CLIMATE FORWARD

Mature Forest Management Forecast Methodology

Overview Webinar

April 15, 2020

Agenda

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Program Overview

The Mature Forest Management Forecast Methodology

1. Introduction
2. The GHG Reduction/Removal Project
3. Eligibility Rules
4. The GHG Assessment Boundary
5. Quantifying GHG Emission Reductions/Removals
6. Project Implementation, Monitoring, and Reporting
7. Confirmation Guidance

Questions

PROGRAM OVERVIEW

Climate Action Reserve

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GHG Accounting Experts

- Pioneered standardized GHG accounting, leading to robust, reliable, and transparent compliance and voluntary carbon markets
- 78% of North American offset credits used by companies and individuals in 2017 in the voluntary market* are issued by the Reserve
- Design innovative GHG accounting frameworks that are user-friendly, and financially feasible

Beyond Carbon Offsets

- **Climate Forward**
- Climate Impact Score
- GHG policy consulting
  - Mexico
  - Ontario
  - Quebec
  - World Bank, USDA, USAID
  - California agencies, and more

CLIMATE ACTION RESERVE

**Ecosystem Marketplace 2018 data*

Climate Forward audience

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Companies and organizations mitigating future emissions	Examples of future mitigation needs
Any new operational or project investment creating GHGs • e.g., anticipated emissions identified via CEQA analysis process *Not appropriate* for addressing current emissions in a compliance program • e.g., cap-and-trade *Not appropriate* for mitigating historical emissions • Cannot mitigate past emissions with future actions	New manufacturing facility New data center New retail complex New residential/commercial developments New transportation projects Facility expansions Operational expansions

Why forward crediting?

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A new expanded paradigm, reducing barriers to entry for innovative, targeted climate solutions that can also achieve sustainability goals beyond climate impacts

- Ex ante crediting has been happening for many years
- Customized climate projects with specific ***co-benefits*** tailored to align with organizational goals and values
- ***Local*** projects in communities directly affected by operations
- New opportunities: demonstrate climate ***leadership***

Climate Forward

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Invest now in emissions reduction projects to mitigate future emissions

- **1 FMU = one metric ton of anticipated CO_2e reduction, to counter anticipated GHG emissions**

Expands the scope and scale of feasible climate action across the economy

- **Enormous potential for diverse, creative climate solutions**

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

- **Follows ISO 14064-2 and GHG Protocol for Project Accounting Standards**
- **Issued on average one year after project commencement**

Tracks FMUs 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

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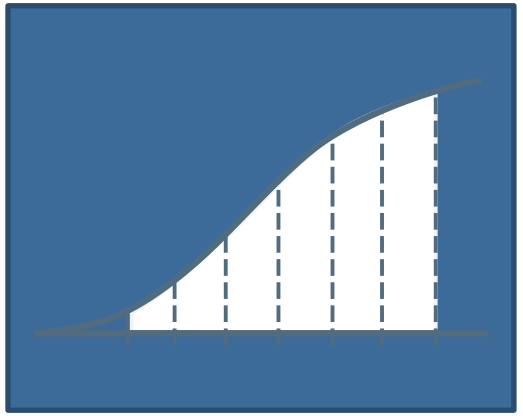
Offsets

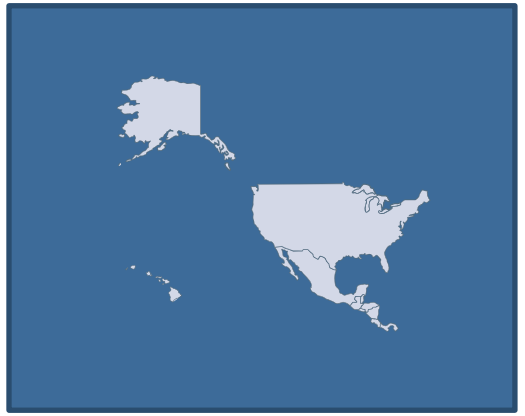
Climate Reserve Tonnes

1 CRT = 1 tCO_2e of achieved reductions



Issued for achieved GHG removals

Used to mitigate any emissions



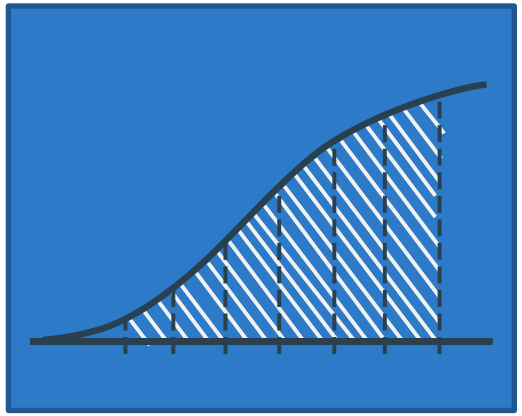
Protocols available for US- and Mexico-based projects

Reserve develops protocols for the offsets it issues

FMUs

Forecasted Mitigation Units

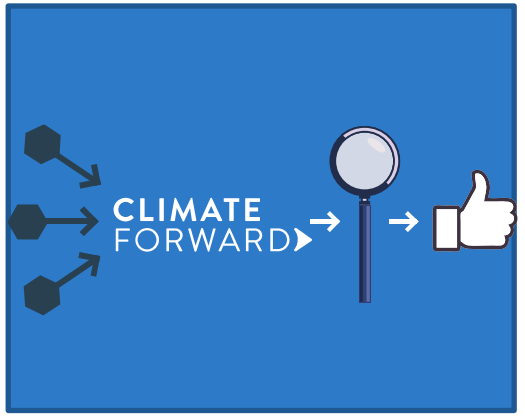
1 FMU = 1 tCO_2e of anticipated reductions



Issued for **forecasted** GHG removals

Used to mitigate anticipated emissions

Projects may be located anywhere in the world



External parties may submit forecast methodologies

tCO_2e = tonne of carbon dioxide equivalent

Section 1

INTRODUCTION

1. Methodology introduction

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Mature Forest Management (MFM) Forecast Methodology accounts for increased carbon sequestration associated with **the management of existing forests for larger, older trees.**

Methodology provides: eligibility rules, methods to calculate expected GHG reductions/removals, and procedures for reporting project information to the Reserve.

Projects receive **independent confirmation** by a Reserve-approved confirmation body (CB) selected by the project proponent (PP)

Forecasted Mitigation Units (FMUs) are awarded on an *ex ante* basis based on application of this methodology and confirmation of project implementation

1.1 Methodology introduction

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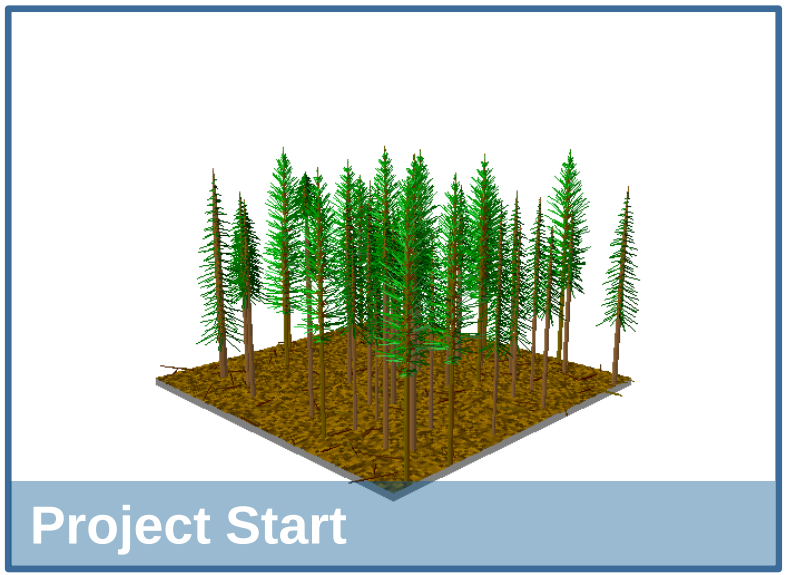
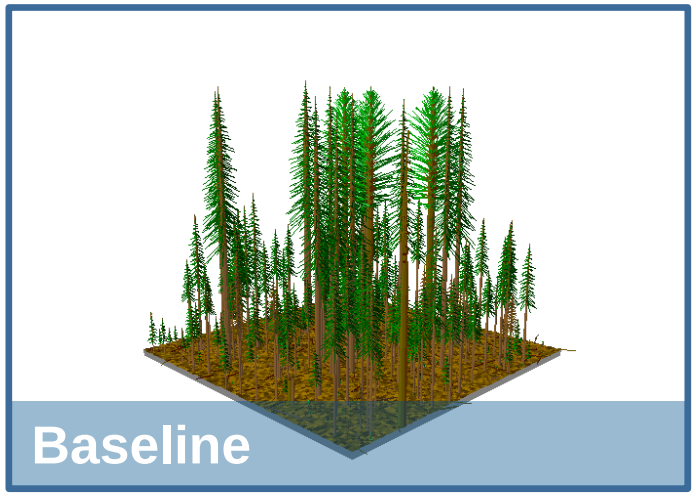
Ex ante crediting shifts the project economics to provide revenue at the start of the project





Methodology introduction

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	Improved Forest Management	Mature Forest Management
Additionality	Increases in C above business-as-usual management, i.e., beyond legal requirements and above "common practice" (average regional stocking for forest type)	
Permanence	100 years, via ongoing monitoring/reporting; buffer pool contribution; compensation for reversals	Perpetual conservation easement (required terms, monitoring, remedies for violations); no buffer pool
Inventory	Field-based inventory installed initially* and re-measured at least every 12-years; annual updates from modeling and/or re-measurement	Field-based inventory installed initially*
Baseline	Modeled based on legal and financial constraints, with common practice as lower limit; or estimated using simplified default approach	Modeled based on legal and financial constraints, with common practice as lower limit
Quantification	Requisite volume/biomass equations;* leakage based on annual harvest volumes; credits based on stock changes as reported from inventory updates	Requisite volume/biomass equations;* leakage based on projected harvest over project lifetime; credits based on modeled increases in stocks resulting from management under conservation easement
Auditing	Repeated verification of emissions reductions throughout project lifetime	One-time confirmation of proper implementation after project initiation; long-term monitoring of easement terms by land trust

*Optional use of Standardized Inventory Methodology and/or Climate Action Reserve Inventory Tool (CARIT)

Section 2

THE GHG REDUCTION/REMOVAL PROJECT

2.1 Project Definition

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Reduced emissions and increased removals of CO_2 from the atmosphere by managing forests in a way that promotes mature stand structure characterized by:

- Increasing prevalence of older, larger trees
- Increasing basal area over time

Management guided by terms of required conservation easement that is:

- Perpetual
- Granted to eligible land trust—accredited by the Land Trust Alliance

2.1 Project Definition (cont'd)

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Required conservation easement terms

- Submission of timber harvest plan for approval by land trust prior to harvest
- Post-harvest retention must result in increased quadratic mean diameter (QMD)
- Terms determined by eligible land trust holding easement to ensure an increase in timber volume over time
- Identification of conditions to allow harvests for:
  - Promoting safety and resiliency
  - Salvaging timber after natural disturbance
- Require reforestation for disturbances >10% of project area
- Require restoration as an optional remedy in the event of easement violation

2.2 Forest Owner and Project Proponent

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Forest Owner

- Individual or entity that has legal control of forest carbon
  - May be multiple owners
- Typically the fee owner

Project Proponent (PP)

- Entity with an active account on the Climate Forward registry
- Submits a project for listing and registration with the Reserve
- Responsible for all project reporting and confirmation
- Must be one of the forest owners

Section 3

ELIGIBILITY RULES

3.1 Location

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- Private land
- Under forest cover for 20+ years
- All areas in US for which there is assessment area data
- Not on prior project site, unless prior project closed in good standing

3.2 Start Date & Crediting Period

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- Start date → Date conservation easement is recorded
- Project submission (listing) → Within 1 year of start date
- Crediting period
  - Period of time over which forecasted emissions reductions and removals are recognized and credited
  - 100 years for MFM projects

3.3 Additionality

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- Projects must yield surplus GHG emission reductions “additional” to what would have occurred in the absence of the project
- Performance standard test
  - Forecasted carbon stocks must exceed those that would have occurred under a “business as usual” (baseline) scenario
  - Baseline typically uses the project area’s “common practice” value as a lower limit
  - Common practice values based on average aboveground standing live tree C stocks associated with the project’s assessment area(s) (i.e., forest type in a given ecoregion)
- Legal requirement test
  - Project activities must not be legally required
  - Attestation of Legal Additionality

3.4 Environmental & Social Safeguards

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- Native species must comprise at least 90% of project's live tree CO_2 stocks
- Species diversity requirement (single-species prevalence thresholds)
  - Defined in MFM Assessment Area Data File
- Description of how harvest activities will ensure species composition requirements are upheld, as guided by conservation easement terms
- PPs are encouraged to voluntarily report any non-GHG benefits, including any alignment with the United Nations' Sustainable Development Goals

3.5 Regulatory Compliance

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- Sign an Attestation of Regulatory Compliance
- Provide an assessment of the risk of future non-compliance during the crediting period and identify how such risks will be reduced or mitigated
- Harvesting restrictions in the conservation easement must be incorporated into timber harvest plans subject to review and approval by land trust
- Easement monitoring and remedies against violations ensures integrity of project

3.6 Ownership & Double Counting

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- PPs must provide a signed Attestation of Title document
  - Exclusive claim to the project's GHG removals
- Ownership of forecasted GHG reductions/removals clearly demonstrated
- Compensation for conservation easement can not include foregone timber value, to avoid being paid twice for the same thing
  - For leaving the trees to grow more, as required by the easement
  - For growing the trees more to increase C stocks under the project

3.8 Project Resilience and Permanence

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Resilience of project and permanence of GHG reduction/removals are ensured over the long term by the conservation easement

- Terms that require:
  - Increased timber volume and larger, older trees
  - Eventual restoration of mature forest cover in event of natural disturbances
- Monitoring and enforcement of easement terms by eligible land trust

Section 4

THE PROJECT AREA

4. The Project Area

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- PP determines:
  - Supersection(s) (pre-defined ecoregions) within the project area
  - Assessment area(s) (forest types) within each supersection
    - Identified in MFM Assessment Area Data File, with values assigned for:
      - Common practice
      - Single species prevalence limit
- Project area not required to be contiguous
- GIS layer of project area must be provided to Reserve

Section 5

THE GHG ASSESSMENT BOUNDARY

5. The GHG Assessment Boundary

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- Live trees
- Harvested wood products (HWP) (in-use; in landfills, as needed)
- Biological emissions from displacement (leakage) of timber harvests from project area to other sites
  - Assessed over 100-year crediting period

Section 6

QUANTIFYING GHG EMISSION REDUCTIONS/REMOVALS

6. Quantifying GHG Reductions/Removals

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Compare project stocks to baseline stocks, based on initial inventory projected forward throughout the crediting period

- **Baseline**: Changes to live tree stocks under "business as usual" scenario, averaged across 100-year crediting period, with resulting harvested wood carbon
- **Project:** Increases in live tree stocks under management as guided by conservation easement, with resulting harvested wood carbon, in total across the 100-year crediting period
- **GHG Emission Reductions:** Net increase in forecasted actual carbon stocks relative to baseline carbon stocks, minus leakage emissions (if any)

GHG emissions reductions are quantified and confirmed during the confirmation period

6. Quantifying GHG Reductions/Removals (cont'd)

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Development of live tree C stock inventory

- Basis for modeling that determines GHG reductions/removals
- Minimum standards for inventory methodology
- Statistical rigor
  - +/-5% at 90% CL
- Required volume and biomass equations
- To streamline project development and confirmation process, projects may optionally use:
  - Standardized Inventory Methodology as basis for inventory methodology
  - CARIT to calculate C stocks from sampled inventory data

6.1 Baseline Quantification

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- Based on baseline requirements for Improved Forest Management projects in the Reserve's Forest Project Protocol v5.0
- Modeling exercise based on management of forest in the absence of the project, considering:
  - Legal constraints (not including conservation easement required for MFM project)
  - Financial feasibility
  - Performance standard (e.g., common practice)
- Results averaged across 100-year crediting period

6.2 Project Activity Quantification

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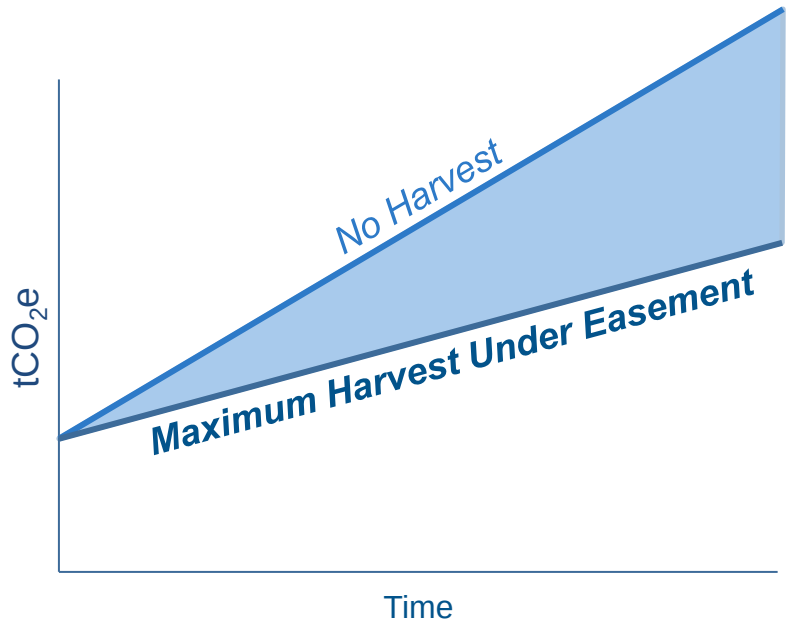
- Modeling exercise based on management of forest under the required conservation easement, considering:
  - Timber harvest restrictions in conservation easement
  - BUT must reflect timber harvesting to the extent allowed under the easement
- Purpose is to demonstrate conservative estimate of increases in onsite C stocks over entire 100-year crediting period, plus contributions to C in harvested wood products



6. Quantifying GHG Reductions/Removals

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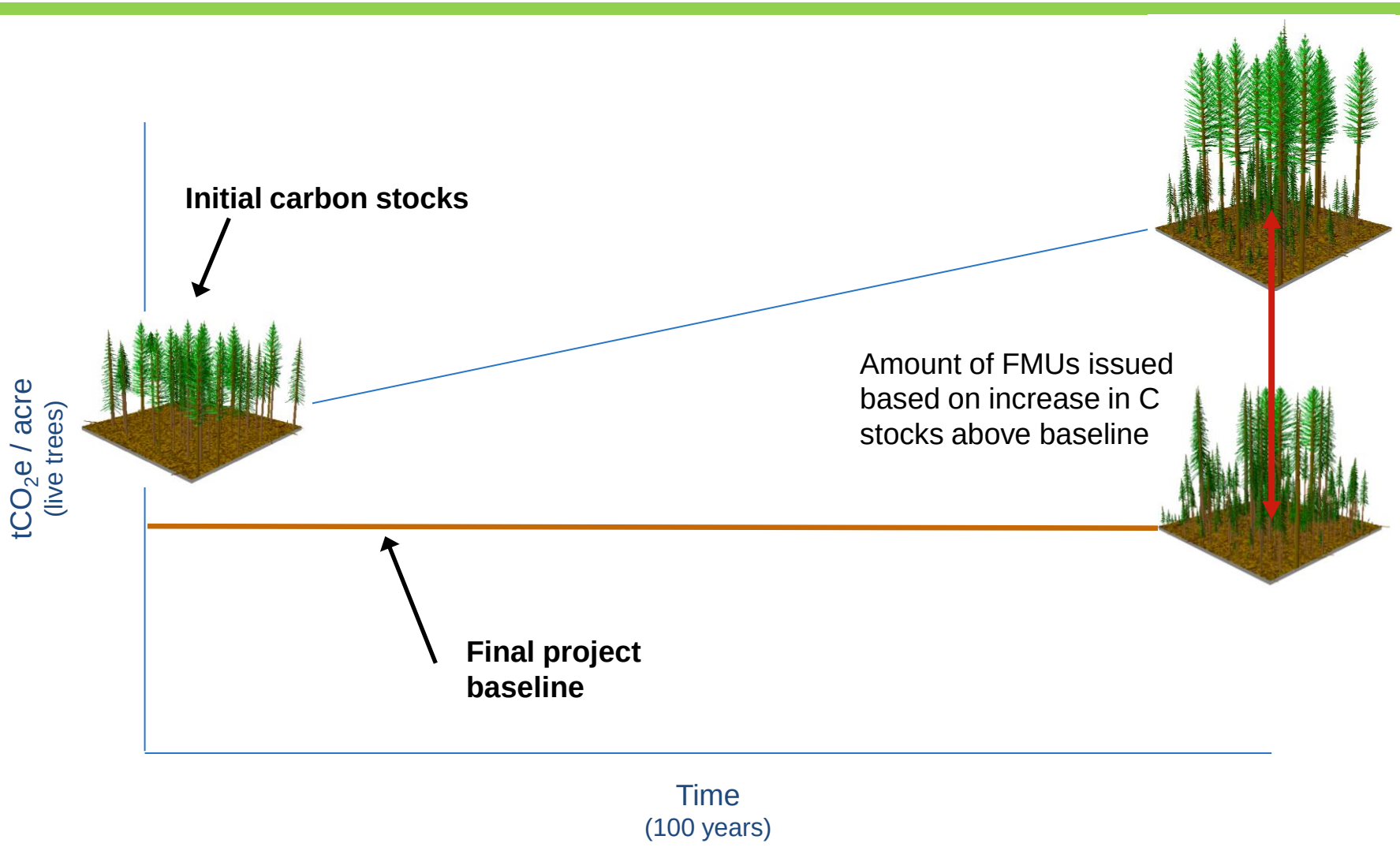

	Tree CO_2e per acre	Timber Harvest (MBF per acre)	QMD (in.)	Basal Area (ft^2 per acre)
MFM	144	65	17	237
Baseline	57	62	12	181
Initial	80	n/a	14	189

6.5 Conservativeness Factors

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- Modeling parameters affecting growth described and substantiated by professional forester, including:
  - Site indexes
  - Crown ratios
  - Mortality function turned on
- Standard deductions to additionally sequestered C to account for resilience-related management not typically captured in project activity modeling (fuel reduction, safety hazard removal, etc.)
  - 10% in most cases
  - 15% if conservation easement prohibits ongoing commercial timber harvests

6. Calculation Worksheet

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GHG Emissions Reductions/FMUs calculated in the MFM Calculation Worksheet, which includes tool for calculating C in harvested wood products

Type of Project:		Data determined by Project Proponent
Mature Forest Management		Data imported from HWP Tool
		Data calculated automatically

		Notes
Project Start Date/Crediting Period Begin Date		
Crediting Period End Date	12/30/1999	
Calculating GHG Reductions/Removals for Onsite Carbon Stocks - all data should be entered as the end of the Crediting Period		
Forecasted Standing Live Tree Carbon Stocks (tonnes CO_2e)		Total forecasted carbon in the standing live tree pool within the Project Area at the end of the crediting period, reported as a best estimate, regardless of statistical confidence.
Confidence Deduction		The confidence deduction is based on the sampling error of the combined estimate of carbon in all onsite carbon pools (Appendix A, Section A.4). Can't be greater than 20% or the project is not eligible.
Adjusted Forecasted Onsite Carbon Stocks (adjusted for confidence deduction) (tonnes CO_2e)	0	Forecasted onsite carbon stocks adjusted using the confidence deduction.
Baseline Onsite Carbon Stocks (tonnes CO_2e)		Baseline estimates of onsite carbon stocks are not affected by the confidence deduction. Baseline carbon stocks are determined from an initial inventory and are modeled thereafter following the guidelines in Section 6 of the MFM Forecast Methodology.
Quantified GHG Reductions / Removals for Onsite Carbon Stocks (tonnes CO_2e)	0	The difference between the forecasted and baseline carbon stocks.
Calculating Carbon Stored in Wood Products - all data should be entered as the end of the Crediting Period		
Forecasted Carbon in Trees Harvested for Wood Products in (tonnes CO_2e)		Based on forecasted carbon in standing live carbon stocks harvested across all modeling output periods, prior to delivery to mills. See worksheet "III. Results + Conversions."
Baseline Carbon in Trees Harvested for Wood Products (tonnes CO_2e)		Based on estimated carbon in standing live carbon stocks harvested across all modeling output periods in the baseline, prior to delivery to mills. See worksheet "III. Results + Conversions."
Forecasted Carbon in Harvested Wood Delivered to Mills (tonnes CO_2e)	0	Based on forecasted amount of carbon harvested across all modeling output periods that is delivered to mills. See worksheet "III. Results + Conversions."
Baseline Carbon in Harvested Wood Delivered to Mills (tonnes CO_2e)	0	Based on estimated amount of carbon harvested across all modeling output periods in the baseline that is delivered to mills. See worksheet "III. Results + Conversions."
Forecasted Carbon Stored Long-term in Wood Products (tonnes CO2e) - Excl Landfill	0	The average amount of carbon (tonnes CO2e) contained in in-use wood products, as calcuated over a 100-year time period.
Forecasted Carbon Stored Long-term in Wood Products (tonnes CO2e) - Incl Landfill	0	The average amount of carbon (tonnes CO2e) contained in both in-use and landfilled wood products, as calcuated over a 100-year time period.
Baseline Carbon Stored Long-term in Wood Products (tonnes CO2e) - Excl Landfill	0	The average amount of carbon (tonnes CO2e) contained in in-use wood products, as calcuated over a 100-year time period for the baseline.
Baseline Carbon Stored Long-term in Wood Products (tonnes CO2e) - Incl Landfill	0	The average amount of carbon (tonnes CO2e) contained in both in-use and landfilled wood products, as calcuated over a 100-year time period for the baseline.
Diff Between Actual and Baseline Carbon in Harvested Wood (tonnes CO_2e) - Excl Landfill	0	Calculated from lines 23 and 25.
Difference Between Actual and Baseline Carbon in Harvested Wood (tonnes CO_2e) - Incl Landfill	0	Calculated from lines 24 and 26.
Difference in Actual and Baseline Carbon Stored in Wood Products (tonnes CO_2e) - Landfill Adj	0	Difference between actual and baseline carbon stored long-term in wood products in each year. May be negative. If total *cumulative* actual harvested volumes exceed total *cumulative* baseline harvested volumes (through previous period), then calculation will *exclude* carbon in landfills. If total cumulative actual harvested volumes are less than total cumulative baseline harvested volumes (through previous period), then this calculation will *include* carbon in landfills.
Calculating Secondary Effects		
Difference Between Actual and Baseline Carbon in Trees Harvested for Wood Products (tonnes CO_2e)	0	The difference between the values in actual and baseline carbon in harvested wood. (Difference between Rows 19 and 20)
Secondary Effects Emissions (tonnes CO2e)	0	If actual harvest is less than baseline harvest on a cumulative basis through the crediting period, then this value will be the difference between actual and baseline harvest prior to delivery to mills in the crediting period multiplied by the leakage factor of 40% adjusted by the proportion of forecasted harvested carbon relative to baseline harvested carbon. If actual harvest is greater than baseline harvest on a cumulative basis through the crediting period, this value will be zero.
FMUs Issued to Account Holder - following confirmation		
FMUs Issued to Account Holder - GHG Reductions/Removals Net of Discounts and Secondary Effects (tonnes CO_2e)	0	Equal to the sum of the values in lines 17, 29, and secondary effects emissions.

Sections 7 and 8

PROJECT IMPLEMENTATION, MONITORING, AND REPORTING

7/8. Project Implementation, Monitoring, and Reporting

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Required Project Implementation Report (PIR) addresses all project monitoring and reporting activities and includes:

- Project location (e.g., map of project area)
- Ownership
- Description of project activity, as guided by conservation easement terms
- Modeling plan and results for baseline and project activity, including description of conservativeness of parameters
- Estimated GHG removals (from MFM Calculation Worksheet)
- Co-benefits (optional)

PIR template provided on Climate Forward website

8.1 Project Submittal Documentation

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Required documentation:

LISTING:

- Project Submission form
- Proposed conservation easement terms

CONFIRMATION:

- Signed Attestation of Title form
- Signed Attestation of Legal Additionality form
- Signed Attestation of Regulatory Compliance form
- Project Implementation Report (PIR)
- MFM Calculation Worksheet
- KML of project area
- Confirmation Report, and Confirmation Statement
- From Confirmation Body: confirmation plan, sampling plan, and list of findings (not made public)

Section 9

CONFIRMATION GUIDANCE

9. Confirmation Guidance

Confirmation guidance supplements the Program Manual and Confirmation Manual and describes confirmation activities specifically related to MFM projects being confirmed under this methodology

Confirmation Bodies trained to confirm MFM projects must be familiar with the following:

- Climate Forward Program Manual
- Climate Forward Confirmation Manual
- MFM Project Forecast Methodology
- MFM Forecast Methodology companion documents
  - MFM Assessment Area Data File
  - MFM Calculation Worksheet

9. Standard of Confirmation

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Accredited Confirmation Body must confirm project has been implemented as described in the forecast methodology – and that estimated emission reductions/removals have been calculated accurately.

- Desktop review
  - PIR
  - Companion documents
  - Modeling and CO_2 calculations
  - Conservation easement terms
- Site visit to confirm project as described in PIR
  - Project area
  - Inventory

Confirmation activities may commence no sooner than 1 year after the required conservation easement has been recorded.

Methodology Available for Use

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Project submissions now being accepted

https://climateforward.org/program/methodologies/mature-forest-management/

Special Thanks

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- John Nickerson, Dogwood Springs Forestry
- Jim Clark, North Coast Resource Management
- Sarah Wescott, Climate Action Reserve

Questions?

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