

Chapter 2

Overview of the Compliance Offset Protocol for U.S. Forest Projects

The Forest Offset Protocol lays out the requirements and methods for quantifying the net GHG emission and removals resulting from voluntary project activities undertaken on forested land. The ARB's compliance offset protocol was built off of the Climate Action Reserve's Forest Project Protocol Version 3.2 (CAR 2010). The Forest Offset Protocol covers three types of project activities, the carbon pools included in each project type, and requirements for project eligibility, monitoring, and commitments.

The start date, or *commencement date*, for all three types of projects is the date on which project activities are initiated (e.g., tree planting, recording a conservation easement, initiating forest management activities that increase sequestration and/or decrease emissions). All forest projects earn offset credits over a 25-year *crediting period* and, with ARB approval, are currently eligible for renewal for an additional crediting period under the then-current protocol version. All forest projects are also subject to a minimum *time commitment* of 100 years which requires that the sequestered carbon represented by the offset credit must remain sequestered for 100 years following issuance of the offset credit (California ARB 2015b).

2.1 Types of Forest Projects

Three types of forest projects qualify to earn offset credits eligible for AB 32 compliance California ARB (2015b), Sect. 2.1:

Reforestation (RF)—Projects restore tree cover on land that is not at optimal stocking levels;

Improved Forest Management (IFM)—Projects modify management activities on forested land in order to maintain or increase carbon stocks relative to baseline levels; and

Avoided Conversion (AC)—Projects prevent the conversion of forested land into non-forested land.

A single protocol defines the accounting methodology for all three types of projects and, with the exception of a few project-type-specific differences, the majority of the protocol applies to all three types of projects. The protocol is titled “Compliance Offset Protocol U.S. Forest Projects” but it is referenced in this document as the “Forest Offset Protocol” or “California ARB (2015b)”. This document references the most recent version of the protocol, adopted June 25, 2015, unless otherwise specified in reference to the earlier first version of the protocol that was adopted October 20, 2011 or to the version adopted November 14, 2014. A project earns offset credits by implementing activities that sequester more MtCO₂e than would have been sequestered without the project’s activities. These intended changes in carbon stocks are called the *primary effect* and are calculated as the difference between the 1-year change in actual carbon stocks and the 1-year change in baseline estimates of carbon stocks. Primary effects include both on-site carbon stocks (i.e. carbon stored in the forest) and carbon stored in wood products produced using timber harvested from the project site. The Forest Offset Protocol also requires accounting for a project’s *secondary effects*, which are defined in the protocol as unintended changes in carbon stocks (typically reductions) or greenhouse gas emissions and removals that result from project activities.

Aside from the type of activity represented by each project and certain project-type-specific calculations, the main differences in project accounting are found in the pools of carbon attributable to a project’s activities, collectively called sources, sinks, and reservoirs (SSRs). The SSRs define what GHGs are included in calculating the baseline and offset credits for different project types. All project types include standing live carbon (SSR 1), standing dead carbon (SSR 3), carbon stored in in-use forest products (SSR 7), and biological emissions from decomposition of forest products (SSR 17), as shown in Table 2.1. Some SSRs (e.g., SSR 6, SSR 8, and SSR 9) are only partly included, in some cases as part of either the baseline or project calculations, or in other cases only under certain circumstances. A few SSRs are specific to the type of project, such as mobile combustion emissions from site preparation activities (SSR 10) in reforestation projects, or biological emissions/removals from changes in harvesting outside the project area (SSR 14) in project accounting for improved forest management projects.

2.2 Eligibility Requirements for Projects

Beyond the type of activity a project involves, there are other eligibility requirements that must be satisfied in each year for a project to be considered eligible to earn offset credits. Among other tests, these common eligibility requirements include:

Table 2.1 Sources, sinks, and reservoirs counted in the compliance offset protocol U.S. Forest projects

SSR	Description	Gas	RF	IFM	AC
1	Standing live carbon (carbon in all portions of living trees)	CO ₂	X	X	X
2	Shrubs and herbaceous understory carbon	CO ₂	X		
3	Standing dead carbon (carbon in all portions of dead, standing trees)	CO ₂	X	X	X
4	Lying dead wood carbon	CO ₂			
5	Litter and duff carbon (carbon in dead plant material)	CO ₂			
6	Soil carbon	CO ₂	\	\	\
7	Carbon in in-use forest products	CO ₂	X	X	X
8	Forest product carbon in landfills	CO ₂	\	\	\
9	Biological emissions from site preparation activities	CO ₂	\	\	\
10	Mobile combustion emissions from site preparation activities	CO ₂	X		
11	Mobile combustion emissions from ongoing project operation and maintenance				
12	Stationary combustion emissions from ongoing project operation and maintenance				
13	Biological emissions from clearing of forestland outside the Project Area	CO ₂	X		X
14	Biological emissions/removals from changes in harvesting on forestland outside the Project Area	CO ₂		\	
15	Combustion emissions from production, transportation, and disposal of forest products				
16	Combustion emissions from production, transportation, and disposal of alternative materials to forest products				
17	Biological emissions from decomposition of forest products	CO ₂	X	X	X

Notes: RF, Reforestation; IFM, Improved Forest Management; AC = Avoided Conversion

X, included in both baseline and project; \, Included partially or contingently

Source: California ARB (2015b), Sect. 5

Land Ownership—Reforestation and Improved Forest Management projects may be located on land owned either privately or publicly by a state or municipal government. However, Avoided Conversion projects must be located on privately owned land unless ownership is transferred to a non-federal public entity as part of the project. Projects developed on tribal lands are subject to a limited waiver of sovereign immunity between ARB and the governing body of the tribe.

Presently, projects undertaken on federally owned land are not eligible for participation in California's cap-and-trade program for a variety of reasons, perhaps foremost of which is legal and administrative ambiguity. Federal agencies would likely need explicit authority to transfer rights to claims regarding GHG impacts, to encumber federally owned land as required under the protocol, and to engage in transactions for the sale and transfer of offsets. Questions have also been raised about the potential impact on private market participants from the potentially large increase in supply possible from inclusion of offset projects on federal lands and about whether or under what circumstances could projects on federal lands truly be

considered additional. Also, there remains some uncertainty regarding recourse in the event a project on federal land experiences a reversal (Smith 2012).

Geographic Location—Only projects located in the contiguous United States, U.S. Territories, Canada, or Mexico are eligible for participation. Projects in Alaska and Hawaii are not eligible due to lack of region-specific data.

Project Start Date—With the exception of early action offset projects, eligible project activities must have been first implemented after December 31, 2006 and must meet registration and filing deadlines.

Legal Compliance—All offset projects must fulfill local, regional, and national legal requirements on environmental impact assessments applicable to the offset project location. An offset project must be in compliance with local, state, and federal environmental, health, and safety laws and regulations. Lack of regulatory compliance during a reporting period means project activities are ineligible to receive ARB or Registry Offset Credits for the reporting period, as explained further below.

There are also project-type-specific eligibility requirements. For instance, a project is only eligible to earn credit for Reforestation if the forest has had less than 10% tree canopy for a minimum of 10 years. Existing forests qualify under Improved Forest Management and Avoided Conversion, but eligibility under Avoided Conversion requires a project to demonstrate a significant threat of forest loss and quantify the difference between the value of the threatened forestland in its current use and the value of the land after conversion to some category of non-forest use to determine the quantity of offsets a project is eligible to earn.

2.3 Offset Principles

The Forest Offset Protocol and underlying ARB regulations governing the use of offsets in the cap-and-trade program are intended to create a system for GHG mitigation that has transparency, reliability, and integrity. Some governing principles applied to offsets from forest sequestration and other project activities in support of these systematic objectives include methods intended to ensure that offsets earned by project activities are additional, permanent, verifiable, and enforceable.

The additionality requirement specifies that all project activities resulting in GHG emission reductions or sequestration should not have occurred in the absence of the project, and that these activities result in GHG mitigation above and beyond what would have occurred under the business-as-usual scenario.

Permanence means that GHG reductions/removals cannot be reversed and carbon cannot be emitted back into the atmosphere (Yonavjak et al. 2011). Under the Forest Offset Protocol, this requirement is ensured through three mechanisms:

Permanence Requirement—Ensures that all credited GHG emission reductions and removals are maintained for a period of 100 years through routine monitoring, reporting, and verification;

Reversal Obligation—Imposes a regulatory obligation for all intentional reversals of GHG reductions that requires compensation through retirement of compliance instruments; and

Risk Management—Requires projects to contribute a percentage of all issued ARB Offset Credits to a pool of offsets, called the Forest Buffer Account, that is used to replace any offsets whose underlying activity has been subject to an unintentional reversal (e.g., natural disturbances such as fires, pest infestations, or disease outbreaks).

To be verifiable, projects must provide a reliable, quantified account of carbon stocks and carbon flows over time. Projects must periodically monitor onsite carbon stocks, submit an annual *Offset Project Data Report* (OPDR), and undergo third-party verification of reports with site visits at least every 6 years for the duration of the project.

These governing principles should be effective in achieving the program's systematic goals if they are enforceable. The compliance offset protocols and accompanying regulations prescribe a variety of penalties and other mechanisms to ensure that all offsets used to meet a compliance obligation in the California cap-and-trade program have an additional, verified, and permanent GHG emission reduction or sequestration activity supporting them, even in the event project activities are reversed.

2.4 Monitoring, Reporting, and Verification

Offset projects developed under the Forest Offset Protocol must be verified at least every 6 years in order for the issued offset credits to remain eligible for use in complying with the California cap-and-trade program. Note that there are some exceptions to this timetable: verification of the first Offset Project Data Report must occur within 9 months of the end of the first reporting period, or first operating year; and, for reforestation projects only, the second verification may be deferred for 12 years if the inventory was deferred, and then occur every 6 years thereafter. Projects must receive a positive verification statement by an ARB-accredited third-party verification entity. Forest projects “must continue to monitor, report, and verify offset project data for the duration of the project life,” (California ARB, 2015a, p. 31), where project life lasts 100 years beyond the issuance of any credit (California ARB, 2015a, p. 7). Monitoring includes updating a project's modeled forest carbon inventory each year, ongoing sampling and updating sample sites at least every 12 years, and keeping a complete inventory of carbon stocks for the life of the project (i.e. 100 years).

Each year the forest offset project prepares an Offset Project Data Report that is submitted to the ARB and offsets are issued to the project annually based on the OPDR. When the project undergoes verification all OPDRs submitted since the previous verification are reviewed and variations in the offset quantity verified and quantities previously reported in the OPDRs are subject to a true-up.

Verifications may also be conducted more frequently than every 6 years. When a project undergoes verification every 6 years, the ARB has the ability to invalidate the issued offsets under certain circumstances for a period of 8 years. However, the statute of limitations on invalidation of issued credits can be reduced to 3 years if a project undergoes verification every 3 years and each verification is conducted by a different offset verification body than the previous verification.

Offset credits can be invalidated by the ARB if an OPDR is found to contain errors that overstate the amount of GHG reductions or removals by more than 5%; if the project was not in compliance with all local, state, and national environmental and health and safety regulations during the reporting period; or if offset credits were issued in any other program within the same offset project boundary during the same reporting period (CCR 2014). In the event of invalidation of issued credits, all invalidated offset credits are removed from the CITSS, but only those offset credits that have been “retired” or submitted into a CITSS retirement account for compliance, must be replaced with either a valid offset credit or another compliance instrument. The burden of replacement falls on the entity that requested the offset credits be transferred into the retirement account. Failure to report data or undergo verification at the required intervals automatically terminates a forest project.

2.5 Commitments and Penalties

Because carbon stored in a biogenic sink such as a forest might eventually return to the atmosphere, forest-based sequestration is not permanent in the same way that destruction of ozone-depleting substances or methane is permanent. For purposes of the Forest Offset Protocol, the permanence principle is achieved by establishing a 100-year permanence-equivalent time period during which carbon sequestered in a participating forest must remain sequestered from the time the offset credit is issued.

When a project fails to maintain sequestration of an MtCO₂e for the 100-year commitment period (i.e. the sequestered carbon is released back into the atmosphere) a reversal has occurred. A reversal occurs for any reporting period in which the change in actual carbon stocks is less than the change in baseline carbon stocks, with the exception that in cases where a project has not previously been issued offset credits the project carries forward the negative GHG impacts and will not earn offset credits until it has a net positive GHG impact. Some specific causes of reversals qualify as unintentional if caused by some uncontrollable agent (e.g., wildfire, disease, insects, etc.), but all other reversals are considered intentional, including those caused by some deliberate act, such as forest owner negligence, gross negligence, or willful intent; for example, over-harvesting or land conversion are considered intentional reversals.

The notion of defining a reversal based on a calculated value is noteworthy since the actual on-site carbon stocks are estimated in a periodic inventory process that relies on statistical sampling. A fundamental aspect of this estimation method is the use of sampling error in the inventory estimate to reduce a project’s carbon stock

estimate by applying a multiplier for a confidence deduction. The confidence deduction reduces the inventory estimate of actual on-site carbon stocks based on the sampling error of the inventory estimate. The reduction is 0% for a sampling error of 5% or less but increases for sampling error rates between 5.1% and 19.9% (i.e. a sampling error of 5.1% results in a confidence deduction of 0.1%). A sampling error of 20% or greater results in a 100% confidence deduction. The confidence deduction is updated with each verification and applied retroactively to all years undergoing verification. Any change in, or incorrect determination of, the sampling error (e.g., reduced sampling over time, loss of a qualified sampling plot, etc.) could retroactively alter a project's previously calculated quantity of GHG removals, even to such an extent as to cause an intentional reversal.

Reversals result in project termination if the reversal lowers the project's actual standing live carbon stock below the baseline level of standing live carbon stock. When a project is terminated a compliance instrument must be retired for every offset credit the project has been issued in the previous 100 years. In the case of an unintentional reversal the ARB retires offset credits from the *Forest Buffer Account*, but when terminated due to an intentional reversal the burden of retiring compliance instruments falls on the project owner. After an unintentional reversal results in project termination, a new project may be initiated within the same offset project boundary as the terminated project; however, new offset projects within the same project boundary are prohibited if a project is terminated for any reason other than an unintentional reversal.

Intentional reversals place a compensation burden on the forest owner. In the case of Avoided Conversion or Reforestation projects the project is only responsible for retiring a number of compliance instruments equal to the number of offset credits issued to the project over the previous 100 years. However, Improved Forest Management projects must not only retire the MtCO₂e credited to the project but may also be charged a penalty of between 5% and 40% of the offset credits issued to the project if the reversal occurs during the first 50 years.

2.6 Project Timeline

A project commences on the earliest date activities resulting in GHG reductions or removals are implemented. After a project is registered with the ARB, a cursory eligibility review is conducted, and the process of preparing project documentation begins. This process includes an initial inventory, an estimate of baselines, and calculation of risk factors. After the project's first year, the initial verification must be completed within 13 months, and then begins a cycle of annual reporting and submission of OPDRs. Periodically, but at least every 6 years, the OPDRs and other monitoring data undergo verification. And, during this time the sampling sites used to develop the project's inventory of carbon stocks must be resurveyed at least every 12 years.

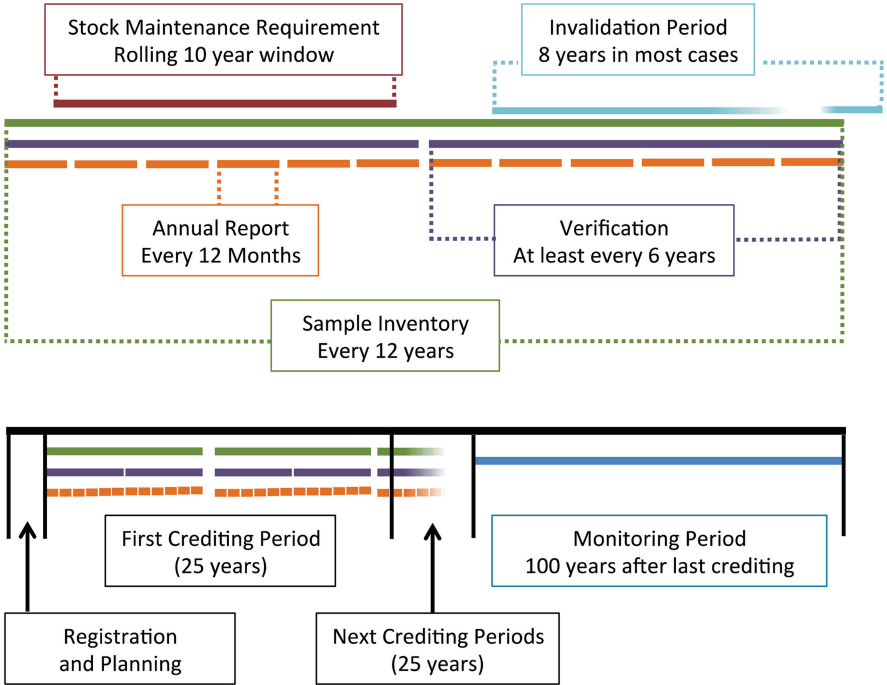


Fig. 2.1 Project time line

As shown in Fig. 2.1, these cycles take place for the duration of the first 25-year crediting period, and can continue if the project is renewed. If the project is not renewed at any point, the project moves into a non-crediting monitoring period during which the project is monitored to ensure that the carbon stock is maintained. This monitoring continues for a period of 100 years from the time the last offset credits were issued. During both the crediting period and the monitoring period, the stock must be maintained on a rolling 10 year window, offset credits are subject to invalidation during the applicable timeframe, and project remain subject to reversal.

Understanding and Analysis: The California Air
Resources Board Forest Offset Protocol

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