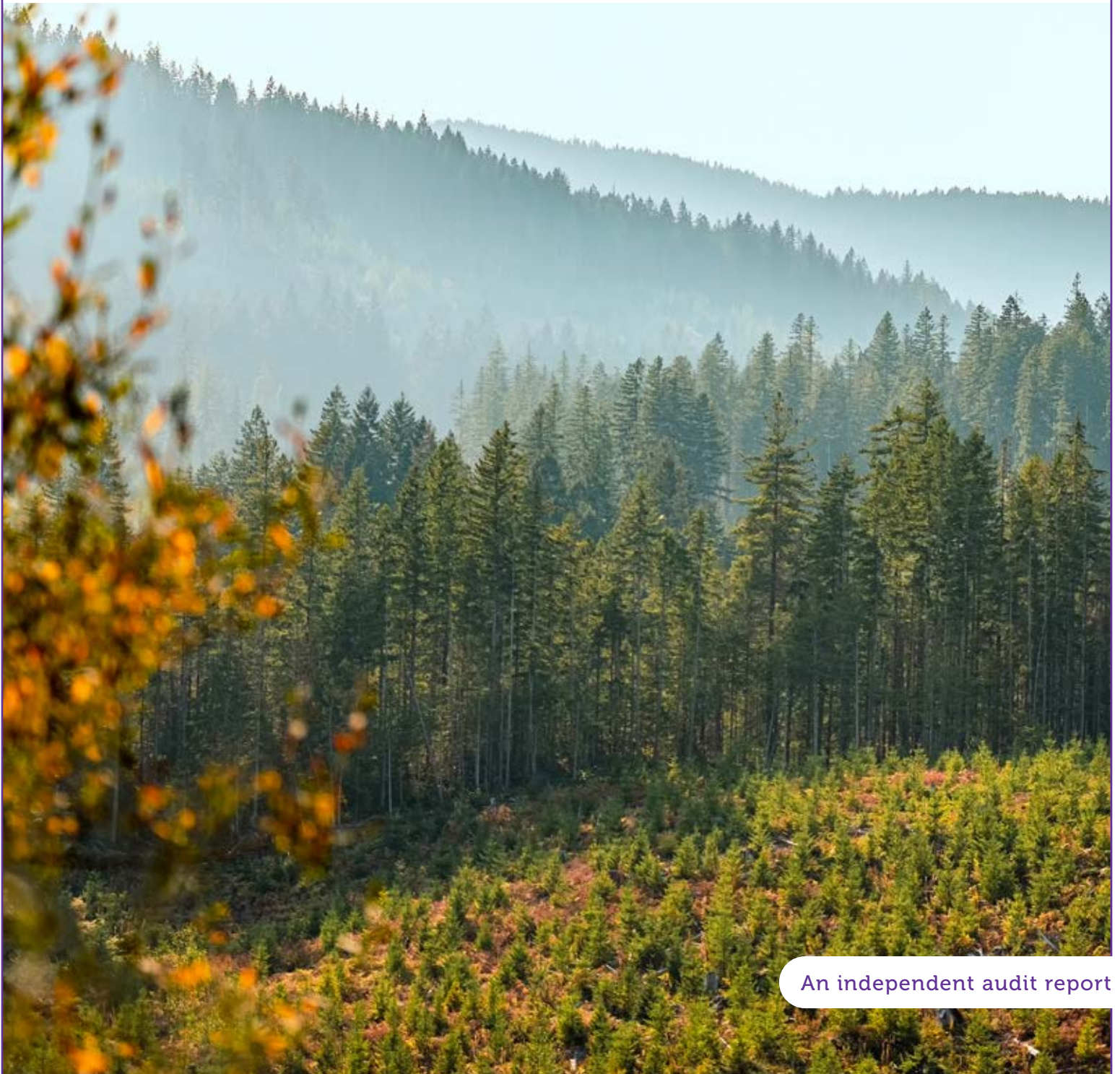




Office of the
Auditor General
of British Columbia

March 2025

Ministry of Forests: Calculating Carbon Projections



An independent audit report



Office of the
Auditor General
of British Columbia

623 Fort Street
Victoria, British Columbia
V8W 1G1

P: 250.419.6100
F: 250.387.1230
oag.bc.ca

The Honourable Raj Chouhan
Speaker of the Legislative Assembly
Province of British Columbia
Parliament Buildings
Victoria, British Columbia
V8V 1X4

Dear Mr. Speaker:

I have the honour to transmit to the Speaker of the Legislative Assembly of British Columbia the report, *Ministry of Forests: Calculating Carbon Projections*.

We conducted this audit under the authority of section 11(8) of the *Auditor General Act*. All work in this audit was performed to a reasonable level of assurance in accordance with the Canadian Standard on Assurance Engagements (CSAE) 3001 – Direct Engagements, set out by the Chartered Professional Accountants of Canada (CPA Canada) in the *CPA Canada Handbook – Assurance*.

Sheila Dodds, CPA, CA, CIA
Acting Auditor General of British Columbia
Victoria, B.C.

March 2025



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Source: Getty Images

Audit at a glance

Why we did this audit

- Forest management practices can support climate change mitigation by increasing carbon captured and stored by forests and by reducing forestry emissions.
- The Ministry of Forests has committed to enhancing the ability of forests and forest products to absorb and store carbon to help mitigate climate change. The ministry uses carbon modelling to understand how some forest management decisions may change the forest carbon balance.
- A defined methodology for completing carbon modelling helps ensure consistency and transparency. This also helps to ensure their quality and builds confidence in the estimates.

Objective

To determine whether the Ministry of Forests used defined methodologies to calculate consistent and transparent forest carbon projections to inform forest management decisions.

Audit period:

April 1, 2022 –
December 31, 2024

Conclusion

We concluded that the Ministry of Forests did not use defined methodologies to calculate consistent and transparent forest carbon projections to inform forest management decisions.

However, in late 2024 the ministry finalized a methodology to calculate consistent and transparent carbon projections to inform forest landscape plans.

The ministry has accepted both recommendations we made focused on using defined and approved methodologies to calculate consistent and transparent carbon projections.

What we found

No defined methodology for calculating the carbon benefit of forest investments

- The ministry's calculations of the carbon benefit from forest investment projects weren't sufficiently documented to ensure consistency and allow for review or replication.
- Despite the uncertainty regarding the quality of its projections, the ministry publicly and annually reported the carbon benefit from the Forest Investment Program.

Recommendation 1

Gaps in methodology for calculating carbon projections of allowable annual cut

- The ministry produced guidance to support carbon analysis for allowable annual cut determinations.
- The guidance didn't provide a specific approach for calculating the forest carbon impact of harvested wood products.

Recommendation 2

Methodology for calculating carbon projections to inform forest landscape planning recently developed

- The ministry wrote new guidance for calculating carbon information for forest landscape planning during the audit period.
- The guidance contained a defined methodology to ensure consistent and transparent projections. The ministry approved it for use in late-2024.

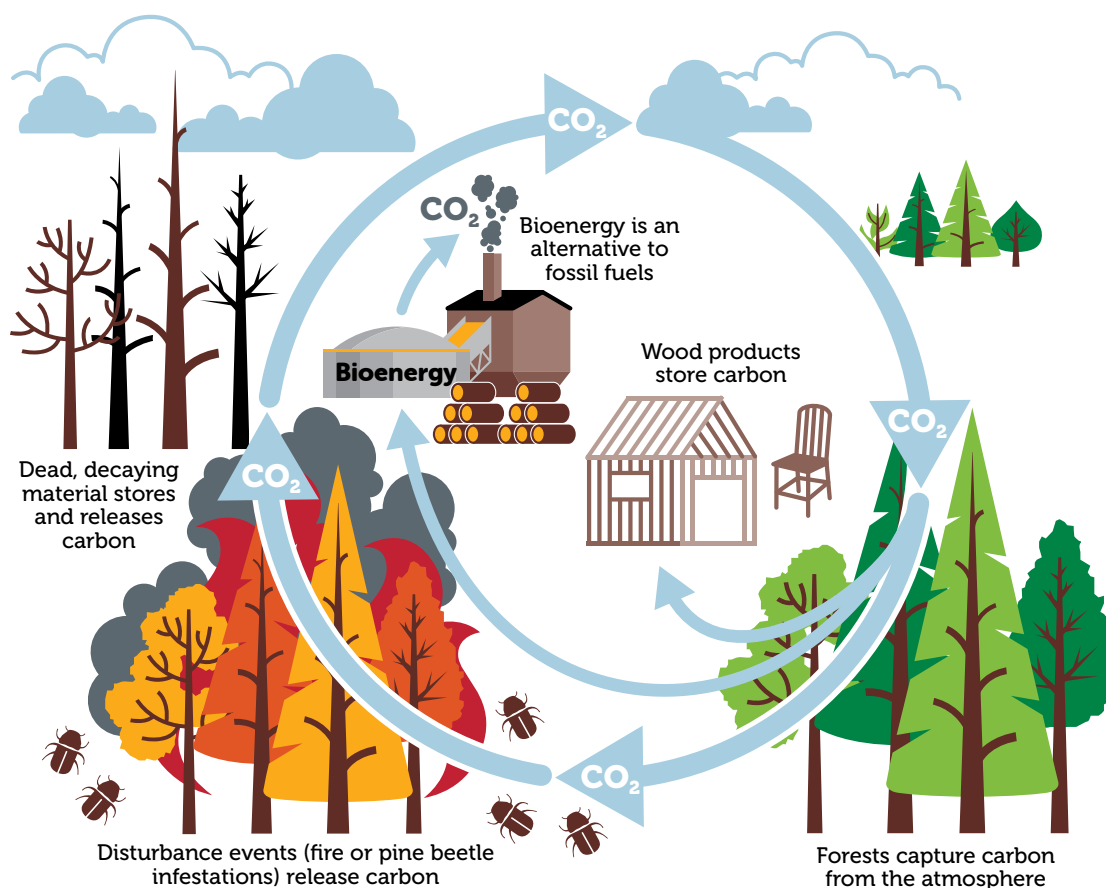
Background

Climate change mitigation activities aim to reduce the extent of future climate change either by reducing greenhouse gas emissions or by removing carbon from the atmosphere.

Forests can help mitigate climate change by removing carbon dioxide – a greenhouse gas – from the atmosphere and storing carbon in vegetation such as trees, bushes, and soil. Forest management can support increased carbon capture and storage through activities such as planting and fertilizing trees.

Forests also release carbon into the atmosphere during timber harvesting, wildfires, decay, and decomposition.

Harvested wood products store and emit carbon during the product life cycle. While in use, harvested wood products store carbon. As they decompose, or if they are used for energy, they release carbon back into the atmosphere.



Source: OAGBC



The Ministry of Forests has committed to enhancing the ability of B.C. forests and wood products to capture and store carbon to help mitigate climate change.

The Office of the Chief Forester leads forest stewardship for the ministry. The office is responsible for three areas that use carbon modelling to estimate how forest management decisions will affect the carbon stored and released by forests:

- The **Forest Investment Program** invests in forest management activities to promote forest carbon capture and storage and to reduce emissions from forestry practices. The ministry uses carbon modelling to determine the overall carbon benefit from the program. It reports the results in the ministry's annual reports.
- **Allowable annual cut determinations** are set by the chief forester, a statutory decision maker responsible for setting the maximum amount of timber that is reasonable to harvest from a timber supply area or tree farm licence. As part of the determination process, carbon modelling allows the chief forester to understand the impact of harvest scenarios on forest carbon.
- **Forest landscape plans** are being created in partnership with First Nations and in collaboration with local governments and forest licensees. The plans will identify where and how forest management activities can occur in the landscape area. Carbon modelling will allow planners to understand the carbon impact of their decisions.

The UN Intergovernmental Panel on Climate Change provides good-practice guidance to ensure the quality of carbon estimates. Good practices include:

Consistency: to the extent possible, the same methodology is used for all carbon projections of a similar type, so that changes reflect real differences in emissions and removals and not changes in how estimates were completed.

Transparency: the methodology to calculate carbon projections is sufficiently documented to allow review and replication.

Defined methodologies that include the data sources, informed assumptions, and models used to produce carbon estimates are key to ensuring consistency and transparency.



Objective

To determine whether the Ministry of Forests used defined methodologies to calculate consistent and transparent forest carbon projections to inform forest management decisions.

Scope

The audit focused on the Ministry of Forests' approaches to calculating forest carbon projections in three forest management areas between April 1, 2022, and Dec. 31, 2024.

We assessed whether the ministry calculated forest carbon projections according to defined methodologies that would allow for review and replication.

[Learn more about the audit criteria on page 15.](#)

[Learn more about how we did this audit on page 12.](#)

Conclusion

We concluded that the Ministry of Forests did not use defined methodologies to calculate consistent and transparent forest carbon projections to inform forest management decisions.

The ministry did not use a defined methodology for calculating the carbon benefit of forest investment projects.

The ministry did not use a fully defined methodology to calculate forest carbon projections to inform allowable annual cut determinations. The methodology was missing a defined method for calculating the carbon impact of harvested wood products.

As we were completing the audit in late 2024, the ministry finalized a methodology to calculate consistent and transparent carbon projections to inform forest landscape plans.



Findings and recommendations

Forest Investment Program

The Forest Investment Program aims to increase the carbon captured and stored in B.C.'s forests through activities such as reforestation and fertilization. The ministry uses carbon projections to estimate the carbon benefit from its forest investments (i.e., how much more carbon will be stored in the future because of the investments). The ministry publicly reports the cumulative carbon benefit from forest investment projects as its only performance measure for climate change mitigation.

No defined methodology for calculating carbon benefit of forest investments

What we looked for

We examined whether the ministry's methodology for calculating the carbon benefit of forest investment projects contained enough information to produce consistent and transparent projections.

[Learn more about the audit criteria on page 15.](#)

What we found

We found the ministry did not have a defined methodology for calculating the carbon benefit of forest investment projects.

The ministry did not document the modelling approach, data sources, or assumptions used to produce the projections.

Ministry staff developed a modelling system to calculate the carbon benefit from the Forest Investment Program. However, this modelling system had not been approved for use by the chief forester.

Overall, the ministry's calculations of the carbon benefit from forest investment projects weren't sufficiently documented to ensure consistency and allow for review or replication.

Despite the lack of defined methodology to ensure consistency and transparency, the ministry used the projections to:

- inform briefing notes and press releases;
- set service plan targets for the carbon benefit of the Forest Investment Program; and
- report the carbon benefit of the Forest Investment Program against its targets in the ministry's annual reports.



Why this matters

Because the projected carbon benefit of the Forest Investment Program is not calculated using a defined methodology, the ministry's assertions of its performance can't be reviewed or replicated to assess their quality. This lack of transparency negatively affects the credibility of the ministry's reporting.

Recommendation

1. We recommend that the Ministry of Forests use a defined and approved methodology to ensure consistent and transparent carbon projections for its forest investment activities.

[See the response from the auditee on page 13.](#)

Allowable annual cut

The *Forest Act* requires the chief forester to determine the allowable annual cut (AAC) at least once every 10 years for the province's 37 timber supply areas and 34 tree farm licences. For each AAC determination, the chief forester must consider biophysical, social, and economic factors.

Ministry staff prepare carbon projections for timber supply area AAC determinations. While the *Forest Act* does not require consideration of carbon in AAC determinations, the calculations provide the chief forester with useful information regarding the impact of their decisions on forest carbon.

Gaps in methodology for calculating carbon projections for allowable annual cut determinations

What we looked for

We examined whether the ministry used a defined methodology to ensure consistent and transparent carbon projections for AAC determinations for timber supply areas.

[Learn more about the audit criteria on page 15.](#)

What we found

We found the ministry didn't use a fully defined methodology to calculate the forest carbon information for AAC determinations for timber supply areas.

While the ministry produced guidance to support carbon analysis for timber supply reviews, key elements needed to ensure consistency and transparency were missing.

The guidance outlined data sources and the modelling approach for forest carbon stock dynamics (e.g., tree growth and decay). But the guidance didn't provide clear instructions for choosing and documenting required parameters, such as temperature settings and changes to growth curves.



The guidance also outlined two approaches for calculating the impact of carbon stored and released from harvested wood products. However, we found that the ministry did not use either of those approaches in the five AAC determinations it made for timber supply areas during our audit period.

Why this matters

By not requiring modellers to use a specific methodology for calculating the impact of carbon stored and released from harvested wood products, the ministry can't ensure consistent and transparent calculations that can be reviewed and replicated to assess their quality.

Recommendation

2. We recommend that the ministry determine and approve the approach for calculating the carbon impact of harvested wood products for allowable annual cut determinations.

[See the response from the auditee on page 14.](#)

Forest landscape plans

The ministry is shifting approaches for forest land planning by replacing forest stewardship plans with forest landscape plans. The ministry intends for forest landscape plans to be prepared in partnership between government and First Nations, in collaboration with forest licensees and local communities, and with input from the public. These plans will define how and where forestry operations can occur in each landscape area.

Forest landscape plans have five objectives:

1. Managing the values placed on forest ecosystems by First Nations.
2. Managing the values placed on forest ecosystems by local communities.
3. Supporting the protection and conservation of the environment.
4. Supporting the production and supply of timber in the forest landscape area.
5. Preventing, mitigating, and adapting to impacts caused by significant disturbances to forests and forest health, including wildfire, insects, disease, and drought.

In 2020, the ministry established four pilot forest landscape planning projects, and started eight more in 2024. Forest carbon modelling will allow forest landscape planning tables to understand the carbon impact of their decisions.



Methodology for calculating carbon projections to inform forest landscape planning recently developed

What we looked for

We examined whether the ministry had developed a methodology to calculate consistent and transparent forest carbon projections to inform forest landscape planning.

[Learn more about the audit criteria on page 15.](#)

What we found

The ministry recently developed a methodology to calculate carbon projections to inform forest landscape planning. The methodology contained all required elements to provide consistent and transparent projections.

In late 2024 the ministry finalized standards and guidance for the design and use of forest landscape models to support forest landscape plans. This guidance included a methodology for modellers to follow to estimate the carbon implications of management decisions.

The guidance stated that carbon projections intersect with four of the five forest landscape planning objectives: managing values placed on forest ecosystems by First Nations and communities; supporting protection and conservation of the environment; and preventing, mitigating and adapting to impacts caused by wildfire, insects, disease, and drought. According to the guidance, forest carbon projections are a mandatory output for forest landscape plans.

We reviewed the methodology and found that it contained the following elements to ensure consistent and transparent carbon estimates.

- The guidance outlined data sources, modelling approaches, and assumptions (i.e., land base, time period, scenarios to model).
- The guidance required modellers to document procedures they used and decisions they made to calculate forest carbon information, including inputs, modelling approach, and outputs.
- The guidance included suggestions for quality assurance and quality control assessments to address the specific uncertainties related to carbon modelling.

Why this matters

If followed, the methodology would ensure consistent and transparent calculations for carbon projections to allow the chief forester and First Nations to understand the carbon impact of their planning decisions.

Recommendation

We have no recommendation in this area.



About the audit

We conducted this audit under the authority of section 11(8) of the *Auditor General Act* and in accordance with the Canadian Standard on Assurance Engagements (CSAE) 3001 – Direct Engagements, set out by the Chartered Professional Accountants of Canada (CPA Canada) in the *CPA Canada Handbook – Assurance*. These standards require that we comply with ethical requirements and conduct the audit to independently express a conclusion against the objective of the audit.

A direct audit involves understanding the subject matter to identify areas of significance and risk, and to identify relevant controls. This understanding is used as the basis for designing and performing audit procedures to obtain evidence on which to base the audit conclusion.

The audit procedures we conducted included document analysis and enquiry. The documents we analyzed included ministry policies and procedures for forest management, standards and guidance for forest carbon calculations, and results of ministry calculations. We also interviewed ministry staff.

We believe the audit evidence we have obtained is sufficient and appropriate to provide a basis for our conclusion.

Our office applies the Canadian Standard on Quality Management (CSQM 1), and we have complied with the independence and other ethical requirements of the code of professional conduct issued by the Chartered Professional Accountants of British Columbia that are relevant to this audit.

Audit report date: February 25, 2025



Sheila Dodds, CPA, CA, CIA
Acting Auditor General of British Columbia
Victoria, B.C.



Appendix A: Recommendations and auditee response

Recommendation 1: We recommend that the Ministry of Forests use a defined and approved standard to ensure consistent and transparent carbon projections for its forest investment activities.

Recommendation 1 Response: The Ministry of Forests agrees with this recommendation and is actively working to obtain formal approval for the existing draft carbon modelling standard.

The decision to carry out tree planting and fertilization activities is not solely dependent on the finalization of the carbon modeling methodology. A draft methodology has already been defined, recognizing that carbon modelling is an evolving field of practice.

The Ministry acknowledges the importance of having an officially approved standard for quantifying and reporting carbon benefits.

It is expected that the methodology will be finalized over the next 12 months and will subsequently go through the appropriate approval process. The Ministry's goal is to have this work completed in the spring of 2026.



Recommendation 2: We recommend that the Ministry of Forests determine and approve the approach for calculating the carbon impact of harvested wood products for allowable annual cut determinations.

Recommendation 2 Response: The Ministry of Forests agrees with this recommendation and is actively working towards finalizing and approving carbon modelling guidance for TSRs.

Modeling methodology is evolving based on new science, better data and enhanced modelling tools. The Ministry has been proactive by including carbon modelling in the TSR process even though it is not a legislative requirement for the statutory decision maker when making determinations.

The Ministry expects to have draft TSR modelling guidance developed by May 2025, and have a final version approved the fall of 2025.

The TSR carbon modelling guidance will list all relevant modelling parameters. This includes temperature settings. The temperature settings are relevant to rates of carbon decay. Other examples of parameters are administrative, ecozone, species, and disturbance mapping defaults. Changes to growth will not be included, as that is not a parameter that we would set in CBM. For CBM, growth curves are an input from other models (such as TIPSYP and VDYP), so any changes would be done there (for example due to alternative silviculture or climate change).

The modelling guidance will clearly state the HWP method to be used. Consistent with the FLP Standards, this will be based on FCOP 2.0. The TSR carbon modelling guidance will be consistent with the carbon modelling framework outlined in the FLP Standards and will provide explicit technical details on how to run CBM for TSR.



Appendix B: Audit criteria

- Criterion 1.1** The ministry used a defined methodology to estimate the carbon benefit of forest investment projects.
- Criterion 1.2** The ministry used a defined methodology for its forest carbon projections to inform timber supply area allowable annual cut determinations.
- Criterion 1.3** The ministry developed a methodology to calculate consistent and transparent forest carbon projections to inform forest landscape level decisions.





Office of the
Auditor General
of British Columbia

Report team

Laura Hatt
Assistant Auditor General

Amy Hart
Executive Director

Janice Dowson
Manager

Christine Armour
Manager

Daniela Pinto
Auditor

Location

623 Fort Street
Victoria, British Columbia
Canada V8W 1G1

Office Hours

Monday to Friday
8:30 a.m. – 4:30 p.m.

Telephone: 250-419-6100

Toll-free through Enquiry BC: 1-800-663-7867
In Vancouver: 604-660-2421

Fax: 250-387-1230

Email: bcauditor@bcauditor.com

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Planted saplings grow in reforested area near
Port Alberni, British Columbia
Cover photo source: Pamela Joe McFarlane/
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