Improved Forest Management Methodology for Quantifying GHG Removals and Emission Reductions through Increased Forest Carbon Sequestration on Non-Federal U.S. Forestlands v1.3

Erratum & Clarifications

This supplemental document recognizes erratum and clarifications to the ACR Improved Forest Management Methodology for Quantifying GHG Removals and Emission Reductions through Increased Forest Carbon Sequestration on Non-Federal U.S. Forestlands, V1.3. Erratum and clarifications are effective as of date posted for all projects registered under the methodology version and are to be incorporated within version v1.4. Project developers and Verification Bodies shall adhere to the erratum and clarifications when conducting project implementation and verification activities.

1.1 Erratum (In bold)

<table>
<thead>
<tr>
<th>Section Reference / Effective date</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.2 Applicability Conditions / July 27, 2020</td>
<td>- Private or non-governmental organization ownerships subject to commercial harvesting at the project Start Date in the with-project scenario must be certified by FSC, SFI, or ATFS or become certified within one year of the project Start Date. If there are no ongoing harvests at the project Start Date, but harvests occur later in the project life cycle, the project area must become certified before any commercial timber harvesting can occur.</td>
</tr>
<tr>
<td></td>
<td>- All Tribal Lands in the United States, except those lands that are managed or administered by the Bureau of Indian Affairs, are eligible under this methodology, provided that they meet ACR requirements for Tribal lands.</td>
</tr>
<tr>
<td></td>
<td>- Public non-federal ownerships currently subject to commercial timber harvesting in the with-project scenario must:</td>
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<td>- Be certified by FSC, SFI, or ATFS or become certified within one year of the project Start date; or</td>
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<td></td>
<td>- Have its forest management plan sanctioned by a senior government official within a state, or a state agency, or a federal agency.</td>
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<td></td>
<td>- Please note that any such forest management plans must be updated at minimum every 10 years</td>
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<td></td>
<td>- If there are no ongoing harvests on a public non-federal ownership at the project start date, but harvests occur later in the project life cycle, the project area must become certified by FSC, SFI, or ATFS, or develop a sanctioned management plan before any commercial timber harvesting can occur.</td>
</tr>
</tbody>
</table>
To

- All projects must adhere to the following sustainable management requirements:
  - Private, non-governmental organization and public non-federal project areas subject to commercial harvesting at the project Start Date in the with-project scenario must adhere to one or a combination of the following requirements:
    - Be certified by FSC, SFI, or ATFS or become certified within one year of the project Start date;
    - Adhere to a long-term forest management plan or program incorporating all their forested landholdings, prescribing the principals of sustained yield and natural forest management (plan and program criteria subject to ACR approval)
  - If the project is not subject to commercial harvest activities within the project area as of the project Start Date, but harvests occur later in the project life cycle, the project area must meet the requirements outlined above before commercial timber harvesting may occur

<table>
<thead>
<tr>
<th>A.2 Applicability Conditions / July 27, 2020</th>
<th>All Tribal Lands in the United States, except those lands that are managed or administered by the Bureau of Indian Affairs, are eligible under this methodology, provided that they meet ACR requirements for Tribal lands</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Tribal lands in the United States meeting applicability conditions of this methodology and requirements of the relevant ACR Standard are eligible (also see American Carbon Registry 2017. The American Carbon Registry Guidance for Carbon Project Development on Tribal lands, version 1.0.)</td>
</tr>
</tbody>
</table>
### C3. Baseline Net Reductions and Removals / July 27, 2020

The following equations are used to construct the baseline stocking levels using models described in section 3.1 and wood products calculations described in section 3.2:

\[
\Delta C_{BSL,TREE,t} = (C_{BSL,TREE,t} - C_{BSL,TREE,t-1})
\]

Where:

- \( t \) Time in years
- \( \Delta C_{BSL,TREE,t} \) Change in baseline carbon stock in above and belowground live trees (in metric tons CO\(_2\)) for year \( t \).

\[
C_{BSL,TREE,t} \quad \text{Change in baseline value of carbon stored in above and belowground live trees at the beginning of the year (in metric tons CO\(_2\)) and } t-1 \text{ signifies the value in the prior year.}
\]

\[
\Delta C_{BSL,DEAD,t} = (C_{BSL,DEAD,t} - C_{BSL,DEAD,t-1})
\]

Where:

- \( t \) Time in years
- \( \Delta C_{BSL,DEAD,t} \) Change in baseline carbon stock stored in dead wood (in metric tons CO\(_2\)) for year \( t \).

\[
C_{BSL,DEAD,t} \quad \text{Change in baseline value of carbon stored in dead wood at the beginning of the year } t (\text{in metric tons CO\(_2\)) and } t-1 \text{ signifies the value in the prior year.}
\]
$C_{BSL, TREE,t}$ Baseline value of carbon stored in above and belowground live trees at the beginning of the year $t$ (in metric tons CO$_2$) and $t-1$ signifies the value in the prior year.

$\Delta C_{BSL, DEAD,t} = (C_{BSL, DEAD,t} - C_{BSL, DEAD,t-1})$ (2)

$t$ Time in years

$\Delta C_{BSL, DEAD,t}$ Change in baseline carbon stock stored in dead wood (in metric tons CO$_2$) for year $t$.

$C_{BSL, DEAD,t}$ Baseline value of carbon stored in dead wood at the beginning of the year $t$ (in metric tons CO$_2$) and $t-1$ signifies the value in the prior year.

| C3 Baseline Net Reductions and Removals / July 27, 2020 | Prior to year $T$ ($T =$ year projected stocking reaches the long-term baseline average) the value of $\Delta C_{BSL,t}$ will most likely be negative for projects with initial stocking levels higher than $C_{BSL,AVE}$ or positive for projects with initial stocking levels lower than $C_{BSL,AVE}$. If years elapsed since the start of the IFM project activity ($t$) is $\geq T$ to compute long-term average stock change use: $\Delta C_{BSL,t} = 0$

To

Prior to year $T$ ($T =$ year projected stocking reaches the long-term baseline average) the value of $\Delta C_{BSL,t}$ will most likely be negative for projects with initial stocking levels higher than $C_{BSL,AVE}$ or positive for projects with initial stocking levels lower than $C_{BSL,AVE}$. If years elapsed since the start of the IFM project activity ($t$) is $> T$ to compute long-term average stock change use: $\Delta C_{BSL,t} = 0$

| C3 Baseline Net Reductions and Removals / September 30, 2021 | If the output for the tree is the volume, then this must be converted to biomass and carbon using equations in Section 3.1.1. If processing of alternative data on dead wood is necessary, equations in section 3.1.2 may be used. Where models do not predict dead wood dynamics, the baseline harvesting scenario may not decrease dead wood more than 50% through the Crediting Period.

To
- If the output for the tree is the volume, then this must be converted to biomass and carbon using equations in Section 3.1.1. If processing of alternative data on dead wood is necessary, equations in section 3.1.2 may be used. Where models do not predict dead wood dynamics, the baseline harvesting scenario may not decrease dead wood more than 50% through the Crediting Period. **If included, standing dead wood must be calculated using the same set of equations as live trees with adjustments for decay and structural loss.**

| C3 Baseline Net Reductions and Removals / September 30, 2021 | Note: The FVS Fire and Fuels Extension volume-based default estimates of Live Carbon are compliant with the above, but do not include bark and stump components. **To**

| C3 Baseline Net Reductions and Removals / August 17, 2021 | Dead wood included in the methodology comprises two components only – standing dead wood and lying dead wood. Below-ground dead wood is conservatively neglected. **To**

| D5. Estimation of Project Emission Reductions or Enhanced Removals / July 27, 2020 | This section describes the steps required to calculate $\Delta C_{P,t}$ (net annual carbon stock change under the project scenario; tons CO$_2$e). This methodology requires 1) carbon stock levels to be determined in each time period, $t$, for which a valid verification report is submitted, and 2) the change in project carbon stock to be computed from the prior verification time period, $t-1$. |
The following equations are used to construct the project stocking levels using models described in section 3.1 and wood products calculations described in section 3.2:

\[ \Delta C_{P,TREE,t} = (C_{P,TREE,t} - C_{P,TREE,t-1}) \]  \hspace{1cm} (11)

Where:

- \( t \) Time in years
- \( \Delta C_{P,TREE,t} \) Change in project carbon stock in above and belowground live trees (in metric tons CO\(_2\)) for year \( t \).
- \( C_{P,TREE,t} \) Change in project value of carbon stored in above and belowground live trees at the beginning of the year \( t \) (in metric tons CO\(_2\)) and \( t-1 \) signifies the value in the prior year.

\[ \Delta C_{P,DEAD,t} = (C_{P,DEAD,t} - C_{P,DEAD,t-1}) \]  \hspace{1cm} (12)

- \( t \) Time in years
- \( \Delta C_{P,DEAD,t} \) Change in project carbon stock (in metric tons CO\(_2\)) for year \( t \).
- \( C_{P,DEAD,t} \) Change in project value of carbon stored in dead wood at the beginning of the year \( t \) (in metric tons CO\(_2\)) and \( t-1 \) signifies the value in the prior year.

This section describes the steps required to calculate \( \Delta C_{P,t} \) (carbon stock change under the project scenario; tons CO\(_2\)e). This methodology requires 1) carbon stock levels to be determined in each time period, \( t \), for which a valid verification report is submitted, and 2) the change in project carbon stock to be computed from the prior verification time period, \( t-1 \).

The following equations are used to construct the project stocking levels using models described in section 3.1 and wood products calculations described in section 3.2:

\[ \Delta C_{P,TREE,t} = (C_{P,TREE,t} - C_{P,TREE,t-1}) \]  \hspace{1cm} (11)
Where:

\[ t \] Time in years

\[ \Delta C_{P,\text{TREE},t} \] Change in project carbon stock in above and belowground live trees (in metric tons CO₂) for year \( t \).

\[ C_{P,\text{TREE},t} \] Project value of carbon stored in above and belowground live trees at the beginning of the year \( t \) (in metric tons CO₂) and \( t-1 \) signifies the value in the prior year.

\[ \Delta C_{P,\text{DEAD},t} = (C_{P,\text{DEAD},t} - C_{P,\text{DEAD},t-1}) \] (12)

\[ t \] Time in years

\[ \Delta C_{P,\text{DEAD},t} \] Change in project carbon stock stored in dead wood (in metric tons CO₂) for year \( t \).

\[ C_{P,\text{DEAD},t} \] Project value of carbon stored in dead wood at the beginning of the year \( t \) (in metric tons CO₂) and \( t-1 \) signifies the value in the prior year.


- There may be no leakage beyond de minimis levels through activity shifting to other lands owned, or under management control, by the timber rights owner.

If the project decreases wood product production by >5% relative to the baseline then the Project Proponent and all associated land owners must demonstrate that there is no leakage within their operations – i.e., on other lands they manage/operate outside the bounds of the ACR carbon project.

Such a demonstration must include one of the following:

- Historical records covering all Project Proponent ownership trends in harvest volumes paired with records from the with-project time period showing no deviation from historical trends over most recent 10-year average; or
- Forest management plans prepared ≥24 months prior to the start of the project showing harvest plans on all owned/managed lands paired with records from the with-project time period showing no deviation from management plans; or
• Entity-wide management certification that requires sustainable practices (programs can include FSC, SFI, or ATFS). Management certification must cover all entity owned lands with active timber management programs.

To

- There may be no leakage beyond de minimis levels through activity shifting to other lands owned, or under management control, by the timber rights owner.

If the project decreases wood product production by >5% relative to the baseline then the Project Proponent and all associated landowners must demonstrate that there is no leakage within their operations – i.e., on other lands they manage/operate outside the bounds of the ACR carbon project. This demonstration is not applicable if Project Proponent and associated landowners enroll all of their forested landholdings, owned and under management control, within the ACR carbon project.

Such a demonstration must include one or more of the following:

- Entity-wide management certification that requires sustainable practices (programs can include FSC, SFI, or ATFS). Management certification must cover all entity owned lands with active timber management programs;
- Adherence to an ACR approved long-term forest management plan or program as specified in section A.2;
- Forest management plans prepared ≥24 months prior to the start of the project showing harvest plans on all owned/managed lands paired with records from the with-project time period showing no deviation from management plans; or
- Historical records covering all Project Proponent ownership trends in harvest volumes paired with records from the with-project time period showing no deviation from historical trends over most recent 10-year average.

F3. Calculation of Total Project Uncertainty / September 30, 2021

- The following equation must be applied:

\[
UNC_t = \frac{\sqrt{\left(\Delta C_{BSLT_t} \cdot UNC_{BSL} \right)^2 + \left(\Delta C_{P,t} \cdot UNC_{P,t} \right)^2}}{\Delta C_{BSL,t} + \Delta C_{P,t}}
\]

(19)

where:
\[ \text{To}\]

- The following equation must be applied:

\[
\text{UNC}_t = \frac{\sqrt{\left(\Delta C_{BSL,t} \cdot \text{UNC}_{BSL}\right)^2 + \left(\Delta C_{P,t} \cdot \text{UNC}_{P,t}\right)^2}}{\Delta C_{BSL,t} + \Delta C_{P,t}}
\]  \hspace{1cm} (19)

where:

- \( \text{UNC}_t \) Total project uncertainty in year \( t \), in %
- \( \Delta C_{BSL,t} \) Absolute change in the baseline carbon stock and GHG emissions (in metric tons CO₂e) for year \( t \). (Section C3)
- \( \text{UNC}_{BSL} \) Baseline uncertainty, in % (Section C5)
- \( \Delta C_{P,t} \) Absolute change in the project carbon stock and GHG emissions (in metric tons CO₂e) for year \( t \). (Section D5)
- \( \text{UNC}_{P,t} \) With-project uncertainty in year \( t \), in % (Section D8)

G. Calculation of ERTs / July 27, 2020

- This section describes the process of determining additional annual net greenhouse gas emission reductions and Emission Reduction Tons (ERTs) issued for a time period for which a valid verification report has been filed with ACR. Annual net greenhouse gas emission reductions (\( \text{CACR},t \)) are calculated using equation 20 by adjusting the difference between the project and baseline carbon stock changes for leakage and uncertainty then multiplying by a non-permanence buffer deduction.
\[ ERT_t = C_{ACR,t} = (\Delta C_{P,t} - \Delta C_{BSL,t}) \cdot (1 - LK) \cdot (1 - UNC_t) \cdot (1 - BUF) \]  

where:

\( ERT_t \)  
Emission Reduction Tons with vintage year \( t \).

\( C_{ACR,t} \)  
Annual net greenhouse gas emission reductions (in metric tons CO\(_2\)e) at time \( t \).

\( \Delta C_{P,t} \)  
Change in the project carbon stock and GHG emissions (in metric tons CO\(_2\)e) for year \( t \). (Section D5)

\( \Delta C_{BSL,t} \)  
Change in the baseline carbon stock and GHG emissions (in metric tons CO\(_2\)e) for year \( t \). (Section C3)

\( LK \)  
Leakage discount (Section D7)

\( UNC_t \)  
Total Project Uncertainty, (in %) for year \( t \) (Section F3). \( UNC_t \) will be set to zero if the project meets ACR’s precision requirement of within ±10% of the mean with 90% confidence. If the project does not meet this precision target, \( UNC_t \) should be the half-width of the confidence interval of calculated net GHG emission reductions.

\( BUF \)  
The non-permanence buffer deduction as calculated in Section B5. BUF will be set to zero if an ACR approved insurance product is used.

To this section describes the process of determining greenhouse gas emission reductions and Emission Reduction Tons (ERTs) issued for a Reporting Period for which a valid verification report has been filed with ACR. Total greenhouse gas emission reductions (\( C_{ACR,t} \)) are calculated using equation 20 by adjusting the difference between the project and baseline carbon stock changes for leakage and uncertainty.

\[ ERT_{RP,t} = C_{ACR,t} = (\Delta C_{P,t} - \Delta C_{BSL,t}) \cdot (1 - LK) \cdot (1 - UNC_t) \]  

(20)
<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>( ERT_{RP,t} )</td>
<td>Total emission Reduction Tons in Reporting Period ( t ).</td>
</tr>
<tr>
<td>( CACR,t )</td>
<td>Total greenhouse gas emission reductions (in metric tons) ( \text{CO}_2e ) at time ( t ).</td>
</tr>
<tr>
<td>( \Delta CP,t )</td>
<td>Change in the project carbon stock and GHG emissions (in metric tons ( \text{CO}_2e )) for year ( t ). (Section D5)</td>
</tr>
<tr>
<td>( \Delta C_{BSL,t} )</td>
<td>Change in the baseline carbon stock and GHG emissions (in metric tons ( \text{CO}_2e )) for year ( t ). (Section C3)</td>
</tr>
<tr>
<td>( LK )</td>
<td>Leakage discount (Section D7)</td>
</tr>
<tr>
<td>( UNC,t )</td>
<td>Total Project Uncertainty, (in %) for year ( t ) (Section F3). ( UNC_t ) will be set to zero if the project meets ACR’s precision requirement of within ±10% of the mean with 90% confidence. If the project does not meet this precision target, ( UNC_t ) should be the half-width of the confidence interval of calculated net GHG emission reductions.</td>
</tr>
</tbody>
</table>

ERT’s by vintage shall then be determined by prorating Reporting Period calendar days within vintage year \( t \) (21), applying the non-permanence buffer deduction (Equation 22) and subtracting ERT’s by vintage year from the non-permanence buffer deduction (Equation 23). Buffer pool ERTs will be deposited by vintage, if this is the risk management option the Project Proponent has chosen.

\[
ERT_{VIN,t} = ERT_{RP,t} \cdot \left( \frac{CAL_t}{RP_{CAL,t}} \right) \quad (21)
\]

where:

- \( ERT_{VIN,t} \): Total Emission Reduction Tons issued in vintage year \( t \)
- \( ERT_{RP,t} \): Total Emission Reduction Tons issued in RP \( t \)
- \( CAL_t \): Reporting Period calendar days within vintage year \( t \)
- \( RP_{CAL,t} \): Total calendar days within Reporting Period \( t \)

\[
BUF_{VIN,t} = ERT_{VIN,t} \cdot BUF \quad (22)
\]

where:
### Buf

<table>
<thead>
<tr>
<th>Buf</th>
<th>Ert</th>
<th>Buf</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\text{BUF}_{\text{VIN},t}$</td>
<td>$\text{ERT}_{\text{VIN},t}$</td>
<td>$\text{BUF}_{\text{VIN},t}$</td>
</tr>
</tbody>
</table>

Buffer tons deducted in vintage year $t$

Emission Reduction Tons issued in vintage year $t$

The non-permanence buffer deduction percentage as calculated in Section B5. BUF will be set to zero if an ACR approved insurance product is used.

\[
\text{ERT}_{\text{NETVIN},t} = \text{ERT}_{\text{VIN},t} - \text{BUF}_{\text{VIN},t} \quad (23)
\]

Where:

- $\text{ERT}_{\text{VIN},t}$: Net Emission Reduction Tons issued in vintage year $t$
- $\text{BUF}_{\text{VIN},t}$: Buffer tons deducted in vintage year $t$

### 1.2 Clarifications (in bold)

<table>
<thead>
<tr>
<th>Section Reference / Effective date</th>
<th>Clarifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/A; / July 27, 2020</td>
<td>- All references to “American Carbon Registry Standard, Version 5.0” shall pertain to the version of the American Carbon Registry Standard effective at project listing/crediting period renewal and requirements set out therein.</td>
</tr>
<tr>
<td>A1. Scope and Definitions / July 27, 2020</td>
<td>- A definition for “Reporting Period” has been added to the methodology (below). Project scenario carbon stock changes, harvested wood products, uncertainty and ERT’s are quantified on a Reporting Period basis. Equations 11, 12, 13, 14, 18, 19 and 20 use the terms “year” and “Reporting Period” synonymously. Equation 21 partitions ERT’s to a vintage year (corresponding to the calendar year the emissions reductions/removals occurred) basis for Registry reporting. Reporting Period: The period of time covering a GHG assertion for a single verification and subsequent request for ERT issuance.</td>
</tr>
<tr>
<td>A1. Scope and Definitions / July 27, 2020</td>
<td>- A definition for “Commercial Harvesting” has been added to the methodology (below).</td>
</tr>
<tr>
<td>Commercial Harvesting: Any type of harvest producing merchantable material at least equal to the value of the direct costs of harvesting. Harvesting of dead, dying or threatened trees is specifically excluded where a signed attestation from a registered professional forester in the relevant jurisdiction is obtained (Society of American Foresters or Association of Consulting Foresters certification sufficient in states without professional forester requirements) confirming the harvests are in direct response to isolated forest health (insect/disease) or natural disaster event(s) that are not part of a long-term harvest regime.</td>
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<tr>
<td>C.3.1 Stocking Level Projections in the Baseline / July 27, 2020</td>
<td></td>
</tr>
<tr>
<td>§ Section C.3.1 states “If the output for the tree is volume, then this must be converted to biomass and carbon using equations in Section 3.1.1”. ACR would like to clarify as a footnote that the steps prescribed in Section 3.1.1 are not relevant where models output projected total aboveground and belowground biomass or carbon.</td>
<td></td>
</tr>
</tbody>
</table>