

QUANTIFICATION TOOLS FOR FOREST CARBON OFFSET PROJECTS

PROJECT SUMMARY

In 2008, the Climate Action Reserve issued its first offset credits to a forest carbon project. Since then, over 107 forest projects have registered nearly 53 million tons of carbon dioxide equivalent in offsets with the Reserve. Most of these projects are participating in California's Cap-and-Trade program. Yet many potential projects have not been brought to the market, in part because the upfront cost and effort required to develop a project and undergo independent third-party verification have been too expensive and time-consuming for many landowners.

Two of the biggest cost factors for a project are the development of the inventory of carbon stocks in the forest and the verification of that inventory. Depending on the project size, such costs can exceed \$100,000.

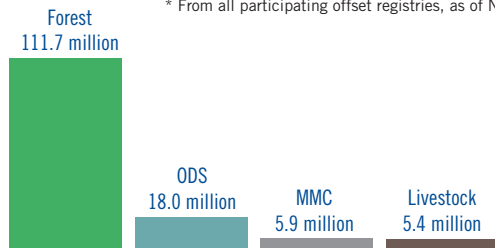
We set a goal of lowering such barriers to entry and increasing the financial viability of all projects. Through a Conservation Innovation Grant awarded by the USDA NRCS, we leveraged our experience working

with forest carbon offset projects for the past decade to develop forest carbon calculation tools and resources that improve clarity and efficiency in the project development, reporting, and verification process.

A forest carbon offset project is a set of planned activities that increases the amount of CO₂ being removed from the atmosphere and stored in trees and durable wood products, or decreases the amount being converted from storage and released into the atmosphere. Such projects may include replanting trees on a site that was once forest but was cleared for other uses or impacted by natural disturbances. It may also include changing how often trees are harvested and how forests are managed, with a greater focus on stocking control and older forests, leading to both more biomass in the forest and increased production of wood products. Forest projects produce a host of benefits in addition to those directly related to greenhouse gases, such as improvements to water quality and wildlife habitat.

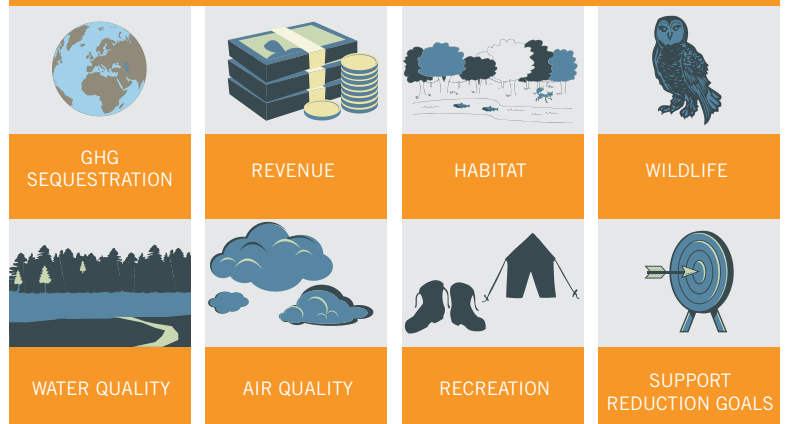
California Compliance Offsets Credits Issued

* From all participating offset registries, as of Nov 2018



Forest projects are one of the most important offset project types. Over 70% of the offset credits issued under California's Cap-and-Trade Program have been produced by forest projects.

Forest projects provide many benefits:

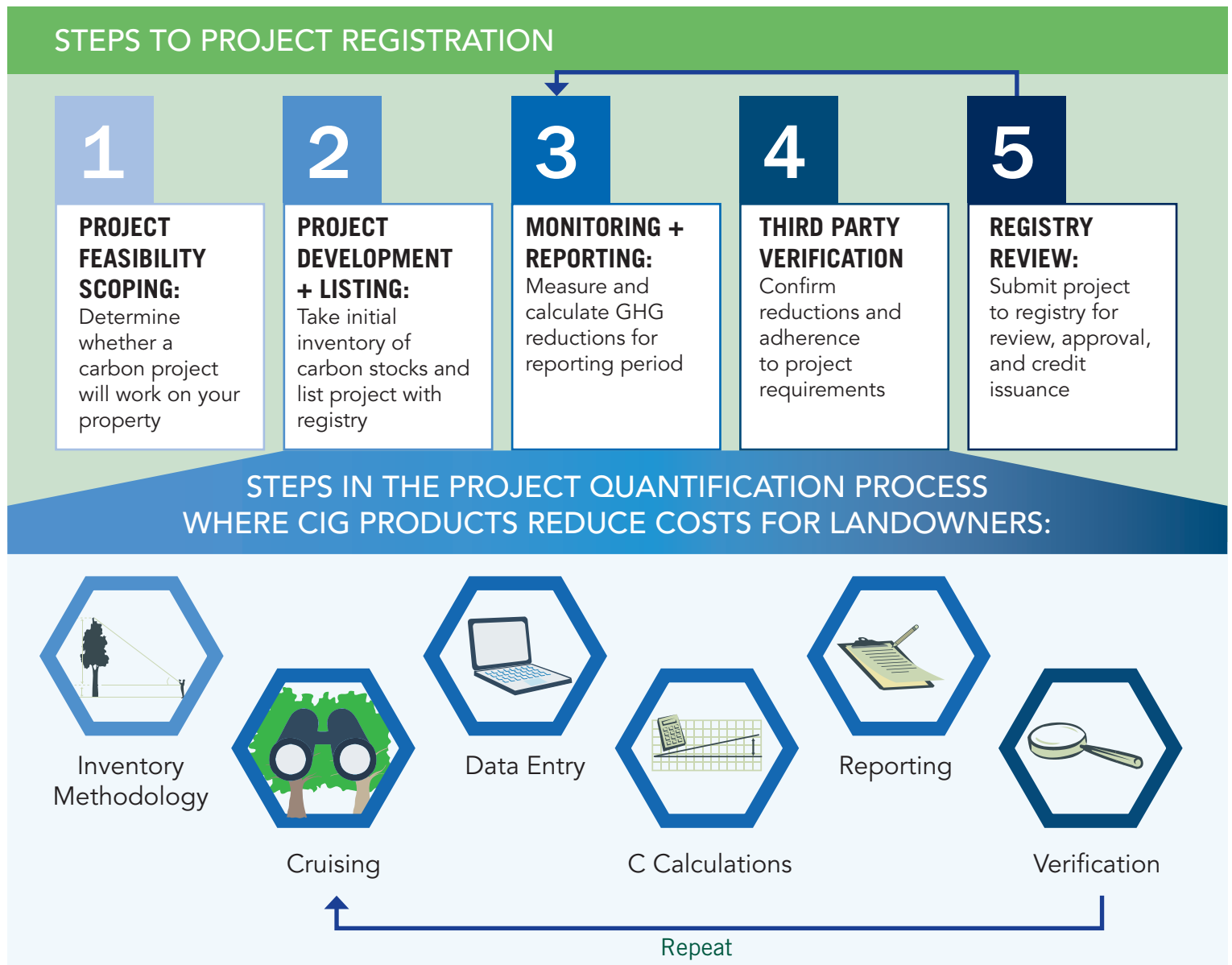


The process to develop and register a forest carbon project includes feasibility scoping, project development, monitoring and reporting, verification, and registry review and offset issuance - with monitoring, verification, and registry review repeated throughout the project lifetime.

Each step in the process represents a cost for the project owner. The main cost components are related to developing analytical tools to perform project analysis and ongoing monitoring, reporting, and verification. Initial development is a one-time cost that currently can easily exceed \$50,000. The ongoing costs for monitoring, reporting, and verification are regularly occurring costs that may require expenditures of over \$50,000 annually for the project lifetime.

Thanks to the NRCS, we have been able to develop a Standardized Inventory Methodology (SIM) that reduces inefficiencies, limits ambiguities, and provides more consistency from project to project, thus helping to streamline the reporting and verification process. We have also created a database tool, called the Climate Action Reserve Inventory Tool (CARIT), that allows project owners to manage, update, and grow their inventory data throughout the life of their project. CARIT also calculates carbon stocks automatically. As both the SIM and CARIT have been pre-verified, projects using them benefit from a simplified verification process with lower costs.

The use of these resources will greatly reduce the time, effort, and cost associated with forest carbon projects, thereby reducing barriers and increasing the benefits to participation for landowners.



PRODUCTS

Goal: Address cost issues and technical challenges of implementation to foster the development of more forest carbon projects

STANDARDIZED INVENTORY METHODOLOGY



With extensive experience and expertise in working with forest carbon projects, the Reserve recognized a need to improve clarity and efficiency in implementing forest inventory methodologies. Our **Standardized Inventory Methodology (SIM)** addresses that need by providing a ready-made sampling methodology that benefits from a simplified verification process, thereby reducing the costs, time, and effort involved.

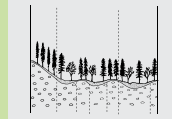
The SIM includes clear guidance to reduce ambiguities during implementation and verification of the inventory. It also addresses specific problems that arise during the project development and verification process

SIM

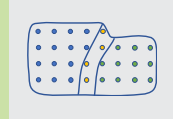
Main features—requirements or guidance for:



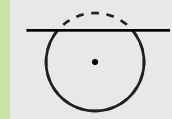
Fixed-area plot design



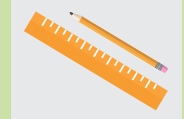
Strata boundary delineation



Plot location and establishment



Sampling along strata boundaries



Data collection methods



(e.g., trees growing between the time plots are sampled and when they are verified).

The SIM does not prescribe an exact specification for every inventory element. However, it does pare down the menu of available options for many components based on the successes (and trials) experienced by existing projects in the past.

No matter which options are chosen, the SIM is designed to conform fully to the requirements specified in the Reserve's Forest Project Protocol. Additionally, the SIM is suitable for use in a variety of forest types and provides the data required for use of the Climate Action Reserve Inventory Tool (CARIT).

CLIMATE ACTION RESERVE INVENTORY TOOL (CARIT)

A DATA MANAGEMENT TOOL TO **CALCULATE, GROW & REPORT** YOUR FOREST CARBON INVENTORY



Approved and validated tool to reduce time, effort, and costs for forest project development, management, and verification



Highly transparent, scientifically accurate, and able to facilitate complex analysis



Lowered cost and improved ease enables landowners to manage their carbon inventory in-house

The Forest Project Protocol requires each project to use specified quantification components, such as species- and region-specific volume and biomass equations. CARIT incorporates those required components and rolls them into a single tool for forest project developers.

CARIT also allows a project owner to manage a project's inventory over the entire life of the project by calculating carbon stocks each year and by accommodating changes to the forest inventory as they occur, such as the growth of trees (via a link to the USFS Forest Vegetation Simulator), harvests and other disturbances, and new field measurements.

Additional features of CARIT:

- Incorporates data collected under the Standardized Inventory Methodology
- Produces data required for project reporting and verification
- Validated by an independent verification body accredited by the Reserve so the quantification results are considered pre-verified
- Accessible MS Access database format
- Includes comprehensive user support, including a user manual, recorded demos, and training sessions, to help guide project owners through the use of CARIT

The intuitive interface and advanced calculation analytics in CARIT greatly improve the ease and efficiency of calculating forest carbon.

Climate Action Reserve Inventory Tool About CARIT

Project: North Coast Example
Description: CARIT Project

Strata	Plot Years	Plot #s
High C - Redwood	2018	1
Medium C - Oak		3
Medium C - Redwood		4
		5
		8
		9
		10
		15

Selecting a different stratum resets plot year selection
Delete key deletes the selected stratum

Click plot # to select/deselect

Calculate CO2

Grow Trees

Project Management

- New Project
- Import from Tables
- Delete Project
- Exp->xls
- Exp->tbl

View and Edit Data

- Strata
- Plots
- Trees

Year and Plot Management

- Delete Year
- New Year
- Copy Plot(s)
- Reassign Plot(s)

Reports

- Project CO2
- Strata CO2
- Plot CO2
- Tree CO2
- Omitted Plots
- Confidence Statistics
- Species Diversity

Settings

- Growth
- Data Checks

CLIMATE ACTION RESERVE

THE PATH FORWARD

REMAINING CHALLENGES

Technical: Although the SIM and CARIT will greatly reduce costs for landowners and open the door to the development of many more projects, the extent of their effectiveness will only be seen once they begin to be used in the real world. Though they have been reviewed and tested internally, the nuanced variability of projects in the real world will provide invaluable feedback to help us further improve the SIM and CARIT to better serve the growing community of project owners.

Marketing: Beyond such technical tasks, we face the challenge of creating public awareness of these tools and fostering their use. We will be promoting the SIM and CARIT via a variety of media and venues, such as the Climate Action Reserve website, newsletters, and social media, as well as webinars, workshops, and conferences. While some of this promotional work has already occurred, there is much more to come.

NEXT STEPS

We will be working over the coming months to continue rolling out and creating public awareness about the SIM and CARIT.

- SIM was officially released in June 2018
- CARIT will be released with the upcoming release of the Reserve's Version 5.0 of the Forest Project Protocol (draft released for public comment in November 2018, with final adoption anticipated in early 2019)

We will continue to refine and improve the SIM as it is used on the ground by project developers. We will also be enhancing CARIT and adding new functionalities to continue to increase the efficiency of projects and the verification process.

In addition to their use in the Reserve's voluntary offset program, we are promoting incorporation of the SIM and CARIT into the Compliance Offset Program of California's Cap-and-Trade Program to help increase the effectiveness and reach of that program.

ACKNOWLEDGEMENTS

Partners

The Climate Action Reserve is grateful for the support for this project provided by the NRCS, as well as by the Disney Corporation, The Climate Trust, and the Redwood Forest Foundation Inc. We would also like to thank Snowden Analytics LLC and Environmental Services, Inc. for the technical support they provided.

About

NRCS

This project was funded through NRCS Conservation Innovation Grants (CIG). CIG is a competitive grant program that stimulates the development and adoption of innovative approaches and technologies for conservation on agricultural lands. For more than a decade, CIG projects have addressed a wide diversity of topics and resource concerns, including soil health, irrigation efficiency, wildlife and pollinator habitat, water and air quality, greenhouse gas markets, on-farm energy use and conservation finance.

Climate Action Reserve

The Climate Action Reserve is the most experienced, trusted and knowledgeable offset registry to serve the carbon markets. With deep roots in California and a reach across North America, the Reserve encourages actions to reduce greenhouse gas (GHG) emissions and works to ensure environmental benefit, integrity and transparency in market-based solutions to address global climate change. The Reserve program promotes immediate environmental and health benefits to local communities and brings credibility and value to the carbon market. The Climate Action Reserve is a private 501(c)(3) nonprofit organization based in Los Angeles, California.