



# Warning: Natural and Managed Forests are Losing their Capacity to Mitigate Climate Change

One of the outcomes of the COP26<sup>1</sup> in November 2021, was the *Glasgow Leaders' Declaration on Forests and Land Use*. The declaration emphasizes, *inter-alia*, the role of forests in helping to achieve a balance between anthropogenic greenhouse gas emissions and removal by sinks. The 133 signatory countries, among which are the 10 countries with the largest forest areas on the globe, agree to ... *working collectively to halt and reverse forest loss and land degradation by 2030 while delivering sustainable development and promoting an inclusive rural transformation*. Counting on world forests and the role they play in regulating climate is not new for the UNFCCC<sup>2</sup>.

First, the Clean Development Mechanism (CDM) of the Kyoto Protocol, which entered into force in 2005, included afforestation and reforestation (CDM-AR) as a flexible mechanism for Annex I countries to obtain emission reduction credits in developing countries. Including the protection of forests in the international mitigation tool kit was a key outcome of COP11 in 2005, which led to the development of the REDD+ mechanism (Reducing Emissions from Deforestation and forest Degradation - Lesniewska 2013). Since then, important efforts engaging the World Bank, the UN-REDD+ program or the Norwegian Climate Initiative, among others, have supported efforts to reduce deforestation.

This renewed importance given to forests by the world leaders in Glasgow can be traced back to the popular idea that *Natural Climate Solutions* could contribute almost 40% of the emissions reduction needed through 2030 in a cost-effective way (Griscom *et al.* 2017). Currently, the only widely available

“technology” providing negative emissions is the sequestration of CO<sub>2</sub> by terrestrial ecosystems, forests being the most important in terms of their extent and potential carbon density. Here, we contend that we urgently need to revisit this idea that natural and managed forests can continue to serve as a central pillar of global climate change mitigation efforts; forests cannot continue to play this vital role without (1) a drastic reduction in our fossil carbon emissions, and (2) a modification in the way we establish and manage our forests.

Abundant evidence throughout the world shows that, rather than being climate saviours, forests are falling victim to climate change themselves (Seidl *et al.* 2017). More intense dry seasons and increased fire and deforestation have already shifted part of the Amazon from a carbon sink to a source (Gatti *et al.* 2021). The Canadian Forest has been a net carbon emitter since 2000 due to increased insect and fire disturbances fueled by climate change (Environment and Climate Change Canada 2020). Fire activity and concomitant deforestation due to climate change is also expected to increase throughout the USA (Heidari *et al.* 2021). Even European forests, which have been considered a solid carbon sink for decades, are showing signs of losing their positive carbon balance due to increased biomass loss by wind, fire, drought, and biotic disturbances (Forzieri *et al.* 2021). Clearly, the potential of natural and managed forests to provide climate solutions rests on their long-term resilience and ability to withstand both chronic long-term effects of climate change as well as extreme events such as drought and heat waves (Ghazoul *et al.* 2015). Consequently, a global forest agenda not only needs to prevent forest loss but must also facilitate management approaches aimed at increasing the resilience and adaptive capacity of forests, e.g., via increasing both functional diversity and connectivity of forest landscapes (Messier *et al.* 2019), promoting climate-smart forestry

(Verkerk *et al.* 2020) and diversifying planted forests (Messier *et al.* 2021). We can no longer expect forests to continue their role in protecting the climate if global warming continues unabated. We therefore call for an ambitious and comprehensive agenda to protect and enhance the capacity of the world's forests to regulate the climate.

The first and most important step of this global forest agenda is an ambitious reduction in greenhouse gas emissions from the fossil fuel sector. World leaders are mistaken to think that protecting forests alone will achieve the necessary reductions in net CO<sub>2</sub> emissions. While the suggestion by Sir Nicholas Stern (Stern 2006) that controlling deforestation is the most cost-efficient way to reduce emissions is very appealing, it is outdated and neglects the fact that ongoing climate change severely erodes the ability of forests to capture and store carbon. For forests to keep playing their important role in climate regulation we first and foremost need to stabilize global climate change at below 1.5° C. Recognizing the limitations and uncertainties associated with a forest-centered climate mitigation strategy is intricately linked to the irreplaceable role of emissions reduction to avoid a catastrophic shift in global climate. Such recognition may also weaken the narrative of stakeholder groups seeking excuses to avoid taking effective measures to cut fossil emissions.

The *Glasgow Leaders' Declaration on Forests and Land Use* and article 38 of the Glasgow Climate Pact, therefore, needs to be interpreted in the context of article 36 as well as the other declarations issued during COP26. We note with great concern that article 36 of the Glasgow Climate Pact only mentions the need to phase out unabated coal power completely, leaving out the urgent need to slow down and eventually completely stop the production of petrol and natural gas. McGlade and Etkins (2015) indeed estimated that one third of all oil and gas reserves as well as

<sup>1</sup>The Conference of the Parties (COP) is the supreme decision-making body of the UNFCCC

<sup>2</sup>United Nations Framework Convention on Climate Change

80 % of the world's coal reserve would need to remain underground to limit global warming to 2°C. Furthermore, the global coal to clean power transition statement signed by 37 countries and the declaration on zero emission cars and vans signed by 46 countries are interesting in that these declarations tackle both the supply (clean power) and demand (cars and vans) side

aspects of the low carbon transition (Sharmina *et al.* 2021). However, their level of ambition and the reduced number of countries supporting them completely falls short of the ambition needed both in terms of targets and of international buy-in. The outcome of COP26 gives the impression that world leaders believe that the protection, restoration, and management of forests

will serve to control climate change without a strong commitment to (1) reduce carbon emissions beyond coal and, (2) rethink the way we manage forests. This thinking is dangerous and not in line with current science and could lead to a false sense of security regarding the world's trajectory in the ongoing climate crisis.

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# Avertissement : Les forêts naturelles et aménagées sont en train de perdre leur capacité d'atténuation des changements climatiques

On compte parmi les retombées de la COP26<sup>1</sup> qui a eu lieu en novembre 2021, la Déclaration de Glasgow sur l'utilisation des forêts et des terres. La déclaration des leaders souligne, entre autres, le rôle des forêts dans l'atteinte d'un équilibre entre les émissions de gaz à effets de serre d'origine anthropogénique et leur fixation dans des réservoirs. Les 133 pays signataires, parmi lesquels les 10 pays comptant les plus grandes superficies forestières de la planète, ont convenu de... collaborer pour stopper et renverser la perte de forêts et la dégradation des terres d'ici 2030 tout en maintenant le développement durable et la promotion d'une transformation inclusive du monde rural. Tenir compte des forêts mondiales et du rôle qu'elles jouent dans la régulation du cli-

mat ne constitue pas une nouveauté pour le CCNUCC<sup>2</sup>.

En premier lieu, le mécanisme de développement propre du Protocole de Kyoto, qui a pris effet en 2005, incluait le boisement et le reboisement comme mécanismes admissibles par les pays de l'Annexe 1 cherchant à obtenir des crédits de réduction des émissions dans les pays en voie de développement. De plus, la protection des forêts incluse parmi l'ensemble des outils de d'atténuation à l'échelle mondiale, représentait une avancée à la suite de la COP11 tenue en 2005, ce qui a mené à l'élaboration du mécanisme REDD+ (Reducing Emissions from Deforestation and forest Degradation—Lesniewska 2013).

Depuis, d'importants engagements de la part de la Banque mondiale, du

programme ONU-REDD ou de l'Initiative norvégienne sur le climat, entre autres, ont appuyé les efforts de réduction de la déforestation. Cette importance de nouveau accordée aux forêts par les leaders internationaux présents à Glasgow peut être reliée à l'idée répandue que les solutions naturelles offertes pour lutter contre les changements climatiques pourraient contribuer à une réduction de près de 40 % des émissions d'ici 2030 de façon facile et rentable (Griscom *et al.* 2017). À l'heure actuelle, la seule « technologie » facilement disponible ne créant pas d'émissions lors de la séquestration du CO<sub>2</sub> par les écosystèmes terrestres, demeure les forêts du fait de leurs superficies et de la densité potentielle de carbone. Nous voulons dans ce qui suit convenir qu'il nous faut de toute urgence reconsidérer cette idée que les forêts naturelles et aménagées peuvent demeurer le pilier central des efforts d'atténuation des change-

<sup>1</sup>La Conférence des Parties (COP) est l'organe de décision suprême du CCNUCC

<sup>2</sup>Convention-cadre des Nations unies sur les changements climatiques

ments climatiques ; les forêts ne peuvent continuer de jouer ce rôle vital sans (1) une réduction drastique de nos émissions de carbone d'origine fossile et (2) une modification de notre façon de mettre en place et d'aménager nos forêts.

De nombreux indices en provenance du monde entier indiquent que plutôt d'être les sauveteurs climatiques attendus, les forêts sont également les victimes des changements climatiques (Seidls *et al.* 2017). Des saisons marquées de fortes sécheresses et de feux de forêts plus intenses en plus de la déforestation incontrôlée ont déjà fait basculé certaines régions de l'Amazonie de réservoirs de carbone en sources de carbone (Gatti *et al.* 2021). Les forêts canadiennes sont devenues une source nette de carbone depuis 2000 à la suite d'épidémies d'insectes et de feux de forêts découlant de changements climatiques (Environnement et changements climatiques Canada 2020). Les feux de forêts et le déboisement conséquent dû aux changements climatiques sont évalués à la hausse partout aux É.-U. (Heidari *et al.* 2021). Même les forêts de l'Europe qui ont été classées comme des réservoirs de carbone solide depuis des décennies, affichent présentement des signes de hausses des émissions à la suite de perte de biomasse à cause des vents, des feux, de la sécheresse et autres perturbations biotiques (Forzieri *et al.* 2021). En somme, le potentiel des forêts naturelles et aménagées de constituer une solution aux changements climatiques réside dans leur résilience à long terme et leur capacité à surmonter tant les effets à long terme des changements climatiques que les événements extrêmes comme la sécheresse et les vagues de chaleur (Ghazoul *et al.* 2015). En conséquence, un agenda forestier mondial se doit non seulement de prévenir les pertes de forêts, mais également faciliter les approches d'aménagement visant à accroître la résilience et la capacité d'adaptation des forêts, par exemple, par l'accroissement de la diversité fonctionnelle et la connectivité entre les territoires forestiers (Messier *et al.* 2019), par la promotion d'une foresterie orientée vers le climat (Verkerk *et al.* 2020) et la diversification des plantations forestières (Messier *et al.* 2021). Nous ne pouvons plus nous attendre à ce que les forêts puissent maintenir leur rôle de protection contre les change-

ments climatiques si le réchauffement climatique mondial n'est pas jugulé. Nous appelons à partir de maintenant à la création d'un agenda ambitieux et global de protection et d'accroissement de la capacité des forêts mondiales à régulariser le climat. La première et plus importante étape de cet agenda forestier mondial est de réduire de façon marquée les émissions de gaz à effets de serre générés par le secteur des carburants fossiles. Les leaders mondiaux sont dans l'erreur de penser que la seule protection des forêts générera les réductions requises des émissions nettes de CO<sub>2</sub>. Même si la suggestion de Sir Nicholas Stern (Stern 2006) de contrôler le déboisement tout en étant un moyen efficace et rentable de réduire les émissions semble être invitante, elle est présentement périmée et met de côté le fait que les changements climatiques en cours ont sévèrement érodé la capacité des forêts de capturer et d'emmagasiner le carbone. Pour que les forêts soient en mesure de jouer leur rôle primordial de régulation du climat, nous devons en premier lieu et avant tout stabiliser la hausse mondiale des températures à moins de 1,5 °C. Il faut reconnaître que les limites et les incertitudes associées à une stratégie d'atténuation des changements climatiques centrée sur les forêts sont intrinsèquement liées au rôle primordial de la réduction des émissions pour éviter une perturbation catastrophique du climat mondial. Une telle reconnaissance pourrait également affaiblir le discours des groupes d'intervenants qui cherchent des excuses pour éviter de mettre en place des mesures efficaces de réduction des émissions d'origines fossiles. La Déclaration de Glasgow sur l'utilisation des forêts et des terres, ainsi que l'article 38 du Pacte climatique de Glasgow doivent, par conséquence, être interprétés selon le contexte de l'article 36 et des autres déclarations émises au cours de la COP26. Nous sommes très inquiets de noter que l'article 36 du Pacte climatique de Glasgow ne fait mention que de la nécessité de supprimer totalement les centrales au charbon, sans mention de l'urgence de réduire et éventuellement cesser complètement la production de pétrole et de gaz naturel. McGlade et Etkins (2015) ont en effet estimé que le tiers de toutes les réserves de pétrole et de gaz, ainsi que 80 % des gisements de charbon de la planète ne

doivent pas être exploités afin de limiter le réchauffement global à 2 °C. De plus, la déclaration portant sur la transition à l'échelle mondiale du charbon vers une énergie propre signée par 37 pays et la déclaration sur les autos et camionnettes sans émission nocive signée par 46 pays sont intéressantes du fait que ces déclarations portent à la fois sur les aspects de l'offre (énergie propre) et la demande (autos et camionnettes) liés à la transition de réduction du carbone (Sharmina *et al.* 2021). Toutefois, leur niveau d'ambition et le faible nombre de pays appuyant ces déclarations réduit la portée requise pour que les cibles soient atteintes et qu'elles soient acceptées mondialement. Les retombées de la COP26 donnent l'impression que les leaders mondiaux croient que la protection, la restauration et l'aménagement des forêts seront aptes à contrôler les changements climatiques sans l'obligation de (1) réduire les émissions de carbone au-delà du charbon et (2) de revisiter notre façon d'aménager les forêts. Cette façon de penser est dangereuse et n'est pas conforme aux connaissances scientifiques actuelles et pourrait engendrer un faux sentiment de sécurité face aux tendances mondiales de la crise climatique actuelle.

## References and Notes/ Références et notes

- Glasgow Leaders' Declaration on Forests and Land-use.* <https://ukcop26.org/glasgow-leaders-declaration-on-forests-and-land-use/>
- Environment and Climate Change Canada. 2020.** National Inventory Report 1990–2018: Greenhouse Gas Sources and Sinks in Canada. <https://unfccc.int/documents/224829>.
- Forzieri, G., M. Girardello, G. Ceccherini, J. Spinoni, L. Feyen, H. Hartmann *et al.* 2021.** Emergent vulnerability to climate-driven disturbances in European forests. *Nature Commun.* 12: 1–12.
- Gatti, L.V., L.S. Basso, J.B. Miller, M. Gloor, L. Gatti Domingues, H.L.G. Cassol *et al.* 2021.** Amazonia as a carbon source linked to deforestation and climate change. *Nature* 595: 388–393.
- Ghazoul, J., Z. Burivalova, J. Garcia-Ulloa and L.A. King. 2015.** Conceptualizing Forest Degradation. *Trends in Ecology & Evolution* 30: 622–632.
- Griscom, B.W., J. Adams, P.W. Ellis, R.A. Houghton, G. Lomax, D.A. Miteva, *et al.* 2017.** Natural climate solutions. *PNAS* 114: 11645–11650.



**Heidari, H., M. Arabi and T. Warziniack. 2021.** Effects of Climate Change on Natural-Caused Fire Activity in Western US National Forests. *Atmosphere* 12 (8). DOI: 10.3390/atmos12080981.

**Lesniewska, F. 2013.** UNFCCC REDD+ COP Decisions: The Cumulative Effect on Forest Related Law Processes. *International Community Law Review* 15: 103–121.

**McGlade, C. and P. Ekins. 2015.** The geographical distribution of fossil fuels unused when limiting global warming to 2 °C. *Nature* 517: 187–190.

**Messier, C., J. Bauhus, F. Doyon, F. Maure, R. Sousa-Silva, P. Nolet, M. Mina, N. Aquilué, M-J. Fortin and K. Puettmann. 2019.** The functional complex network

approach to foster forest resilience to global changes. *Forest Ecosystems* 6, 21. DOI: 10.1186/s40663-019-0166-2.

**Messier, C., J. Bauhus, R. Silva et al. 2021.** For the sake of resilience and multifunctionality, let's diversify planted forests! *Conservation Letters*. e12829.

**Seidl, R., D. Thom, M. Kautz, D. Martin-Benito, M. Peltoniemi, G. Vacchiano et al. 2017.** Forest disturbances under climate change. *Nature Climate Change* 7: 395–402.

**Sharmina, M., O.Y. Edelenbosch, C. Wilson, R. Freeman et al. 2021.** Decarbonising the critical sectors of aviation, shipping, road freight and industry to limit warming to 1.5–2°C. *Climate Policy* 21: 455–474.

**Stern, N. 2007.** The economics of climate change: The Stern Review. Cambridge University Press. <https://www.lse.ac.uk/granthaminstitute/publication/the-economics-of-climate-change-the-stern-review/>.

**Verkerk, P.J., R. Costanza, L. Hetemäki, I. Kubiszewski, P. Leskinen, G.J. Nabuurs, J. Potocnik and M. Palahi. 2020.** Climate-Smart Forestry: The missing link. *Forest Policy and Economics* 115, 102164.

## Response to Muir – Paradigm Shift, Meet Denial

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Change is hard, especially when it requires a fundamental shift in worldview. Not surprisingly, a first reaction is to disregard the call for change, and if that doesn't work, to deny the need. An opinion piece published in *The Forestry Chronicle* by Muir (2021) denied the need for change to BC forestry. We strongly disagree with his message and his methods.

The provincial government took a leadership step when it commissioned a review of the state of BC's old growth (Gorley and Merkel 2020). A striking outcome of Gorley and Merkel's extensive year-long consultation process was their conclusion that almost everyone, regardless of perspective, agreed that BC's current forest management approach is not working. The authors, both men with long careers in traditional forest management, recommended a fundamental change—a paradigm shift—from managing timber with constraints to prioritizing ecosystem health, as BC, along with the rest of the globe, faces climate and biodiversity crises (IPBES 2019; IPCC 2022).

The first on-the-ground implication is recommendation #6: "Until a new strategy is implemented, defer development in old forests where ecosystems are at very high and near-term risk of irreversible biodiversity loss" (Gorley and Merkel 2020). The authors list criteria to identify these forests based on stand age, ecosystem rarity and tree size. Recommendation #6 calls for a temporary pause in logging of these

at-risk forests in order to maintain options and provide time for collaboration, consultation, analysis, and planning. Deferrals would be the first manifestation of a new approach that aims to maintain ecosystem health.

In 2021, the BC government appointed an independent panel, the Old Growth Technical Advisory Panel (OG TAP), to identify and map at-risk forests that meet Gorley and Merkel's (2020) criteria. The panel neither designed the criteria nor decided whether deferrals would happen; the BC government made those choices based on Gorley and Merkel's advice. As the intent was simply to maintain options for ensuing conversations, the panel was asked to work quickly using available strategic-level provincial data.

Following release of maps showing recommended areas for harvest deferral, the deferral process and members of the OG TAP have been criticized in this journal (Muir 2021) and elsewhere (Truck Loggers Association 2022, Interior Lumber Manufacturers' Association 2021, various media outlets). Muir and his colleagues have tried to generate uncertainty about the need for change, discredit participating scientists and professionals, discredit the process itself, and sow concern about dire consequences. These now-familiar tactics were pioneered and honed by tobacco and oil industries (Union of Concerned Scientists 2018). We suggest Muir's string of false statements and half truths serve to obfuscate and mislead at best (Table 1).

### Generating Uncertainty

In an effort to generate uncertainty about the need for change, Muir implies that BC has plenty of old growth, plenty of big-treed old growth, and plenty of protected old growth. He claims that BC has 19.2 million ha of old forest (Muir 2021), a number that directly contradicts the 11.1 million ha determined by OG TAP (Old Growth Technical Advisory Panel 2021), approved by provincial government analysts, and confirmed by Forsite (2021). Muir does not present his criteria or methods.

Based on an industry-funded report (Forsite 2021), Muir claims that 30% of remaining old growth, rather than 3% as reported in Price *et al.* (2021), occurs on highly productive sites. To achieve this ten-fold increase, Forsite (2021) included stands classified as moderate productivity by Price *et al.* (2021), and unsurprisingly found more area. Changing definitions confuses or misleads readers; it does not falsify previous findings as claimed by Muir.

While it is true that considerable old growth remains in BC, particularly at high elevations, in low productivity bog forests and in remote regions, the remnants do not at all represent the original extent, type, or distribution of old growth (Price *et al.* 2021). In most ecosystems, highly productive old growth covers a small fraction of its former distribution, often in small patches and with diminished ecosystem services – a pattern common worldwide (Joppa and Pfaff 2009; Lindenmayer *et al.* 2012).

**Table 1. Responses to claims in Muir (2021)**

Claim	Assessment	Comment
<b>Generating Uncertainty About the Need for Change</b>		
“over 3.3 million ha of old forests, or about 30% are growing on high productivity sites”	False comparison	Forsite (2021) changed the threshold for big trees so that this number includes stands that were classified as moderately productive in Price <i>et al.</i> 2021, thus increasing from 3% (high productivity) to 30% (moderate plus high productivity; Holt <i>et al.</i> 2022).
“19.2 million hectares of old growth in BC”	False	OG TAP, approved by the province, found 11.1 million hectares of old growth meeting provincial criteria (OG TAP 2021).
“6.9 million hectares... is protected”	False	OG TAP, approved by the province, found 3.5 million hectares meeting provincial protected criteria (including old growth management areas; OG TAP 2021).
<b>Questioning Credibility of the Process</b>		
“tight coterie of anti-forest groups”	False	OG TAP work was independent of any political processes and is replicable.
“Deferral areas are riddled with inaccuracies”	Wrong scale	Deferrals used provincial data which are designed for strategic level planning and are the same used for timber supply analysis.
“Deferrals have been geographically situated to block access” to timber	False	Deferrals used replicable methods to identify at-risk forests. There was no shifting to meet any other objectives.
<b>Questioning Credibility of OG TAP</b>		
“four of the five appointees to OG TAP members had ties to” the Sierra Club	False	Four of the five members (including all three analysts) do not belong to, have never worked for, and have no ties with the Sierra Club. Most of their work over the past 25 years has been for provincial and First Nations’ governments. The fifth member worked for Sierra Club 15 years ago.
two Sierra Club-linked members “are married”	Half-truth	They are not Sierra Club-linked, but they are married. They also managed a woodlot together and worked on industry contracts together.
old-growth study “hosted on the Sierra Club website”	Half-truth	The study was released and hosted on an independent website belonging to one of the scientists. The Sierra Club subsequently reposted the report.
old-growth study “claimed to have been written on a ‘voluntary’ basis”	True	The authors volunteered over a year’s person-days as a professional responsibility to the public.
Voluntary “claim turns out to be worth exactly what was paid for it”	False	The authors stand by their peer-reviewed work. We are unaware of credible criticism. Forsite (2021) used a different threshold to define big-treed forest; the analysis is not comparable and does not change the results of Price <i>et al.</i> (2021).
The panel “ignored” ... “independent studies”	False	Forsite’s (2021) COFI-sponsored report was not independent and was not released until the week before the OG TAP work. However, OG TAP had already addressed the challenges associated with site index metrics raised in the report by using tree height and diameter.
OG TAP aimed to “marginalize authority of professional foresters”	False	The panel included two registered professional foresters and two ecologists with extensive experience in old growth assessment.
OG TAP “insisted that their professional advice remained unchallenged”	False	Provincial ecologists and analysts reviewed all OG TAP work. OG TAP members addressed all concerns.
<b>Sowing Concern About Dire Consequences</b>		
OG TAP report “immediately implemented in full”	False	OG TAP mapped candidate deferral areas for consideration by First Nations. Beyond BCTS pausing sales in overlapping areas, nothing was implemented immediately. There have been no Section 13 deferral orders implemented as of April 13.
Estimates of “loss of up to 18000 jobs”	Inflated	Deferrals provide a pause, not protection. Deferrals overlap with about 50,000 ha of planned cutblocks; cutblocks can be moved. Even if the total 2.6 million-hectare area was subsequently protected, it covers 7% of the timber harvesting landbase, suggesting loss of up to 7% of jobs (3500 forest sector jobs or 6000 direct, indirect, and induced jobs; BC Government 2020 multiplier).

**Table 1. Continued**

Claim	Assessment	Comment
“Decide the fate of an industry that represents 18%” of BC’s economy	Undefined indicator	There are many ways to express proportion of BC’s economy; Muir does not clarify his indicator. Forestry, support for forestry, wood, and paper manufacturing totalled 2.3% of BC’s 2020 GDP (Stats Canada 2022).
The “annual allowable cut would be slashed severely”	False	Deferrals are temporary. The annual cut will not be affected until land use plans are in place as per current provincial policy.
“incapable of supporting the level of harvesting we have today”	True	The fall-down effect where timber harvest level drops as the industry transitions to harvesting second growth has been understood and ignored for decades.
“massive shortfall in government revenues”	Inflated	The projected drop in revenues in the latest budget is mainly due to a projected decrease in lumber prices from historic high levels (BC Government 2022).

### Discrediting Process and Participants

Muir (2021) questions the credibility of the process and OG TAP members. We leave process comments to the provincial government to address beyond noting that OG TAP work was independent of any political process, was replicated by provincial analysts and is replicable (except for some private Tree Farm Licence data) to anyone with analytical capacity.

Muir tries to discredit the scientists and professionals who worked to identify deferrals. For the record, the technical horsepower of the OG TAP, Daust, Price, and Holt, have no ties to the Sierra Club, and have worked primarily for provincial and First Nations’ governments for the last 25 years. They have published peer-reviewed science articles on forests and forestry, have been hired as experts on forest management matters for decades, do field work, and have managed a woodlot. They have also defended First Nations in court against the provincial government. As claimed, two are married. (One is not!) Scandal? We hardly think so. The Sierra Club posted Price *et al.*’s 2020 report on their website – also, hardly a crime. While the authors have no ties with the Sierra Club, we wonder why a mission “to support people stewarding abundant ecosystems and a stable climate, while building resilient, equitable communities” (Sierra Club 2022) prevents good science any more than corporate goals to maximise shareholder profit (Malhotra 2019).

There *are* legitimate criticisms of government’s chosen process path with

respect to deferrals, especially related to First Nations’ involvement. The technical analysis underpinning deferral recommendations, and the independence and expertise of the OGTAP, however, are not valid criticisms.

We question publication of Muir’s opinion including fallacious *ad hominem* arguments in *The Forestry Chronicle* – a “professional and scientific forestry journal” (Canadian Institute of Forestry 2022). Journalistic integrity matters to society and particularly in journals, such as *The Forestry Chronicle*, purporting to be scientific and unbiased sources of information.

### Spreading Fear

Muir (2021) predicts dire socio-economic costs of deferral, quoting the loss of 18 000 jobs (COFI 2021) and suggesting a massive loss in provincial revenue. These numbers seem inflated. Deferrals are a temporary pause not protection, and every region has merchantable timber beyond recommended deferral areas. Only 50 000 ha of the 2.6 million ha of recommended deferral area overlap with active and pending cutblocks. Apart from small area-based tenures like woodlots, which are exempt from deferrals, deferrals should create minor short-term costs associated with changing harvesting plans. Even if people, through subsequent land-use planning, decide to protect all recommended deferral areas, this area represents about 7% of the timber harvesting land base, meaning a potential decline of 7%, about 3 500 forestry, manufacturing, and support jobs (Canadian Forest Service 2021), or up to 6 000 including

indirect and induced jobs (BC Government 2020).

There are many ways to express contribution to BC’s economy. Muir claims that forestry represents 18% of our “base economy” without explaining this metric or presenting data on contribution to a well-established metric like the GDP. While vital to many small communities, the forest sector, including manufacturing and support, contributes about 2 – 3% to BC’s GDP (Stats Canada 2022). Without cited evidence, it is impossible to assess Muir’s claim of massive social cost.

An unfortunate result of denial is that, when it comes to jobs and community impacts, environmental protection is being scapegoated, drawing attention away from more fundamental, and worrisome, trends. Claims that reduced harvest levels drive job losses are not supported by data: over the past 30 years, comparing jobs to volume harvested demonstrates that more than three-quarters of all jobs lost were due to mechanization and increased efficiency, not reduced area or volume harvested (SAFT 2021). Increasing efficiency benefits shareholders and company executives, less so workers and communities. Compounding impacts, volume harvested will decline, though mostly not due to conservation. The forest sector has known for decades that timber supply will drop, the “fall-down”, as industry transitions from harvesting old growth to second growth. This fall-down has been ignored, meaning that BC is now peering over a timber supply cliff edge. Avoiding deferrals will not remove the



cliff. Adding value could potentially mitigate impacts of increased efficiency and decreasing supply. However, the focus on developing a value-added industry, started almost three decades ago, has so far failed due to policies that incentivise large spaghetti mills and high volumes of low value products.

## Discussion

Let's return to the big picture. Until now, provincial policy has managed forests primarily for timber, leading to implications for ecosystem health (Gorley and Merkel 2020). The province has committed to implementing recommendations to shift this prioritisation. Deferrals are intended as a small step in that process, a rapid action to pause further harm and allow planning for ecosystem health.

The fog of outrage—it is not science—against deferrals and the paradigm shift mirrors decades of climate denial, and moves the focus away from the conversation we need: how can we manage BC's forests to ensure ecosystem health and resilience under a changing climate? Like climate change, beginning the transition in the 1990's would have placed BC on a better track economically and ecologically. The longer we wait to act, the more painful the process.

There is no time for power plays. The need for a paradigm shift is clear. Humanity faces concurrent biodiversity and climate crises, and forest conservation and improved management can help (Drever *et al.* 2021). Instead of denying that a problem exists, we suggest that professionals, politicians, and citizens re-focus our collective energy on solving the challenging questions ahead. We must determine how to implement reforms that move us up the value chain, supporting workers and communities through this transition we've known was coming for 50 years. Rather than creating division, we need work together. We call upon all forest professionals and others in industry to take leadership roles that look for solutions rather than continuing the petty and backward-looking rhetoric published in Muir's (2021) article.

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## Literature Cited

- BC Government 2020.** Forest economic multipliers [https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/forest-industry-economics/economic-state/bc\\_forest\\_economic\\_multipliers.pdf](https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/forest-industry-economics/economic-state/bc_forest_economic_multipliers.pdf) [accessed April 20, 2022]
- BC Government 2022.** Budget and fiscal plan 2022/23 to 2024/25. Table A5. [https://www.bcbudget.gov.bc.ca/2022/pdf/2022\\_budget\\_and\\_fiscal\\_plan.pdf](https://www.bcbudget.gov.bc.ca/2022/pdf/2022_budget_and_fiscal_plan.pdf)
- Canadian Forest Service 2021.** Statistical data for BC forest sector employment <https://cfs.nrcan.gc.ca/statsprofile/employment/bc> [accessed April 20, 2022]
- Canadian Institute of Forestry 2022.** About *The Forestry Chronicle*. <https://www.cif-ifc.org/what-we-do/about-the-forestry-chronicle/>
- COFI 2021.** Harvest deferral process will have devastating impacts shutting 14 to 20 sawmills and threatening 18 000 BC jobs. News release November 2, 2021. <https://www.cofi.org/harvest-deferral-process-will-have-devastating-impacts-shutting-14-to-20-sawmills-and-threatening-18000-bc-jobs/>
- Drever, C.R., Cook-Patton, S.C., Akhter, F., Badiou, P.H., Chmura, G.L., Davidson, S.J., Desjardins, R.L., Dyk, A., Fargione, J.E., Fellows, M. and Filewod, B., 2021.** Natural climate solutions for Canada. *Science Advances*, 7(23), p.eabd6034.
- Forsite 2021.** Status of BC's old forests. Report written for BC Council of Forest Industries (COFI). [https://www.cofi.org/wpcontent/uploads/BC\\_OldGrowth\\_2021Satus-Report\\_Oct21-2021.pdf](https://www.cofi.org/wpcontent/uploads/BC_OldGrowth_2021Satus-Report_Oct21-2021.pdf)
- Gorley A. and Merkel G. 2020.** A new future for old forests: a strategic review of how British Columbia manages for old forests within its ancient ecosystems. <https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/stewardship/old-growth-forests/strategic-review-20200430.pdf>
- Holt, RF, Price K and Daust D 2022.** How much big-treed old growth remains in BC—very little. <https://veridianecological.ca/old-growth-resilience/>
- Interior Lumber Manufacturers' Association 2021.** Old growth deferral. Presentation to the Regional District of Kootenay-Boundary.
- IPCC 2022.** Climate Change 2022: Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [H.-O. Pörtner, D.C. Roberts, M. Tignor, E.S. Poloczanska, K. Mintenbeck, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem, B. Rama (eds.)]. Cambridge University Press. *In Press*. <https://www.ipcc.ch/>
- IPBES 2019.** Global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. (Version 1). Zenodo. <https://doi.org/10.5281/zenodo.6417333>.
- Joppa, L. N. & Pfaff, A. 2009.** High and far: biases in the location of protected areas. *PloS one*, 4(12), e8273.
- Lindenmayer, D. B., Laurance, W. F., & Franklin, J. F. 2012.** Global decline in large old trees. *Science* 338(6112): 1305–1306.
- Malhotra N. 2019.** Should corporations simply maximize shareholder value? *Forbes*. <https://www.forbes.com/sites/neilmalhotra/2019/04/16/should-corporations-simply-maximize-shareholder-value/?sh=6c08a09627b7>
- Muir S. 2021.** Modernization, meet paradigm shift. Paradigm shift, meet chaos. *The Forestry Chronicle*. 97: 226–228.
- OG TAP 2021.** Priority deferrals: an ecological approach. Old Growth Technical Advisory Panel. [https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/stewardship/old-growth-forests/summary\\_for\\_g2g\\_package.pdf](https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/stewardship/old-growth-forests/summary_for_g2g_package.pdf)
- Price K, Holt RF and Daust D. 2020.** BC's old growth forest: a last stand for biodiversity. <https://veridianecological.files.wordpress.com/2020/05/bcs-old-growth-forest-report-web.pdf>
- Price K, Holt RF, and Daust D. 2021.** Conflicting portrayals of remaining old growth: the British Columbia case. *Canadian Journal of Forest Research*. 51(5): 742–752. <https://doi.org/10.1139/cjfr-2020-0453>
- SAFT 2021.** Job change in the forest sector. Science alliance for forestry transformation. [https://www.saftforestry.com/\\_files/ugd/25533c\\_548889ab1e3848c48c6dcb02079006a8.pdf?index=true](https://www.saftforestry.com/_files/ugd/25533c_548889ab1e3848c48c6dcb02079006a8.pdf?index=true)
- Sierra Club 2022.** BC mission statement. <https://sierraclub.bc.ca/about/>
- Statistics Canada 2022.** Table 36-10-0402-01 Gross domestic product (GDP) at basic prices, by industry, provinces and territories (x 1,000,000) DOI: <https://doi.org/10.25318/3610040201-eng> [accessed April 18, 2022]
- Truck Loggers Association 2022.** Winter 2022 Truck Logger BC magazine. Includes Muir article identical to that in *The Forestry Chronicle*.
- Union of Concerned Scientists. 2018.** The disinformation playbook. <https://www.ucsusa.org/resources/disinformation-playbook>