The Role of Reforestation in Carbon Markets

A Review of Climate Forward’s Reforestation Forecast Methodology V2.0

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Speakers

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Agenda

- Introduction to Climate Action Reserve and Climate Forward
- Overview of Reforestation Forecast Methodology
- Q&A
Introduction to Climate Action Reserve & Climate Forward
Climate Action Reserve

Regulatory-quality standard setting and credit generation

Publicly accessible web-based system

Comprehensive protocol development process

Working to ensure integrity, transparency, and financial value in the North American carbon market
Climate Forward accelerates action on climate change by encouraging investment in projects that mitigate future greenhouse gas emissions.
Climate Forward: 
_a carbon project registry_

Issues Forecasted Mitigation Units (FMUs) to projects that follow Reserve-approved methodologies

- Follows ISO 14064-2 and GHG Protocol for Project Accounting Standards
- Credits issued about one year after project commencement, for the forecasted climate benefit over the project’s lifetime
- No long-term, ongoing monitoring, reporting and verification requirements

Expands the scope and scale of carbon project types

- Enormous potential for diverse, creative climate solutions

Tracks FMUs ownership and project activities in a publicly accessible database

- A registry of forward-looking GHG reductions to balance against forward-looking GHG impacts
Accelerating Climate Mitigation: CLIMATE FORWARD

**Offsets / CRTs**

Climate Reserve Tonnes

1 CRT = 1 tCO₂e of achieved reductions/removals

*Ex post*

**FMUs**

Forecasted Mitigation Units

1 FMU = 1 tCO₂e of anticipated reductions/removals

*Ex ante*

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tCO₂e = tonne of carbon dioxide equivalent
Overview of Reforestation Forecast Methodology
Revisions from Reforestation Forecast Methodology V1.1 to V2.0

- Introduction of programmatic monitoring
- Clarification on future voluntary monitoring options, including transitioning to the Reserve’s voluntary offset program
- Guidance for selecting default projections and proposing new projections
- Increased clarity and flexibility around conservation easement-related provisions
- Guidance regarding stacking with ecosystem services payments
- Addressed effects of pre-existing trees/seedlings/shrubs on baseline quantification
- Incorporation of soil carbon increases (limited situations)
- Revisions to standardized discounting
- Adjustments for non-seedling-based planting projects
Methodology introduction

Accounts for carbon sequestration associated with the restoration of forest cover on sites where trees are not regenerating on their own. Credits issued on an ex ante basis.

Establishes eligibility rules, methods to calculate expected GHG removals, and procedures for reporting project information to the Reserve.

Provides guidance for independent confirmation by a Reserve-approved confirmation body selected by the project proponent.
Ex ante crediting shifts the project economics, helping to cover initial reforestation costs.
Project Proponent

An entity that is issued FMUs and is ultimately responsible for all project reporting and confirmation and has exclusive claim to C removals from the project.

Project proponent is assumed to be owner of the land and trees.

If not, must provide agreement with landowner granting the right to be issued credits to project proponent. Allows for aggregation across multiple landowners.
Overview of Reforestation Forecast Methodology

Eligibility
Start Date & Crediting Period

Start date
First date that trees are planted or site preparation initiated

Submission deadline
Must be submitted for listing within 12 months of start date

Crediting period
Period for which future projections of sequestered carbon are recognized for crediting
Varies based on forest community and land ownership, up to 100 yrs
Linked to permanence
Project Location

Unlimited geography with approved tree seedling growth projections

- Currently forest communities in the US are approved
- Project proponents may propose additional forest community projections for approval for a fee

Appropriate for reforestation

- Site is ecologically appropriate for forest cover
- Intervention is necessary to establish forest cover
- Site is not at high risk for conversion to non-forest use
Environmental & Social Safeguards

Must support/enhance native ecosystems

Initiate forest composed of diversity of native tree species

For communal lands: free, prior and informed consent required

Encouraged to voluntarily report any non-GHG benefits, including any alignment with the United Nations’ Sustainable Development Goals
## Additionality

<table>
<thead>
<tr>
<th>Performance standard test</th>
<th>Not under forest cover for at least 10 years, or</th>
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<tbody>
<tr>
<td></td>
<td>Affected by natural disturbance within past 10 years, resulting in &lt;25% canopy cover</td>
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<tr>
<td>Legal requirement test</td>
<td>Project activities must not be legally required</td>
</tr>
<tr>
<td></td>
<td>Conservation agreements requiring reforestation must not pre-date the project start date by one year</td>
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<tr>
<td>Enhancement payment stacking</td>
<td>Submitting a project based on the same practices that are being funded by the government or other parties via grants, subsidies or other similar payments, including ecosystem services payments</td>
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<tr>
<td></td>
<td>Generally, not prohibited but must obtain approval and guidance from the Reserve</td>
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<td></td>
<td>If full cost is covered, likely not additional</td>
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Permanence

Climate Action Reserve’s standard:

Climate benefits of GHG removals are realized when removals are permanent

100 years = permanent

How to apply this standard within an **ex ante** framework?
Permanence

Tonne-Tonne Accounting

• 1 t CO$_2$ sequestered = 1 FMU
• When assured additional C will remain sequestered 100 years

Tonne-Year Accounting

• Recognizes time-value of CO$_2$ sequestered through end of crediting period
• 1% of 100-year climate effect issued per year tonne remains sequestered (0.01 FMU per tonne per year)
• When C will remain sequestered for <100 years
Projections show expected increases in timber volume and C stocks

Ideally, stocks would be maintained for 100 years after being sequestered

Permanence
Permanence

Perpetual conservation agreement/easement

100-year permanence is assured

1 tCO2e = 1 FMU & 100-yr crediting period

Similar for public lands managed to maintain forest cover, but crediting period typically shorter
## Conservation agreement terms

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Description</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agreement holder</td>
<td>Agreement held by qualified conservation agreement holder that is a governmental agency or a non-governmental accredited by relevant governing body, where applicable (e.g., Land Trust Alliance)</td>
<td>Conducts long-term monitoring of conservation agreement terms</td>
</tr>
<tr>
<td>Forest cover</td>
<td>Project area must be dedicated to forest cover</td>
<td>Required for at least the length of the permanence period for the project</td>
</tr>
<tr>
<td>Reforestation after disturbance</td>
<td>If site experiences a natural disturbance (e.g., wildfire) with &gt;50% tree canopy loss, site will be reforested</td>
<td>Allows for passive reforestation (letting trees regrow on their own). Reforestation required after each of at least two such disturbances.</td>
</tr>
<tr>
<td>Harvest limits (optional)</td>
<td>During crediting period, harvesting only for forest health, safety or salvage; must increase quadratic mean diameter of trees; may not reduce canopy cover &lt;60% on any 10 acres</td>
<td>Harvest limits must be applicable for the length of the crediting period, after which harvest must be limited to growth</td>
</tr>
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<td></td>
<td></td>
<td>If not included, project-specific modeling must be performed based on any included harvest limits</td>
</tr>
</tbody>
</table>
Permanence

If 100-yr storage not assured, crediting period limited based on risk of reversal from timber harvest

Likelihood of harvest increases once trees reach merchantable sizes and/or growth rates decline

Heightened likelihood of harvest/reversal

$ tCO_2e$

Years

0

0

100
Permanence

If 100-yr storage not assured, crediting period limited based on risk of reversal from timber harvest. Likelihood of harvest increases once trees reach merchantable sizes and/or growth rates decline. End of crediting period = point of increased likelihood of harvest & Tonne-year accounting applied: 1% for each year each tCO₂e expected to remain sequestered.
Project Performance

Additional measures to ensure projected C stocking achieved and provide FMU integrity

Confirmation occurs at least 1 year after seedling planting/site prep

Standard deductions applied to ensure programmatic integrity

<table>
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<tr>
<th>Intent</th>
<th>Programmatic Ex Ante Risk Discount</th>
<th>Permanence Risk Pool Contribution</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Address risk of project being intentionally abandoned (e.g., harvest, conversion) or underperforming relative to projections</td>
<td>Address risk of unintentional reversals (e.g., wildfire), similar to buffer pool contributions for offset program</td>
</tr>
<tr>
<td>Deduction</td>
<td>Maximum of 10%, scaled to length of crediting period relative to 100 years (e.g., 50yr crediting period → 5% discount).</td>
<td>Maximum lowered to 5% if incorporating conservation agreement with minimum terms that help to secure ongoing forest cover</td>
</tr>
</tbody>
</table>
Overview of Reforestation
Forecast Methodology

Quantification
Quantifying GHG Removals

Comparison of project stocks to baseline stocks, projected forward throughout the crediting period

- **Project Stocks**
  - Projected growth of live tree stocks
  - Increase in soil carbon, if eligible

- **Baseline Stocks**
  - Deductions applied to project stocks for:
    - Pre-existing trees/seedlings
    - Baseline shrubs (only if decrease is expected)

- **Secondary Effects**
  - Mobile emissions from site preparation equipment
  - Leakage emissions from land-use displacement

- **Standard Deductions**
  - Programmatic Ex Ante Risk Discount
  - Permanence Risk Pool Contribution
Live Tree C Quantification

Based on growth projections—defaults provided by the Reserve

Guidance for selecting default projection(s) to use:

- Species composition (forest type)
- Tree establishment conditions (e.g., planting density)
If no matching default projection or default seems inappropriate, new projection(s) may be proposed.

Reviewed and approved by the Reserve.

Use of approved model (project-specific projections).

Demonstrate how modeling is appropriate and conservative.

If proposing use of tonne-year accounting in new jurisdiction, must also propose how crediting period length is determined, based on increased likelihood of harvest.
Conservation agreement may include timber harvest limits designed specifically for management goals of landowner.

Must include all other required terms in conservation agreement.

Use approved growth model to project changes to future live tree C.

Demonstrate how modeling is appropriate and conservative.

Model harvesting as aggressively as possible under the conservation agreement.
**Project Soil C Quantification**

Soil C can be included for credit quantification

Only applicable under specific circumstances
- Initially, only mine reclamation sites
- Others may be eligible in the future (e.g., mangrove reforestation)

Conservative default soil C sequestration rates applied
Baseline Tree Assessments

Percentage deduction applied to project C stocks

Pre-existing trees

- Canopy cover assessment using i-Tree Canopy
- % deduction based on % canopy cover

Pre-existing natural regeneration (seedlings)

- Only for no site preparation performed
- Pre-planting photo plots
- % deduction based on expected contribution to future forest cover (pre-defined categories)
Baseline Shrub Quantification

Conservative safeguard
No credits awarded for increases in shrub stocks, only a deduction for decrease in stocks

Estimate pre-project shrub stocking
- Shrub cover assessment via i-TREE Canopy
- Estimate of average shrub height (by 3-foot height classes)
- Default biomass-to-area ratio by height class

Results compared to projected shrub stocking

- Pre > Project → No Deduction
Quantifying GHG Removals

GHG removals/FMUs are calculated in the Reforestation Communities Data File

Input required:

- Landowner type
- Length of conservation agreement (if applicable)
- Forest type and area
- Baseline trees
  - Canopy trees
  - Natural regeneration
- Shrub cover (pre- and post-start date)
- Soil C inclusion eligibility
- Activity-shifting leakage rate
Overview of Reforestation
Forecast Methodology

Reporting and Confirmation
### LISTING:

- Project Submission form
- Reforestation Project Goals form
- Reforestation Project Conservation Agreement Screening Form (if applicable, not made public)
- KML (map) file of project area

### CONFIRMATION:

- Signed Attestation of Title form
- Signed Attestation of Legal Additionality form
- Signed Attestation of Regulatory Compliance form
- Project Implementation Report (PIR)
- Reforestation Communities Data File
- Confirmation Report, and Confirmation Statement
- From Confirmation Body: confirmation plan, sampling plan, and list of findings (not made public)
Confirmation

Must wait at least 1 year after completion of planting or site preparation activities

- Allows confirmation body to evaluate viability of newly established trees
- If seeds were planted, confirmation must wait until trees have an average height of 6 inches

Desktop review to evaluate PIR and companion documents

- Eligibility requirements
- Tree and shrub cover assessments
- Natural regeneration photo plots

Site visit to confirm reforestation activities

- Project area
- Seedling species diversity
- Density of viable seedlings – sampling by confirmation body determines if there is sufficient stocking, consistent with projections
Ongoing Monitoring Options
Ongoing Monitoring Options

Climate Forward does not require ongoing monitoring, reporting and verification of projects beyond initial FMU issuance.

BUT the Reserve will be conducting programmatic monitoring of projects and, if deemed necessary to ensure the integrity of FMU issuances, adjusting the credits in the permanence risk pool (analogous to offset buffer pool) and modifying relevant methodologies.

Project proponents may also optionally undertake any of the following:

- Transition of FMUs and/or project to offset program for offset credit (CRT) issuance
- Voluntary monitoring incentive (verification for additional FMU issuance)
- Voluntary ongoing monitoring incentive (verification for additional FMU issuance)
- Voluntary monitoring (reporting only)
## Ongoing Monitoring Options

<table>
<thead>
<tr>
<th></th>
<th>Voluntary monitoring (reporting only)</th>
<th>Voluntary Ongoing Monitoring Incentive</th>
<th>Transition of FMUs/Project to Offset Program</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Purpose</strong></td>
<td>Provide project status updates for transparency purposes</td>
<td>Show project has outperformed original FMU issuance</td>
<td>Transfer FMUs and project to the Reserve’s voluntary offset program</td>
</tr>
<tr>
<td><strong>Registry</strong></td>
<td>Climate Forward</td>
<td>Climate Forward</td>
<td>Climate Forward → Climate Action Reserve</td>
</tr>
<tr>
<td><strong>Monitoring/Reporting/Verification</strong></td>
<td>Information provided to Climate Forward (optional template to be provided); Reviewed by Reserve staff for reasonableness; No confirmation/verification</td>
<td>Monitoring data provided to Climate Forward and undergo third-party verification; Requires guidance and approval from Reserve staff</td>
<td>Project must meet all monitoring, reporting and verification requirements of the complementary offset protocol</td>
</tr>
<tr>
<td><strong>Impact on existing credits</strong></td>
<td>No impact</td>
<td>No impact</td>
<td>Unretired FMUs transitioned to CRTs (up to amount verified)</td>
</tr>
<tr>
<td><strong>New credits issued</strong></td>
<td>Not applicable</td>
<td>FMUs</td>
<td>CRTs, including potential for additional CRTs for amount verified in excess of original FMU issuance</td>
</tr>
</tbody>
</table>
**Ex ante and ex post options**

**Ex ante crediting**
- Issue ex-ante credits once trees are confirmed to have been planted.
- Crediting at Year 0 based on projection of forest growth under tonne year.

**Ex post crediting (optional)**
- Ex post monitoring continues on 6 or 12-year cycle for balance of 100-year crediting period.
- Ex post MRV and issuance of CRTs.

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**Radiative Forcing**

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Stocking (t CO₂ per acre)</th>
<th>Costs</th>
<th>Revenues</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>50</td>
<td>50</td>
<td>$</td>
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<tr>
<td>100</td>
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**CLIMATE FORWARD**

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How to Activate the Methodology in New Jurisdictions
Activating the Methodology in New Jurisdictions

Need default projections for C stock increases for forest types in new jurisdiction or project-specific modeling proposed by project proponent for US: default projections developed by US Forest Service or proposed by project proponent using FVS.
Activating the Methodology in New Jurisdictions

Criteria for approving new default projections

Source
- Government agency, or
- Peer-reviewed journal article

Description of modeling (model, parameters, and assumptions)
- Forest type/species
- Planting density
- Site productivity
- Geographic/climatic conditions

Description of
modeling (model, parameters, and assumptions)
Additionally, criteria for determining crediting period length must be established, based on combination of:

- landowner classes
- forest types
- economic considerations (tree size; rate of return vs. growth rate)
Questions?
Thank you!

Contact us: info@climateforward.org

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