2010) to effectively steward the area and to meet the objectives that had been proposed from the beginning of the project
	Leakage mitigation strategy	▪Advocacy for low impact re-routing alternatives to the coastal highway, which can satisfy transportation objectives while reducing environmental impacts ▪Engagement with the MOP and regional authorities through periodic meetings in its capacity as member of the Technical and Legal Coordination Committee (CCTL), which is a collaborative multilateral body to advise on the Coastal Highway ▪Allocation of a section of eucalyptus plantations to supply firewood ▪Working in partnership with the National Forest Corporation (Corporación Nacional Forestal: CONAF) to create a regional fund for sustainable activities near protected areas.
	Non-permanence risk mitigation strategy	▪Provision of improved freshwater quality and employment opportunities for the local communities who derive livelihoods from the project area ▪Employment of Social Programs Coordinator who is present on site to develop community programs ▪Establishment of fire prevention measures (six park guards on staff trained in fire prevention; availability of local fire brigade)

		▪Establishment of access agreements with fisherman's unions in Chaihuin, Huiro, and Niebla to provide land based access to the marine resources
	Additionality	▪There are no laws and regulations that prevent the baseline land-use scenario at the project start date ▪The acquisition and management of the VCR are not financially viable without the revenues of carbon credits ▪The project activities are not common practice in the region (i.e. is not baseline scenario)
With-project emissions		
	**Assumed effectiveness of measures**	100% effective in stopping deforestation and degradation
	Carbon stock changes	Carbon stocks protected from deforestation and degradation.
	GHG emissions	▪None (CH4 and N2O as a result of biomass burning for illegal degradation will be monitored ex post)
	Leakage	**Types** **Activity shifting leakage** ▪No activity shifting leakage is expected by stopping planned highway construction, and is assumed ex ante to be equal to zero over the first 10 year baseline period ▪No activity shifting is expected by stopping conversion of the native forest to forest plantation after 2007, due to the Chilean native forest law (law 20.283/2008) that prohibits the conversion of native forest to plantation activity, except where permits had been previously **Market leakage** ▪Market leakage due to stopping planned highway construction (volumes of wood products that would be extracted from existing plantations from the project area) is assessed, reflecting the fact that In Chile, on average 87% of domestic timber production is designed for export (2006-2010) ▪Market leakage due to stopping the conversion of the native forest to forest plantations is assessed as zero throughout the first 10-year baseline period, since commercial timber harvest is not affected by the project activity until 2019, in which the first plantation would be harvested. Historical practice shows that no wood products have been produced from the initial native forest conversion activity in the region, due to the poor market and long transport distances **Deduction** 4.25% (During the first 10 year baseline period)

Non-permanence risk	**Buffer:** Following the VCS AFOLU Non-Permanence Risk Tool, version 3.1., the total overall risk rating for non-permanence is 10%
Ex-ante estimated net greenhouse gas emissions reductions	**Total over crediting period:** 581,540 tCO2e (over first 10 years) **Annual average:** 58,154 tCO2e **Annual average per ha:** 45.68 tCO2e
Monitoring of carbon stock changes and emissions	**Parameters** i. Area of recorded deforestation ii. Area impacted by natural disturbance iii. Carbon stock in all pools iv. Area potentially impacted by degradation processes v. Biomass carbon of trees cut and removed through degradation process vi. Total area of deforestation by the baseline agent of the planned deforestation in stratum vii. Area burnt **Methods** i., ii. Analysis of classified satellite imagery iii. Forest inventory iv. Observations by guards and consultations with the district attorney's office v. Estimated from diameter measurements of cut stumps in sample plots vi. Monitored through investigation of MOP construction records or current road maps and remote imagery vii CONAF fire database and analysis of remote sensing data **Frequency** i., ii., iii. Each monitoring/verification event iv. Park guard surveys are continuous throughout the crediting period. Consultations with the district attorney's office conducted every < 2 years. v. every 5 years vi. No less than every 10 years vii. At least every 5 years, but more frequently if needed to align with verifications

Stakeholder identification and engagement

 **Stakeholders identified**	▪There are no communities living within the project area. However, 12 communities were identified with which the VCR has either a direct or indirect relationship. 5 communities have a direct relationship to or reliance upon the resources within the VCR. They are considered as direct local stakeholders, as they are dependent on natural resources both within the VCR (non-timber forest

		products principally) and adjacent to the VCR (marine and riverine fish, shellfish, and seaweed) ▪Other stakeholders include government institutions (including CONAF, and the MOP and local authorities), NGOs, tourists, and an academic institution
	Identification process	▪In 2000, an initial program directed by WWF articulated the social connection with conservation in the communities of the region ▪VCR staff conducted social assessments through past and ongoing meetings with the communities around the VCR to identify direct local stakeholders. Also the project has conducted public meetings organized with community leaders
Full and effective participation		
	**Access to information and consultation**	▪Prior to the acquisition of the VRC (i.e. project start data), key stakeholders in the communities were informed about the potential acquisition by TNC and asked about their concerns ▪Following the establishment of the VCR, meetings were held with local communities and all holders of life estates (October and November 2004), where the purposes of the VCR were explained, and participants were invited to bring forward any concerns or interests they might have relating to the development of the VRC ▪TNC has consulted >20% of potential users through the communities' democratically elected leadership, with whom the VCR staff interacts on a regular basis in the course of making management decisions about the project ▪A project summary was produced in Spanish with the aim of distributing door to door in the five communities of Chaihuín, Huiro, Huape, Cadillal Alto and Cadillal Bajo and to a range of other stakeholders ▪TNC collaborates with 10 community associations, which provide an important structure to facilitate communication between members and the VCR project
	Participation in design, implementation and monitoring	▪Initial project consultation with key stakeholders in the communities to shape the project design ▪Development of the VRC Management Plan in 2010 in collaboration with local area stakeholders ▪Employment of community members as park guards ▪Evaluation with the community organisations from Huape, Chaihuín, Cadillal and Huiro about their relationship with the VCR (March 2012) ▪TNC has invited and encouraged the communities to participate in the development of a social impact assessment of the project: meetings were organised with community leaders (March 2012)

	Feedback and grievance redress procedures	▪TNC has developed a protocol to describe the project's feedback and grievance redress procedures, which has also been disseminated in the Project Summary. The grievance system accepts both verbal and written forms. For minor complaints, the response is generated within 30 days of receipt of a request or grievance, and a register is kept of all such communications. For larger issues, meetings will be held to defuse the problematic issue based on mutual consensus. As needed, TNC seeks a third party mediator for these meetings ▪Following the initial consultations with communities, a number of concrete steps have been taken to address and resolve issues or concerns of stakeholders. These include recognition of traditional use of an existing access road and traditional land ownership. In addition, TNC hired a staff member specifically to guide coordination with local communities in 2004.
	Worker relations and safety	▪All TNC VCR personnel receive introductory training, which includes content related to professional ethics, institutional culture, legal rights, anti-discrimination laws ▪Review and compliance with applicable local, state and national laws with the advice and assistance of outside counsel at the Chilean law firm ▪The PD submitted to CCBA lists relevant Chilean laws, including labour laws ▪The project has a formal contingency plan in case of accidents, and park rangers are trained in carrying out these procedures, minimizing risks, and providing first aid ▪In 2006 TNC Chile became a member of the Chilean Security Association (ACHS), which provides coverage for any type of work-related accident and develops risk prevention programs for companies in Chile
Communities		
	**Without-project scenario**	▪The road construction and establishment of Eucalyptus plantations would drive high sediment loadings by clearcutting and burning of native forest, and damage significantly water bodies where community members rely on for drinking water or harvest shellfish as an important part of their economy ▪ A lack of institutional commitment by the government and by the former property owner to rural and indigenous community development would be expected to continue ▪Some local community members (approximately 18 people) could have expected to be employed for Eucalyptus plantation establishment and management

With-project scenario	**Expected net benefits** The project is expected to increase the social, natural, financial and human capital of the neighbouring communities, as follows: ▪Maintain and improve local livelihoods and economy through ensuring access to the reserve for sustainable collection of non-timber forest products, wood extraction and grazing, as well as new income-generating opportunities related to tourism ▪Provide nutrient and sediment reduction benefits to water bodies within the VCR ▪Bring community development services such as provision of potable water and waste management through supporting government institutions and implementation of collaborative projects ▪Provide training programme and capacity building for community development and resource management **Possible negative impacts on other stakeholders and mitigation strategy** ▪Tourism has the potential to change the social context of the communities in negative ways. Any changes or potentially negative impacts caused by ecotourism will be monitored. Tourist numbers will be monitored to ensure they stay within the capacity of the site. The flow of car and walking traffic will be carefully controlled through signage and walkways. ▪Use local guides and promote the strengthening of local culture by supporting microenterprises.
Impact monitoring	**Indicators** A series of indicators have been developed for social impact assessment to evaluate the achievement of the VCR´s social program objectives, which include the following 5 key themes: water and sanitation/health, education, employment/income generation/livelihoods, women's empowerment, and community / VCR relation **Methodologies** ▪Participatory approach; community members are invited to periodic reviews of community outreach activities ▪Community Monitoring Plan, which assesses differentiated impacts, including benefits, costs, and risks, for each of the Community Groups with an annual evaluation by the affected Community Groups **Frequency** Annually
Biodiversity and ecosystem services	
Without–project scenario	▪Deforestation due to the construction of highway (86 ha) and conversion of native forest to Eucalyptus

		plantations (1,187ha) in the baseline scenario would have negatively affected the native tree and plant species, as well as a host of animal communities that dwell within or migrate through the Valdivian forests. The VCR is home to 77 species of mammals, birds, reptiles, amphibians and fish, some of which are globally important
	With-project scenario	**Expected net benefits** ▪The native forest types would be protected, including the Olivillo coastal forest (Aextoxicon punctatum) and Alerce forest (Fitzroya cupressoides) ▪The habitat of several endangered and endemic wildlife species would be continually protected and increased. The endangered and endemic wildlife species that are likely to benefit from the project include: River Otter, Pudu, Mountain Monkey, Magellanic Woodpecker,Guina Cat, Darwin's Frog, Valdivian Toad **Possible negative offsite impacts and mitigation strategy** Potential negative impacts resulting from increased tourism (mitigation strategy is given above in community section)
	Impact monitoring	**Indicators** The VCR Conservation Plan (2005) developed by TNC has 13 conservation objectives and 33 corresponding strategic actions and monitoring indicators, including human activities, width of riverside/coastal native vegetation, forest land cover, species composition, tree density, amphibian population density, vegetable species, etc. **Methodologies and Frequency** There are a number of monitoring methodologies designed in the VRC Conservation Plan to measure the established 33 indicators. These include: ▪Trajectory approach for human activities (2 times/year) ▪Trajectory approach for species composition (1 time/ year) ▪GIS and aerial images analysis for vegetation cover (2 times/year) ▪Permanent sample plots of 20 m*20 m for tree density (1 time/2 years) ▪Permanent sample plots of 5 m*5 m for amphibian population density (1time/year) ▪Permanent sample plots of 20 m*20 m for vegetable species (1 time/3 years)
Progress		
	Validation	VCS validation report issue date: 09 April 2014 CCBA validation: undergoing

Verification	VCS verification period and report issue date: 04 November 2003 to 03 November 2011; 01 May 2014 4 November 2011 to 3 November 2014; 25 Nov 2015 CCBA verification: undergoing
Credits issued	Number: 127,332 As of: 20 November 2015

Further information

- TNC website:
http://www.nature.org/ourinitiatives/regions/southamerica/chile/explore/valdivian-coastal-reserve.xml
- VCS Project Database:
http://www.vcsprojectdatabase.org/#/project_details/1175
- CCBA website:
http://www.climate-standards.org/2015/10/05/avoiding-planned-deforestation-and-degradation-in-the-valdivian-coastal-reserve-chile/

Documents reviewed

From VCS project database

- VCS Project Description Version 02:
- VCS Validation Report Version 03: VO12064.00val
- VCS Verification Report Version 04: VO12064.00ver
- PD Annex 1 Forest Biomass Inventory Results for Valdivia Coastal Reserve revNov2012
- PD Annex 3 - Plan de Conservacisn Reserva Costera Valdiviana.pdf

From CCBA project database

- CCBA project design document:
- CCBA project implementation report