Verified Carbon Standard
A VERRA STANDARD

Comments received during the 23 March - 22 April 2022 Public Consultation on new *Methodology For Improved Forest Management Through Targeted, Short-Term Harvested Deferral*

Note: The developer has provided responses to the comments and Verra has made a preliminary assessment (see color code). The methodology will not be updated or assessed by a VVB due to Verra's decision not to move forward with tonne-year accounting at this time.

#	Organization	Commenter	Section	Comment	Proposed Change	Developer Response (see color code of preliminary assessment)
						It is likely that these comments have been fully addressed, but an updated version of the proposed methodology has not been assessed by a VVB.
						These comments may require further updates to the methodology and subsequent assessment by a VVB.
						A clarification has been provided by the developer, but it has not been reviewed by a VVB.
1	WillSonn Advisory, LLC	William Sonnenfeld	2	NCX provides an example of 25-30 year rotations in the US South.	NCX should stipulate a minimum age (e.g., 25 years in their example) for every timber type in every region in which they will operate so that stands below these minimum age thresholds are not eligible for offset crediting.	Non-merchantable timber, defined by regionally-specific and data-driven rules, is not at risk of harvest. We do require landowners enroll all of their eligible acreage, which can lead to confusion suggesting that even non-merchantable stands are at risk of harvest, but is important to minimize risk of activity-shifting leakage.
2	WillSonn Advisory, LLC	William Sonnenfeld	6	if there is an exercisable option on the timber, then the landowner has no control over the persistence of the timber during the project period. This violates condition #3 of section 4.	Standing timber under contract where the landowner has no control of the timing of harvest (so, stumpage contracts, timber deeds, timber reservations, etc.) are categorically excluded from participation in the project. Otherwise, landowners (at no risk and no cost) can enroll these lands, and if not cut, sell the credits, and if cut, not sell the credits (at no cost to them)	We note the confusion around this line in the methodology and have reworded this section to clarify the intent which is that the owner of the exercisable option may generate carbon credits, not necessarily the landowner.
3	WillSonn Advisory, LLC	William Sonnenfeld	6	Exclusion of properties for only legal constraints is too narrow. Relying on participants to voluntarily provide limitations to harvesting, when it is clearly in conflict with their best interest (maximizing the number of credits sold), is a false source of evidence.	Adherence to state BMPs (which are guidelines, rather than legal requirements) is a core requirement for a log buyer to meet SFI and FSC certification. While these limitations are not "legal" they are widely adopted and affect harvesting activities nation-wide. In addition, market absorption must also be considered - for example, assuming thousands of acres of hardwood bottomlands can be harvested because state laws permit it, ignores the fact that markets could not absorb such large volumes all at once.	Our carbon at risk model takes into account only merchantable timber. Local regulations are taken into account when excluding specific forested areas from consideration in the project, as well as topography, and local harvesting norms.
4	WillSonn Advisory, LLC	William Sonnenfeld	6	NCX lists possible units, and makes references to precise specifications without disclosure, but offers only a general example for review, certainly not something that I or anyone reviewing this proposal, could use to determine the likelihood of harvest using our own data for any particular stand.	NCX must be more prescriptive, more specific, and provide the actual formulae to be used, so that a complete evaluation of their methodology can be conducted.	Thank you for your comment. We are updating our methodology to make our formulae and accompanying documentation more transparent and specific.
5	WillSonn Advisory, LLC	William Sonnenfeld	7	Regulatory Surplus is inadequate	This should be expanded to include operational surplus, SFI and FSC surplus, and market absorption surplus (within the context of all other landowners within a program area).	Our carbon at risk model takes into account only merchantable timber. Local regulations are taken into account when excluding specific forested areas from consideration in the project, as well as topography, and local harvesting norms.
6	WillSonn Advisory, LLC	William Sonnenfeld	7	Section 6 has not provided enough details regarding the calculation of likelihood of harvest to adequately assess the sufficiency of the program.	As Prestemon & Wear discuss, the landowner's expectation of future price changes are also an important decision making component, yet is absent from any of the examples provided. P&W also discuss the age of the stand, and this is also absent.	Thank you for your comment. We are updating our methodology to make our formulae and accompanying documentation more transparent and specific.
7	WillSonn Advisory, LLC	William Sonnenfeld	8,3	As stated on the "Key Questions" tab, the definitions adopted by NCX for Activity-shifting leakage and Market-shifting leakage are at odds with the definitions used by CARB. This leads to confusion and conflation of concepts. The percentages proposed by NCX are far too low.	Adopt (and address) CARB definitions: Activity-shifting leakage are emissions moving outside the project area as a result of harvests occurring on other forest lands (not limited to the project owner's lands. CARB assumes 20%). Market-shifting leakage are emissions moving outside the project area as a result wood products being supplied by another source (CARB assumes 80%).	Leakage is poorly studied across existing IFM projects, especially short-term harvest deferral projects. We agree that leakage is a possible outcome of purposefully delaying a harvest. Based on comments received, we have updated the methodological approach to include a more conservative deduction. We look forward to working with other developers and academic researchers to explore methods of measuring leakage directly in the future.

8	WillSonn Advisory, LLC	William Sonnenfeld	8,3	Multiple re-enrollments are permissible by a landowner, with no impact on the assessed likelihood of harvesting.	If a landowner decides to re-enroll, that should be used as evidence for future likeliness assessments, particularly if the landowner re-enrolls lands that are beyond regional standard rotation ages, or during periods of flat or declining log prices.	If a landowner re-enrolls their property for multiple years, the assessed likelihood of harvest is recalculated every year. This takes into account factors that could make consecutive years of harvest deferral more or less likely.
9	WillSonn Advisory, LLC	William Sonnenfeld	8,4	In the discussion of uncertainty, if two estimates of standing inventory have a +/- 8% confidence interval, and the difference between the two estimates is less than 16% then the two estimates are not statistically different. However, NCX ignores the margins of error referenced, and allows the change in the point estimate to dictate the number of credits issued.	This is where one-year deferrals clash with using imprecise point estimates of standing inventory, which have an inherent sampling error. The magnitude of that sampling error is even greater for volume by species and volume by grade, which are used for assigning value to the stands in calculating the likelihood of harvest. Incremental storage during the deferral period should take into account the statistical precision of the volume estimates.	We agree that accounting for uncertainty is very important in any forest carbon project. Our revised methodology propagates and accounts for uncertainty across all models and requires a deduction associated with the uncertainty of carbon stocks in the project and baseline scenarios.
10	WillSonn Advisory, LLC	William Sonnenfeld	8,4	We don't know (it is not disclosed) how NCX determines volume by species and grade, though the worksheet suggests, by stating a Basal Area Per Acre to Volume conversion rate, that volumes are extrapolated only by Basal Area estimates. This extrapolation of a simplistic conversion rate adds additional errors to the estimates.	Disclose the actual formulae being used and the incremental error parameters associated with the simplistic conversion rates applied to BA estimates. 1.5% is likely a significant understatement of the impact.	We use industry standard allometric equations and take into account any associated uncertainty. As we are advancing this methodology independently, we will be moving to increase transparency rather than following an expert review process. This includes both detailed documentation of particular models used, as well as sharing benchmarking and performance information for baseline models. Finally, the revised approach to uncertainty explicitly accounts for imprecision in the baseline model in calculating the final number of credits generated from projects developed under this methodology.
11	WillSonn Advisory, LLC	William Sonnenfeld	9	VVB look at the program forest at time 0 and time 1, the period during which the property is under contract for deferral. This ignores the opportunity to "learn" and refine the likelihood assessments by measuring carbon stocks on non-program properties with similar forests and similar ownership groups.	If a landowner foregoes harvests during the deferral period, while non-participating landowners with similar forests (same age, same size, same stocking, same species, same markets, same ownership group) continue to harvest, then that provides evidence of additionality. However, if neighboring landowners are also deferring harvests of similar forests during the deferral period (waiting for their forests to grow, or to add value, or to allow more time for prices to increase), this provides evidence of a lack of additionality. This assessment of nearby and similar landowners operating under similar circumstances should be a key component of third-party verification of additionality. It may also be used to provide a more applicable estimate of leakage.	Our baseline model is informed by observed harvesting behavior in forests across the U.S. As the first project cycles close, we will have the capability of fine tuning the baseline model with information from non-enrolled forest properties.
12	WillSonn Advisory, LLC	William Sonnenfeld	9,3	established plots used for verification must be monumented with flagging and/or rebar.	By monumenting plot locations, a landowner could easily instruct loggers/buyers to not harvest on such plots, or in the case of partial harvesting prescriptions, to remove fewer trees. More discreet monumenting (or none at all) would reduce the likelihood of cheating.	Harvesting and other disturbance are primarily monitored using remotely sensed data. As we have revised our methodology we have clarified the emphasis on leveraging remote sensing-derived data products for generating inventory estimates at scale. We have further emphasized methods for incorporating field measurements into estimates of forest disturbance and change.
13	WillSonn Advisory, LLC	William Sonnenfeld	11,2	no-where is age included in the list of model inputs used to assess the likelihood of harvest.	NCX recently facilitated credit issuance for an 8-year old pine plantation in the US South. Except under the conditions of a plantation failure (fire, hurricane, tornado damage), these stands had zero chance of harvest. The likelihood assessment must have a minimum age under which stands would be ineligible (e.g., 24 years in the US South, 35 in the PNW, etc.).	Thank you for your comment. Non-merchantable timber, defined by regionally-specific and data-driven rules, is not at risk of harvest. We do require landowners enroll all of their eligible acreage, which can lead to confusion suggesting that even non-merchantable stands are at risk of harvest, but is important to minimize risk of activity-shifting leakage.
14	WillSonn Advisory, LLC	William Sonnenfeld	11,4	the basis for the 355 acre figure are based on two studies, one in West Virginia and one in Tennessee, but are applied to all states in the USA. These two states are not necessarily representative of all states, and ignore the state BMPs that vary from state to state, and the harvest area limitations stipulated in SFI and FSC protocols.	Set the upper bounds (the smaller acreage) areas for each state based on state BMPs and regulations, and SFI and FSC requirements.	Many commenters raised questions about the assumptions within the baseline model regarding the relationship between property size (< 355 acres, >10000 acres) and acreage likely to be harvested in a given year. We have clarified the assumptions and framework of the baseline modeling process that specify this relationship.
15	WillSonn Advisory, LLC	William Sonnenfeld	11,4	The lower bound average of 6% appears to approximate harvest levels (percentage of standing inventory) in the Pacific Northwest, based on SEC filings of publicly traded timber REITs. In the US South, harvest levels are approximately 10%. In the Northeast and lake states, where selective harvesting is more common, 2-3% (approximating growth) is most common.	Use regional averages rather than a one-size fits all approach, based on two narrow studies.	Thank you for your comment. Our carbon at risk model is informed by many variables, including regionally specific harvesting averages.

16	WillSonn Advisory, LLC	William Sonnenfeld	13,2	VVBs may select a minimum of 2% of project plots for remeasurement. Standard check cruising contracts require a minimum of 5% sample by the check-cruiser, not 2%.	Increase the minimum check cruising to 5%.	We agree that more sample plots could sometimes yield lower variance in data. We are re-evaluating requirements for verification to ensure utmost transparency and low uncertainty.
17	WillSonn Advisory, LLC	William Sonnenfeld		Regarding the first comment above, a landowner in the US South reported that they have sold a one-year deferral through NCX on an 8-year old plantation.	This demonstrates that the likelihood of harvest assessments employed by NCX are currently inadequate. Minimum stand ages must be designated for each forest cover, species and region of the US, which reflect the standard final rotation ages employed by landowners in the region, below which credits for harvest deferrals are not permitted (e.g., 24 in the US South, 35 in the PNW, 65 in the NE, etc.)	Thank you for your comment. We are updating our methodology to make our formulae and accompanying documentation more transparent and specific.
18	WillSonn Advisory, LLC	William Sonnenfeld		The accompanying spreadsheet, which provides example forests for estimating deferred carbon emissions, is not interactive. Changes to cells E3 - E13 do not result in any change in the estimate of carbon deferrals.	Make the spreadsheet truly interactive.	This spreadsheet includes a master tab that is not interactive and additional tabs that are interactive. We will be releasing more interactive examples along with our revised methodology.
19	WillSonn Advisory, LLC	William Sonnenfeld		I am aware that NCX is proposing a ration of 30:1 rather than 100:1, as suggested in the spreadsheet example. I do not support the concept of using a financial discounting concept and applying it to carbon accounting. This is disingenuous.	Verra/VCS should stipulate that NCX must use a 100:1 ratio. If an emitter were to purchase a package of 30 single ton-year offsets (so, 30/100 of a permanent mtco2e), that be deemed to perfectly offset an emission of a ton of carbon today (so, 100/100). Using anything less than a 100:1 ratio would allow an emitter to offset only a fraction of its emissions (but at the full cost of a 100-year offset credit). That is a waste of carbon emission mitigation funds.	The long-standing research and implementation of the Social Cost of Carbon approximates the net present value of the perpetual stream of future costs and damages caused by climate change. For our methodology, we apply a similar economic framing and a net discount rate of 3.0% to identify the equivalence ratio between the benefits of delaying emissions for 1 year compared with 100 years. See Parisa et al. 2022 for a full explanation of how this economic model yields an economic equivalence between credits of different durations. In order to incentivize action today to avoid those future damages, it is appropriate to use a similar economic framework to calculate the benefits of near-term climate action. While a ratio does not signify a physical equivalence, it does appropriately value the future economic benefits of physical action today.
20	WillSonn Advisory, LLC	William Sonnenfeld		There is insufficient detail provided either in the spreadsheet or in the narrative proposal, to allow a review such as myself, to calculate the number of credits for a specific piece of property.	NCX should provide all of the details of their calculations, in plain English, in order to allow for this level of review.	We appreciate comments noting that the structure and performance of the baseline model used within this methodology is strongly influential on the predicted and realized climate impact of projects. As we are advancing this methodology independently, we will be moving to increase transparency rather than following an expert review process. This includes both detailed documentation of particular models used, as well as sharing benchmarking and performance information for baseline models. Finally, the revised approach to uncertainty explicitly accounts for imprecision in the baseline model in calculating the final number of credits generated from projects developed under this methodology.
21	WillSonn Advisory, LLC	William Sonnenfeld		Just because a program for offset credits is being developed for the voluntary market does not give license to employ protocols that are at least as stringent as the protocols in the regulated markets. To do so only dilutes the market for offset credits and risks tarnishing the reputation of forest-based offsets for the entire sector (both regulated and voluntary).	Don't water down the protocols used in the regulated markets in order to attract smaller landowners to participate - this does a disservice to the environment.	We believe our approach brings a new level of transparency and opportunity for scaling impact to meet the challenge of mitigating climate change. The current voluntary and regulated markets have provided very important foundational work that we are thankful for and eager to build on.
22	Maine Licensed Professional Forester	Tom Colgan		First sentence on plot-based field measurements. There should be a requirement that all participating properties have a minimum number of on site plot-based field measurements using a pre-defined protocol to determine the number of plots to meet a minimum required confidence interval. NCX seems to indicate a very heavy reliance on using FIA permanent plot data for a region to establish region wide averages. This is not an accurate representation of the variation in the enrolled properties, and remote sensing is not accurate enough to validate these numbers. You end up with using averages of averages instead of accurate ground-based field data.		As we have revised our methodology we have clarified the emphasis on leveraging remote sensing-derived data products for generating inventory estimates at scale. We have further emphasized methods for incorporating field measurements into estimates of forest disturbance and change

23	Maine Licensed Professional Forester	Tom Colgan		Quoting from the NCX's FAQ for Sellers v1.6 Updated on 11/16/2021. Question 20. Will NCX be visiting my property? Answer: "Maybe. Few participants will have cruises conducted on their properties …….Question 30 How are initial carbon stocks measured? Answer: "Carbon stock values on participating properties are also measured with field measurements in a design unbiased (model-assisted) plot design at the beginning and conclusion of the year term" To me, the answer given to these two questions shows the ambiguity of whether there is an intent to have a robust field plot sample from participating properties. I believe the intent is to have as few on the ground samples as possible from participating properties. If this is the case, there is insufficient data to have comfort in the estimation of carbon stocks.		As we have revised our methodology we have clarified the emphasis on leveraging remote sensing-derived data products for generating inventory estimates at scale. We have further emphasized methods for incorporating field measurements into estimates of forest disturbance and change
24	Maine Licensed Professional Forester	Tom Colgan		Definition of Program Area – It is hard to comment on whether or not program areas make sense without, as a minimum, a map showing NCX's current program areas. Granted, these can be modified and refined but I have no sense of their current size.		Currently, any forestland in the contiguous U.S. could be considered for the program. Eligibility, based on our eligibility requirements, is rigorously vetted to ensure the additionality of credits produced under this methodology.
25	Maine Licensed Professional Forester	Tom Colgan		Delete first sentence and replace with "Participating properties are required to have an authorized 10 to 20 year management plan or program in place indicating planned harvest schedules."		One of the aims of this methodology is to facilitate engagement with small landowners that have been historically excluded from carbon markets. Participants are not required to have an authorized management plan or program in place. We note that this position allows for engagement with more family forest owners in the US, where we know that there is a substantial gap between the percentage of owners who have a written management plan and the percentage of owners who have or intend to commercially harvest – many family forest owners who harvest do not have a written management plan.
26	Maine Licensed Professional Forester	Tom Colgan		Change the word "may" to "shall"		As we have revised our methodology we have clarified the emphasis on leveraging remote sensing-derived data products for generating inventory estimates at scale. We have further emphasized methods for incorporating field measurements into estimates of forest disturbance and change
27	Maine Licensed Professional Forester	Tom Colgan		Comment on "dynamic performance benchmark". If the methodology has a process to change the performance benchmark how does a verifier know there is consistency in how the benchmark is established beyond taking the word of NCX? This is putting a burden on the verifier and too much faith in NCX.		We appreciate comments noting that the structure and performance of the baseline model used within this methodology is strongly influential on the predicted and realized climate impact of projects. As we are advancing this methodology independently, we will be moving to increase transparency rather than following an expert review process. This includes both detailed documentation of particular models used, as well as sharing benchmarking and performance information for baseline models. Finally, the revised approach to uncertainty explicitly accounts for imprecision in the baseline model in calculating the final number of credits generated from projects developed under this methodology.
28	Maine Licensed Professional Forester	Tom Colgan	6	Business as Usual" is not the proper baseline assessment, it should be "Behavior as Usual".		Our baseline model predicts likely forest management, which is commonly referred to as business as usual.
29	Maine Licensed Professional Forester	Tom Colgan		Comment: Using an econometric model as a "predictive" model of landowner **BEHAVIOR** is incredibly misleading. This is a fundamental flaw of the whole methodology. The methodology rewards landowners who were not going to harvest anyways, therefore no behavioral change. There is **NO ADDITIONALITY**		Projects are additional when the carbon stocks in the project scenario are greater than the carbon stocks expected under the baseline scenario–this is the basis for any carbon project verified against any standard. Because additionality, and therefore, creditable carbon is dependent on an accurate baseline, eligibility is limited to forests that are truly at risk of being harvested in the next year. Deferring that harvest results in additional carbon in the landscape.

30	Maine Licensed Professional Forester	Tom Colgan		Delete 10% and replace with 50%. Even this is too low a leakage number because the regional wood using industry will get the wood they need to fully run their mills from another woodlot owner regardless of the enrollee's one-year harvest deferral.		Leakage is poorly studied across existing IFM projects, especially short-term harvest deferral projects. We agree that leakage is a possible outcome of purposefully delaying a harvest. Based on comments received, we have updated the methodological approach to include a more conservative deduction. We look forward to working with other developers and academic researchers to explore methods of measuring leakage directly in the future.
31	Maine Licensed Professional Forester	Tom Colgan		Uncertainty. Until we see a defined field plot sampling protocol for baseline measurements on participating properties, including the method to determine number of plots and sampling confidence limits, it is impossible to comment on the proper uncertainty deduction. Particularly with small woodlots, the variance will be large and in need of significant field data collection. As mentioned before, remote sensing technology does not have the level of precision to be the final judge of carbon stocks. This is an obvious weakness in the methodology proposed by NCX.		We agree that accounting for uncertainty is very important in any forest carbon project. Our revised methodology propagates and accounts for uncertainty across all models and requires a deduction associated with the uncertainty of carbon stocks in the project and baseline scenarios. As we have revised our methodology we have clarified the emphasis on leveraging remote sensing-derived data products for generating inventory estimates at scale. We have further emphasized methods for incorporating field measurements into estimates of forest disturbance and change.
32	Maine Licensed Professional Forester	Tom Colgan		Data and Parameters available at Validation Participating Property. There needs to be a validation of the field data collected for carbon stock assessment on the participating property. This must be at a participating property level. Just referring to model equations is insufficient.		We agree that accounting for uncertainty is very important in any forest carbon project. Our revised methodology propagates and accounts for uncertainty across all models and requires a deduction associated with the uncertainty of carbon stocks in the project and baseline scenarios.
33	Maine Licensed Professional Forester	Tom Colgan		Appendix A: Baseline Common Practice Harvest Model. Using an econometric model to predict the harvest decisions of landowners, particularly landowners with property less than 2,000 acres, is categorically wrong. Landowners are not a business. They do not make every decision based on economics. This model assumes landowners are fully informed on local timber prices, past timber prices, costs of building roads, availability of loggers and truckers; have a professional forester advising them; and view their woodlot as a source of income. I know very few small woodlot owners who are knowledgeable enough to answer even half of these questions. But I do know landowners who had to cut their woodlot to pay estate taxes, for college tuition, pay for medical help etc. I also know landowners who never have cut their woodlot, and never will. Do you really think an econometric model can predict this behavior? And I use the word "behavior" precisely to make the point that behavior, not business, is what drives harvest decisions made by small woodlot owners.		Our business as usual model is a hierarchical statistical model that predicts one-year harvest risk and intensity based on FIA training data and a suite of covariates that include geographic, biological, economic, and sociological factors. Partial pooling across forest types ensures that the model is able to leverage the similarity and ubiquity of covariate relationships across the forests of the continental U.S. while still allowing for regionally specific differences. Predicting behavior of any type, which is the basis for any forest carbon program, is not straightforward, and depends on models whose performance can be measured. Our revised methodology requires the propagation of model uncertainty through to calculation of final credits, as well as reporting of benchmarking for all models.
34	Maine Licensed Professional Forester	Tom Colgan		The guts of the NCX methodology is based on this econometric model. Business as usual is a misnomer; a methodology to reward a woodlot owner for increased carbon stock ONLY comes through a change of behavior. And paying someone for a one-year deferral of harvest that was never in the plans, is not changing behavior. A one-year harvest deferral is not a valid, verifiable methodology. We started with 100-year carbon offset programs and have moved to 40 years. Dropping to a one year deferral harvest is a bridge too far, and can only increase the current skepticism about the efficacy of IFM carbon offset programs.		Our business as usual model is a hierarchical statistical model that predicts one-year harvest risk and intensity based on FIA training data and a suite of covariates that include geographic, biological, economic, and sociological factors. Partial pooling across forest types ensures that the model is able to leverage the similarity and ubiquity of covariate relationships across the forests of the continental U.S. while still allowing for regionally specific differences. Predicting behavior of any type, which is the basis for any forest carbon program, is not straightforward, and depends on models whose performance can be measured. Our revised methodology requires the propagation of model uncertainty through to calcation of final credits, as well as reporting of benchmarking for all models.

35	Sky Harvest Resources LLC	Will Clayton	2	Limiting the determination of Additionality to only the Performance Method has four negative effects: (1) it creates possible timing issues with verification, as noted in the "Key Questions" tab, (2) it fails to include the option to use well-established growth/yield models for forecasting tree growth such as the USDA's Forest Vegetation Simulator (FVS), (3) limits the potential for innovation within the methodology, and (4) creates barriers to participation for companies with approaches distinct from NCX Much like the December 2021 "Methodology for Afforestation, Reforestation, and Revegetation Projects" currently under assessment, this methodology should allow for a project method to be implemented alongside. The existing framework will limit adoption by being unnecessarily narrow. For instance, the performance benchmark established in section 2 would disallow the use of any modeling that is foundational to virtually all other North American forestry methodologies (e.g., FVS) in the VCS framework. Modeling supplemented and informed by routine measurements can achieve the same level of effective accuracy and scientific rigor. Providing optionality is not unheard of: VM0042, though as a practice method, allows for both a measure and remeasure approach alongside a measure and model approach.	We are not prescribing a proposed change, but rather seeking to initiate a conversation surrounding pathways to alternative project or standardized methods. We see two distinct pathways immediately possible: 1) Provide a project method option alongside the developed performance benchmark based on VM0003 yet adapted to meet necessary conditions in the NCX IFM ERA methodology. 2) Providing multiple measurement approaches based on the VM0042 v1.1 methodology (though VM0042 is a project method methodology).	As we are moving forward with Certification 2.0, we will no longer be limited to language and requirements around "performance methods" or "activity methods" and will soon be releasing a revised version of our methodology. We will be moving to increase transparency through the release of documentation of particular models used, as well as sharing benchmarking and performance information for baseline models.
36	Sky Harvest Resources LLC	Will Clayton	8,1	The $\Delta CO2bsl,t$ metric assumes that once the above ground live tree biomass no longer exists in terrestrial carbon stocks after harvest. However, we know this is not true and we can estimate the persistence and decomposition of terrestrial carbon stocks in the locations where the carbon stocks persists: slash left on the ground following harvest, decaying below ground biomass, wood products manufactured from the harvested timber, waste in landfills, and finally carbon emissions into the atmosphere from any of these other locations.	The proposed change is quite significant: to estimate the persistence of carbon in these terrestrial stocks over a given time horizon (100 years) and estimate the transfer from the terrestrial carbon pool to the atmospheric carbon pool as the carbon stocks decompose. Then measure the difference between these carbon stocks in the baseline scenario and the project each year. This change would model the true benefit of the project activity (harvest deferral), rather than a false proxy benefit. Note: Ton-year accounting could still be applied to sum the small differences in carbon stocks between scenarios into mTCO2e, with or without a discount rate representing time preference.	We appreciate the detailed comments raised about the absence of HWP accounting in the initial draft of our methodology. The carbon stored in trees is released into the atmosphere when a tree dies, some of it almost instantaneously and sometimes over years to decades. We believe it is important to account for all reasonable pools of emissions related to a harvest, and our revised methodology takes the storage of carbon in, and subsequent release of carbon from, harvest wood products into account.
37	Sky Harvest Resources LLC	Will Clayton	5	We have measured below ground live carbon to equal 15-30% of above ground live carbon, with variability depending on forest characteristics. At harvest all of this carbon will die and then begin the slow process of decomposition.	Consistent with the proposed change in section 8.1 (row 9 above), carbon stored in this location should also be considered when calculating the project's net carbon benefit.	We are conservatively excluding belowground biomass from our projects for now since the allometric equations for BGB are much more uncertain than for AGB. We support research into this area to better understand BGB since it can be significant pool of carbon.
38	Finite Carbon	Sarah Wescott	5	Section 5 indicates that wood products are not included, because the project is simply deferring the creation of wood products rather than eliminating them. However, we believe this is a major oversight on the part of the methodology. The baseline scenario for this methodology is based on the premise that a harvest would happen. Post-harvest, that carbon does not vanish into thin air. Some carbon will be left behind in the form of slash and lying dead wood to decay over time or be burned in some cases. The merchantable portion of the tree will be milled, and a significant portion of the carbon will end up in harvested wood products. Depending on the product, some carbon would be emitted quickly (for short-lived products like paper), but some carbon would wind up in long-lived wood products and will continued to be stored long after the project has ended (in the form of lumber, mass timber, furniture, etc.). In the case of instances committing for a single year, that log may not even be milled in the amount of time under consideration, and instead may await transport in a log yard for several months before it is turned into a useable product. By excluding harvested wood products from baseline accounting, this methodology is ignoring a crucial reality of how timber markets operate, neglecting a significant baseline carbon pool, and diverging from best practices established by other carbon programs. To put it simply, it is not conservative to exclude harvested wood products from the baseline scenario, and this methodology should be revised to account for all relevant and significant carbon sources, sinks, and reservoirs. Additionally, the harvested wood product pool should be accounted for on the same time scale as the instance enrollment period. If a landowner is being credited for deferring harvest for one year, they should also be accounting for the carbon stored in harvested wood products in the baseline during that same period.	We request that harvested wood products be included in the baseline, and that an accounting framework for carbon in harvested wood products be included in the methodology. ACR, CAR, the CA Air Resources Board, and the IPCC all offer tested, reputable methods for accounting for carbon in harvested wood products (although these would need to be adjusted to match the timescale of the deferrals under consideration in this methodology).	We appreciate the detailed comments raised about the absence of HWP accounting in the initial draft of our methodology. The carbon stored in trees is released into the atmosphere when a tree dies, some of it almost instantaneously and sometimes over years to decades. We believe it is important to account for all reasonable pools of emissions related to a harvest, and our revised methodology takes the storage of carbon in, and subsequent release of carbon from, harvest wood products into account.
39	Finite Carbon	Sarah Wescott	7	Section 7, Step 2 refers to deferral of harvests that would have occurred under the project scenario – this should refer to the baseline scenario.	Please revise to refer to the baseline scenario.	Thank you for your comment. We have revised that sentence of the methodology.
40	Finite Carbon	Sarah Wescott	8,3	Leakage is a foundational principle of carbon accounting and well-crafted offset methodologies. Defined as “unintended carbon outcomes outside a project as a result of project activities,” leakage from forestry projects can be due to activities shifting within an	We recommend revisiting the leakage policy in the VCS Standard to ensure it correctly considers landowner commitments as short as one year in length. We suggest that Verra staff may consult with academic	Leakage is poorly studied across existing IFM projects, especially short-term harvest deferral projects. We agree that leakage is a possible

41	Finite Carbon	Sarah Wescott	4; 8.3	The internal or activity shifting leakage factor is assessed in the methodology as zero due to the required "whole entity" reporting approach. If comprehensive, whole entity reporting or inclusion in the project would adequately protect against negative outcomes from activity shifting decisions. With such an approach, it would be clear if an entity shifted harvesting activities to another portion of their ownership. However, we noted that Page 9, Item 7 of the methodology leaves the door open to potential gaming. This bullet requirement is written such that an owner that has designated their forest to be managed by two or more dedicated managers would not be required to report or include all lands, but rather just the lands covered by the relevant manager. Many timberland portfolios in the United States have multiple managers, so this rule seems to leave the door open for activity-shifting leakage by the owner from one manager to another.	We suggest that the language require enrollment of all owned lands in the United States or, at a minimum, disclosure of any harvesting within the entire ownership, disclosure of lands transferred between managers, and a calculation of any associated activity-shifting leakage disclosed during that reporting for discounting purposes.	Where the methodology is not explicitly prescriptive, it is expected that project developers will implement appropriate safeguards to prevent gaming in this manner. NCX signs a legal agreement with landowners that affirms their control over harvesting decisions of all land under their ownership.
42	Finite Carbon	Sarah Wescott	8,3	Section 8.3 states the leakage calculation changes "beginning at consecutive year 8 of enrollment." Will non-consecutive enrollment be possible? If a landowner enrolls in year 1, does not enroll from year 2-7, and then returns in year 8 having not harvested in those intervening years, will they still be considered to be in "year 1" per the leakage calculations? If consecutive enrollment isn't required, how will that factor into their probability of harvest? The landowner's deferral should seemingly be perceived as less additional at that point, since they were able to defer for several years without carbon revenue, in this hypothetical scenario.	We request adding clarifying language answering the questions raised. If consecutive enrollment isn't required, we suggest adding in a discussion of how this will be considered in the baseline model.	If a landowner re-enrolls their property for multiple years, the assessed likelihood of harvest is recalculated every year. This takes into account factors that could make consecutive years of harvest deferral more or less likely.
43	Finite Carbon	Sarah Wescott	8,4	Section 8.4 describes overall project uncertainty as a function of the uncertainty resulting from measurement plots. However, as we describe in our comments pertaining to Appendix A, it seems that baseline models developed under this methodology may have wide variability and differences in accuracy. The nature of forest management makes it incredibly difficult to predict a landowner's actions within a single year. This is one reason carbon registries have traditionally required commitment periods ranging from 30-200 years for implementing such projects. While it can be challenging to pinpoint a management change in any given year with a high level of precision, over a 30+ year timeframe we have significantly more confidence in the counterfactual scenario proposed by the project proponent. To that end, what level of statistical accuracy are the baseline models expected to meet?	We suggest an acceptable threshold be defined in the methodology, and that a test be included for demonstrating accuracy of the model's predictions. For instance, the methodology could require the baseline model to predict harvests and match actual observed harvest measurements within certain parameters, using historical harvest data. Furthermore, since model uncertainty affects only the baseline in this case, and not the project stocks, there is potential for baseline stocks to be inflated with model bias. The methodology should include a discount for baseline model uncertainty in Section 8.4 to ensure there is sufficiently conservative accounting.	We agree that accounting for uncertainty is very important in any forest carbon project. Our revised methodology propagates and accounts for uncertainty and requires a deduction associated with the uncertainty of carbon stocks in the project and baseline scenarios. We will soon be releasing our empirical benchmarks that demonstrate adequate performance for predicting business as usual behavior.
44	Finite Carbon	Sarah Wescott	9,2	There is a parameter referenced as "Gti". Should this refer to "Gbsl,t,I"?	Please clarify and correct if needed.	This has been clarified in the revised methodology.
45	Finite Carbon	Sarah Wescott	11 (Appendix	The additionality framework for this methodology hinges on a baseline approach that estimates the fraction of carbon at risk during the project activity period. This fraction of	Disclosure of the baseline modeling creation process, results of the expert panel review, and clear identification of resulting claims on	We appreciate comments noting that the structure and performance of the baseline model
46	Finite Carbon	Sarah Wescott	11 (Appendix A)	As written, there do not appear to be sufficient protections in place within Appendix A to ensure that baseline harvest levels do not exceed what is legally allowable on an individual property. The database referenced in Appendix A 11.3.b.ii (Protected Area Database of the United States, or PADUS) is not inclusive of many legal harvest restrictions, particularly if just focusing on GAP Status 1 and 2, which were specifically identified in the methodology. For additional protections, most – if not all - offset programs require that BMPs limiting harvest intensity be taken into account to ensure baselines are sufficiently conservative. Although we understand the FIA plots used to inform the baseline can be expected to provide a representative sample of harvest constraints across the US, performing additional checks to identify legal and operational constraints would ensure project baselines meet the level of conservativeness required by Verra's program and the requirement that any emission reductions achieved are in excess of "business as usual" activities. We recommend the methodology consider expanding the scope of references used to identify pertinent legal constraints since, there are many other policies that may limit the ability to harvest. For instance, it can be anticipated that harvest will be limited in streamside management zones, and these riparian zone restrictions can be assessed throughout the US in advance of landowner enrollment and readily incorporated into the baseline model, as such requirements limit the carbon at risk. To provide another example, endangered species surveys may be required in advance of obtaining permits to harvest to comply with USFWS requirements. For such a landowner, it should be a simple exercise to identify them as having zero probability of harvesting if they have not begun the process for obtaining necessary permits or harvest plans. The level of detail referenced in Appendix A for assessing legal restrictions to harvest activities does not seem sufficient for filtering out these cases. Instead, such cases appear to be left to the landowner attestation, which requires any given landowner to understand the entire process of obtaining timber harvest plans or other relevant permits. This leaves the door open for unintentional misrepresentation of the ability to harvest. A landowner that newly acquired their property, relocated to a new state with different legislations, or is considering harvesting for the first time may be	We suggest adding a requirement along the lines of: "Baseline models must contain steps to exclude from the estimate of carbon at risk any portions of participating properties that are subject to legal constraints on harvesting. Steps also must be taken to exclude from the estimate of carbon at risk the portion of carbon that must be retained by partial legal constraints on harvesting. For example, if a certain level of basal area retention is mandated or recommended within required riparian buffers, any associated carbon should be excluded from baseline carbon at risk."	The business as usual model is a hierarchical statistical model that predicts one-year harvest risk and intensity based on FIA training data and a suite of covariates that include geographic, biological, economic, and sociological factors. Partial pooling across forest types ensures that the model is able to leverage the similarity and ubiquity of covariate relationships across the forests of the continental U.S. while still allowing for regionally specific differences. We also go through a post-prediction adjustment step that takes into account, for example, local constraints on harvesting.

47	Finite Carbon	Sarah Wescott	11 (Appendix A)	FIA plot remeasurements are used to train the baseline model. The FIA program remeasures plots on varying 5- and 10-year cycles. However, the time periods for these remeasurements will not necessarily coincide with the enrollment of new project instances, which will be happening more frequently. Market conditions like the value of timber, cost of harvesting, and other factors affecting the likelihood of harvesting in the baseline may not be comparable to those observed at future remeasurement dates. In other words, when a harvest is observed in an FIA plot, it will be associated with specific timber prices and harvesting costs when the harvest occurs. Therefore, the resultant probability modeling is associated with these particular conditions, and populations with different probability models should be combined carefully.	We suggest that the methodology include a description of how to account for and correct for time-dependent variables in the baseline model.	When preparing the training data to fit our baseline harvest risk model we adjust timber pricing to reflect the conditions present during the actual FIA measurement & remeasurement periods. Following this adjustment model training and model prediction both rely on market conditions contemporary to the recorded or predicted harvest behavior.
48	Finite Carbon	Sarah Wescott	11.3 b) (Appendix A)	Page 37, item iii states: "The query and raw results are reproduced in Appendix B. Responses were summarized and reported by state; see table below for an example of summarized results for Alabama (Butler et al. 2021)." However, these results are missing from Appendix B.	Please provide the missing information.	Thank you highlighting this omission, the query and raw results were not provided as part of the methodology submission. We will link to this information in the revised version of our methodology.
49	Finite Carbon	Sarah Wescott	11.4 (Appendix A)	The methodology refers to an upper limit for property size that could reasonably be harvested in a single year. However, it is not clear where or how "radj" should be applied. We suggest adding a worked example to Appendix A to illustrate this. Similarly, is a lower limit considered for a property that is too small to be considered economically viable for harvest? If so, how is this factored into the baseline model?	We suggest adding a worked example and providing clarifying information for the questions posed.	Many commenters raised questions about the assumptions within the baseline model regarding the relationship between property size (< 355 acres, >10000 acres) and acreage likely to be harvested in a given year. We have clarified the assumptions and framework of the baseline modeling process that specify this relationship.
50	American Forest Foundation	Lynn Riley	6	**Recommend removing 100% probability of harvest in any scenario:** It seems not-conservative to allow for 100% probability of harvest, even where "exercisable option" for harvest exists. There are a variety of risks that exist even when a signed contract exists that a harvest will occur that prevent the harvest from occurring at the fully expected volume or occurring at all (weather events, contract falls through, etc.).	We propose a more conservative maximum of 90% probability of harvest be used in these cases, as that matches the other uncertainty thresholds used throughout the methodology and VCS, as well as matches the minimum risk score set out in the VCS non-permanence risk tool, which seems like a relevant precedent in which even a signed agreement takes on a 10% risk deduction.	Thank you for your comment. This is one of the key components of the harvest risk model that we are working on improving.
51	American Forest Foundation	Lynn Riley	6	**Clarifying "exercisable option":** "Exercisable option" should be more clearly defined. It's unclear what this means and what would count under this; is it a signed contract between a landowner and a timber company? Something else? (referring to page 11, section 6)	Define what consistutes as an "exercisable option" or use more clarified terms instead.	We note the confusion around this line in the methodology and have reworded this section to clarify the intent which is that the the owner of the exercisable option may generate carbon credits, not necessarily the landowner.
52	American Forest Foundation	Lynn Riley		**Clarifying Combination of Remote Sensing and Field Measurements:** More clarity is needed on the combinations of field measurements and remote sensing permittable under this methodology (or perhaps clarify that is this up to the project proponent to put forth and a validator to validate as appropriate). As this is not clearly defined currently (and in some cases, it appears that monitoring is done primarily through field measurements supplemented by remote sensing (page 6), and in others it appears that it is done primarily through remote sensing supplemented by field measurements (page 29)), different projects utilizing this methodology could use vastly different combinations that lead to different outcomes. For example, is there a minimum number of field plots required?	Clearly state what uses and combinations of field measuremnets and remote sensing technology would be permittable under this methodology.	As we have revised our methodology we have clarified the emphasis on leveraging remote sensing-derived data products for generating inventory estimates at scale. We have further emphasized methods for incorporating field measurements into estimates of forest disturbance and change.
53	American Forest Foundation	Lynn Riley	2	**Additionality of plantations with a range of optimal rotation ages:** For plantations where optimal rotation age is a range of years, how will that be handled? In the example provided of Southern yellow pine optimal rotation age of 25 – 30 years, it seems not as credibly additional to credit harvest deferral from year 25 to 26, as year 26 still falls within standard optimal practice. Though that year from 25 – 26 may result in growth, it seems odd to attribute that to the project when it was arguably likely already planned by the plantation manager as falling within the optimal rotation age.	One recommendation would be for plantations to be required to use the rotation age of the species that optimizes for NPV as the baseline, as that seems like a likely management motivation and therefore something the project proponent could claim as having impacted and created additionality through the project.	This methodology is applicable to all forest types, not only plantations. Projects are additional when the carbon stocks in the project scenario are greater than the carbon stocks expected under the baseline scenario–this is the basis for any carbon project verified against any standard. Because additionality, and therefore, creditable carbon is dependent on an accurate baseline, eligibility is limited to forests that are truly at risk of being harvested in the next year. Deferring that harvest results in additional carbon in the landscape.
54	American Forest Foundation	Lynn Riley	5	**Dead wood and harvested wood products:** The methodology does not clarify enough that this methodology can only be used for Extended Rotation Age projects, and leaves open the possibility that activities in which other carbon pools are relevant may utilize it without appropriately accounting for all relevant carbon sources. For example, are project participants allowed to remove dead wood for firewood or salvage? If so, should dead wood be included as a pool? Particularly for those choosing to defer part of a harvest rather than a whole harvest, it seems plausible that dead wood may be removed and would need to be accounted for, unless explicitly prohibited to project participants, in which case we would recommend that being clarified in the methodology if it will be required to implement the methodology.	Reduce the applicability of this methodology to only Extended Rotation Age activities, or expand the selected carbon pools included to include all those affected by IFM or other activities (such as dead wood).	The crediting mechanism is the deferral of the harvest of live trees during the contract period. The pool of deadwood carbon is conservatively excluded from this methodology's carbon accounting.

55	American Forest Foundation	Lynn Riley	9,2	**Justification and safeguards for the frequency of monitoring:** More justification is needed for 4-month range provided on page 26 in which field monitoring measurements can take place. Particularly, how is it justified that measurements take 2 months prior to the start of an activity period (in which case, it could be argued, it was prior to the project participant being influenced by the project proponent and thus not additional as it was already planned) accurately reflect T0? Additionally, depending on the time of year in which an activity period starts, this 4-month range could create significant differences in monitoring measurements within instances in the same project activity period, just due to the growing seasons. For example, if the project activity period begins in August, and some instances are measured in June, and others are measured in October, those measured in June will have reflected more months of growth as they were in the project within a growing season, which could be significant when the period reported is just one year. There should additionally be safeguards in place such that this range does not allow for measurements to overlap on one project instance between subsequent project activity periods. For example, an instance enrolls in a project in August 2022 using measurements from June 2022. Its T1 measurement takes place in September 2023. It then enrolls for a second year in August 2023, and takes T0 measurements in August 2023. August – September 2023 are now being counted in two separate periods.	We recommend safeguards be put in place that instances enrolling in subsequent activity periods may not have overlapping measurements between periods.	Landowners are committing to delay harvest for a 1-year activity period and so we credit them for a full 12-months of deferral. Landowners are not allowed to enroll in overlapping activity periods and our measurements are time aware to safeguard agains any overlapping.
56	American Forest Foundation	Lynn Riley	4	**Justification of no forest management plans/longer-term impacts of short-term deferrals:** The methodology indicates that participating properties are not required to have authorized management plans. We understand that this helps optimize the landowner enrollment process and reduces barriers to enrollment; we also think it weakens the argument against common criticism that forest carbon projects, in particular short-term deferred harvests, have an actual long-term climate impact, even when considering tonne-year accounting. The methodology may not want to require forest management plans, but perhaps could encourage them as an option among other options for promoting long-term behavior change to improved forest management for project participants. The alternative is that the methodology, VERRA, and project proponents are rightfully opened to criticism that providing financial incentives to a participating property that encourage them to defer harvests short-term until their woods reach a point at which the timber incentives outweigh the carbon incentives. In this case, the impetus of the project could be argued to have made not impact on the landowner and did not really improve forest management; rather, it financed the landowner's time in waiting to do a more intensive harvest than they would have originally been able to do. More justification is required to prevent such criticism, whether it be through forest management plans or other means to show long-term additionality.	Add justification for not requiring forest management plans (or remove that assertion from the methodology), and/or add in justification of the long-term additionality, for example through using the same project longevity and crediting period requirements as required of traditional VCS projects (such as how CAR handles tonne-year accounting projects).	One of the aims of the methodology is to facilitate engagement with small landowners that have been historically excluded from carbon markets. Participants are not required to have an authorized management plan or program in place. We note that this position allows for engagement with more family forest owners in the US, where we know that there is a substantial gap between the percentage of owners who have a written management plan and the percentage of owners who have or intend to commercially harvest – many family forest owners who harvest do not have a written management plan. See Butler, Brett J. 2021. America's family forest owners. Society of American Foresters, Washington, D.C.
57	South Pole	Maria Fernanda Buitrago	Section 2 Description of the methodology	**"Therefore, this is a performance-based methodology that relies on measurements to demonstrate harvest deferrals, and associated GHG emission reductions / removals, in relation to a baseline scenario. As such, growth and yield modeling that is necessary in most IFM project types is not employed."** We understand that is a performance based methodology, but for the Ex ante estimations, when the project activities (Deferral) is just starting, then the ex ante estimations need to be calculated with growth models fpor the species and the forest? And the ex-post will be calculated with the permanent plots. similar to what we do for ARR, right?	The Ex ante shoudl be calculated with growth information from: literature, local inventories and national inventories, and the ex post shoudl can be built with permanent plots, similar to what we do in ARR	As we have revised our methodology we have clarified the emphasis on leveraging remote sensing-derived data products for generating inventory estimates at scale. We have further emphasized methods for incorporating field measurements into estimates of forest disturbance and change.,
58	South Pole	Maria Fernanda Buitrago	Section 3 Definitions	What are the level II ecoregions?		Level II ecoregions are North American regions defined by the U.S. Environmental Protection Agency.
59	South Pole	Maria Fernanda Buitrago	Section 12.1	"Any deviation from the dataset compilation procedures described herein should be explicitlylisted as a variance from the methodology during VVB review." Does this mean taht the only option here are National Inventories? If teh company has a local inventory, which can be even more accurate than a national inventory, then it has to be included as a variance from the methodology?		Local inventories that are more accurate could be used under the revised methodology as long as they provide appropriately rigorous and robust datasets.
60	South Pole	Maria Fernanda Buitrago	Section 4. Applicability conditions	"1. Participating properties are subject to timber harvesting in the baseline scenario during the activity period as determined via a business as usual (BAU) assessment. This should be conducted for each activity period to re-assess additionality." How can we demonstrate this? With Management plans? Previous harvesting historical data?"		The business as usual model is a hierarchical statistical model that predicts one-year harvest risk and intensity based on FIA training data and a suite of covariates that include geographic, biological, economic, and sociological factors. Partial pooling across forest types ensures that the model is able to leverage the similarity and ubiquity of covariate relationships across the forests of the continental U.S. while still allowing for regionally specific differences.

61	South Pole	Maria Fernanda Buitrago	Section 4. Applicability conditions	"The geographic applicability of the methodology is limited only by the availability of appropriate data sources and quantification techniques. The methodology specifies a process for establishing a dynamic performance benchmark that is applicable in the United States (due to data availability), but the methodology may apply to projects located in countries where relevant data sources are available and where all other requirements of this methodology can be met." It is not clear why in US it could be easier. In our case we have projects around the world where you can always establish permanent plots to monitor the "project" scenario, and for the baseline scenario, there is in many cases inventories from teh same reforestation companies or local data from environmental or national organisations. These permanent plots and inventories shoudl be sufficient, right?`		Our baseline model uses U.S. Forest Service Forest Inventory and Analysis data, however it is only the first module, or version. Future iterations of the methodology and baseline models could incorporate other data sources from other geographies to expand adoption.
62	South Pole	Maria Fernanda Buitrago	Section 6. Baseline	"Predicted harvest volumes, used to estimate the proportion of carbon that would be removed in a harvest, must be based on region- and forest type-specific normal silvicultural implementations as observed in an authoritative source such as national forest inventory data, peer-reviewed publications, or government/NGO reports; silvicultural implementations may also be empirically derived from national forest inventory or other repeated measurements in the region of interest during model development. Inputs to the model must be grounded in academic research and/or empirical evidence. Appendix A: " This means that for the ex ante we can use this information (literature, permanen plots, national inventories, etc) to build the basleine and the project scneario?		Yes, that is correct in theory, though this methodology only facilitates the generation of ex-post credits.
63	La Belle Forêt	Margaud Dieffenbacher	5	Why not take into account the below-ground biomass ? As said in the method, the carbon sequestrated in this pool is likely to increase due to the project activity. Wouldn't it allow to sell more CO2 tonnes ?		We are conservatively excluding belowground biomass from our projects for now since the allometric equations for BGB are much more uncertain than for AGB. We support research into this area to better understand BGB since it can be significant pool of carbon.
64	La Belle Forêt	Margaud Dieffenbacher	6	How can someone know if a tree is harvestable ? Is it based on a minimum diameter of exploitability ? Who defines that ?		Non-merchantable timber, defined by regionally-specific and data-driven rules, is not at risk of harvest. Merchantibility of timber is determined by mill capacity and harvesting trends from remeasured data.
65	La Belle Forêt	Margaud Dieffenbacher	6	How is the non-timber value of the stand calculated ? Does it have an impact on the price of the carbon credit ?		Non-timber or amenity value of a forest is represented by total standing volume in our current model, similar to what was done in the original Prestemon and Ware publication.
66	La Belle Forêt	Margaud Dieffenbacher	8,4	I might be wrong but I understood that the uncertainty related to the above ground live tree biomass estimations is based only on sampling errors. Thus, the bigger the sample, the smaller the error ? Is the uncertainty based on the use of models, allometric equations, expansion factors etc. taken into account ? If so, then how ?		We agree that accounting for uncertainty is very important in any forest carbon project. Our revised methodology propagates and accounts for uncertainty and requires a deduction associated with the uncertainty of carbon stocks in the project and baseline scenarios.
67	La Belle Forêt	Margaud Dieffenbacher	8,4	Why reduce UNCt to 1,5% when UNCao,t is ≤ 10% and not keep the real percentage ? Based on other existing methods, I would have imagined a minimum uncertainty factor set to 10 or 15%.		We agree that accounting for uncertainty is very important in any forest carbon project. Our revised methodology propagates and accounts for uncertainty and requires a deduction associated with the uncertainty of carbon stocks in the project and baseline scenarios. The revised version of our methodology will include a more stringent deduction for uncertainty.
68	La Belle Forêt	Margaud Dieffenbacher	8,6	This is a more general question. I understand the reasoning behind the principle of market leakage, but taking it into account, how can we encourage an owner to engage in a virtuous cycle if the tons of CO2 that might be sequestered by the project are reduced by taking this effect into account? This does not allow to value the individual work.		Forest landowners are able to generate credits through harvest deferral. The overall climate impact of the project in which they participate must consider exogenous factors such as market leakage as well as the impact of the creditable behavior.

69	Green Assets	Jonathan Pomp, CF, RPF	2 and 9	Section 2 states "Harvest deferrals, and any associated stock changes, are monitored through plot-based field measurements of carbon stocking that inform both the baseline scenario and the project scenario; these are repeated measures, with the same plots measured at the beginning of the reporting period, time t0, and after completion of the reporting period, time t1. Spatially explicit remote sensing data of the program area and additional field measurement may also be employed to enhance repeated field-based measurements and to detect areas of disturbance during the activity period (i.e., between t0 and t1)." Page 23 (PPC,t0,i and PPC,t1,i Parameter) then states "Biomass and carbon stocks are determined through design-unbiased field sampling coupled with remote sensing data to develop forest inventories at t0 (beginning of activity period) and t1 (end of activity period) to ensure precise and unbiased estimates of carbon stocks within the project instance." The methodology is inconsistent within itself as it states that field measurements are used and may be supported by remotely sensed data and then later states that carbon stocks (used to quantify GHG emission reductions) are based on combined field sampling and remotely sensed data. Further, the methodology sets no requirements for accuracy of remotely sensed carbon stocking estimates where ground based sampling is not utilized.	The methodology should clarify that it does not intend to base quantified "emissions reductions" based solely on ground based sampling methods and that remotely sensed estimates of carbon stocking are expected to be used. Further, the methodology should define accuracy requirements for remotely sensed carbon stocking estimates (for areas not sampled via ground-based methods) that are reflective of industry norms. The established rules and requirements should be validated by a VVB prior to verification.	As we have revised our methodology we have clarified the emphasis on leveraging remote sensing-derived data products for generating inventory estimates at scale. We have further emphasized methods for incorporating field measurements into estimates of forest disturbance and change.
70	Green Assets	Jonathan Pomp, CF, RPF	4	The methodology states "Participating properties are not required to have an authorized management plan or program in place." This disincentivizes long-term sustainable forest management and removes a responsibility for long-term forest conservation and management by Project participants	All approved VCS IFM methodologies should require a long-term commitment to sustainable forest management and adaptive planning via certification schemes and/or adoption of forest management/stewardship plans.	One of the aims of the methodology is to facilitate engagement with small landowners that have been historically excluded from carbon markets. Participants are not required to have an authorized management plan or program in place. We note that this position allows for engagement with more family forest owners in the US, where we know that there is a substantial gap between the percentage of owners who have a written management plan and the percentage of owners who have or intend to commercially harvest – many family forest owners who harvest do not have a written management plan. See Butler, Brett J. 2021. America's family forest owners. Society of American Foresters, Washington, D.C. Our contracts are only for one year so shouldn't necessarily incentivize nor disincentivize any long term sustainable forest management.
71	Green Assets	Jonathan Pomp, CF, RPF	8,3	The methodology states "This methodology makes the conservative assertion that a rotation extension (harvest deferral) beyond 7 years may no longer be associated with a minimal change in total harvest over time, and should instead be considered a moderate to high leakage risk." While the assumption is conservative as related to market effects leakage, this statement also suggests that harvest deferral itself will have minimal change on a landowner's total harvest amount over time.	Short-term harvest deferral with no commitment to a reduction in long-term harvest levels should not be considered Improved Forest Management by any carbon offset program.	Short-term harvest deferrals with no commitment to a reduction in long-term harvest levels may lead to an increase in the average age of forests and increase their capacity to store and remove carbon. Older forests with more average carbon are outcomes of improved forest management.
72	Green Assets	Jonathan Pomp, CF, RPF	Appendix B	Appendix B states that " A model-based approach to setting a dynamic baseline requires a standardized dataset for model training and validation to ensure equitable performance across projects and project proponents." National forest inventories (e.g. the USFS Forest Inventory and Analysis program) provide a standardized, authoritative sources of data that cover the large geographic extents, making them well-suited to serve as baseline data for training and validation. However, no clear model validation rules or requirements have been identified in the Methodology.	The methodology should include explicit rules and requirements for baseline model training and validation with defined accuracy requirements reflective of industry norms. The established rules and requirements should be validated by a VVB prior to verification.	We appreciate comments noting that the structure and performance of the baseline model used within this methodology is strongly influential on the predicted and realized climate impact of projects. As we are advancing this methodology independently, we will be moving to increase transparency rather than following an expert review process. This includes both detailed documentation of particular models used, as well as sharing benchmarking and performance information for baseline models. Finally, the revised approach to uncertainty explicitly accounts for imprecision in the baseline model in calculating the final number of credits generated from projects developed under this methodology.
73	Green Assets	Jonathan Pomp, CF, RPF	6	The baseline section states that if there is an "existing exercisable option for timber purchase on the land in question" the likelihood of harvest is 100%. Without a clear definition of "exercisable option" this is meaningless. A private landowner is always free to sell their timber and a mill is always willing to buy it.	Provide an explicit definition of "exercisable option" or remove language.	We note the confusion around this line in the methodology and have reworded this section to clarify the intent which is that the owner of the exercisable option is the one eligible for carbon credits, not necessarily the landower.
74	Green Assets	Jonathan Pomp, CF, RPF	6	The baseline section allows for use of "written harvest plan" to estimate the proportion of standing carbon expected to be removed at harvest. This would be very easy to abuse, particularly with no written management plan or third party certification requirement as mentioned previously. Anyone, qualified or not, could simply update a harvest plan each year to hypothetically remove 100% of stocks and be credited for it each year.	Remove section or revise language to close this potential loophole.	Harvest plans should be real and credible. All project developer should implement safeguards to identify and report fraud.

75	International Emissions Trading Association (IETA)	Ellen Lourie	Summary description	In the proposed methodology, tonne-year accounting has been proposed as a means of allowing projects of variable durations, including as short as 1 year, to enter the market and claim long-term permanence. The method establishes an equivalency ratio between the impact of short-term action (such as harvest deferral) versus long-term, multi-decadal climate impact. Across IETA's broad membership there are varying views on tonne-year accounting. We will begin by addressing elements specific to this methodology and will then include an excerpt from our comments on the consultation on the proposed VCS program updates.		Thank you for your comments; we welcome feedback.
76	International Emissions Trading Association (IETA)	Ellen Lourie		First, a point of clarity; in Section 2 of the methodology, it states that a tonne year accounting conversion rate has been separately approved by Verra. This is not quite true – as the public consultation on the VCS program just closed earlier this month and Verra has not yet released the finalised updates to the VCS program (expected end of Q2 2022). Since this important element of the proposed methodology is still subject to change during the finalisation of the updated to the VCS program, it is challenging to fairly evaluate this methodology without having that information confirmed. IETA requests that Verra provide a second opportunity to comment on this methodology if there are any changes that come out in the finalised VCS program updates.		A tonne-year is simply a unit of carbon account like a kilowatt hour is to a kilowatt for electricity, a unit of volume over time. While tonne-year accounting may not be used widely today in the voluntary carbon market, it has been supported as an alternative to traditional carbon accounting in the scientific literature for many years. One cannot adequately know the full benefit of a solution without adding in the time or duration term. Fundamentally, tonne-year accounting allows for the delivery of realized impact, not presumed future impact on timescales incongruent with the variability of natural systems. Furthermore, tonne-year accounting allows the direct comparison of benefits of different carbon offsets approaches over many different time scales and technologies.
77	International Emissions Trading Association (IETA)	Ellen Lourie		Some concerns specific to the methodology are related to additionality and leakage. On additionality, short-term commitments force the assumption that project actions (such as deferred harvest) would occur in a specific year. In reality, natural systems such as forests are managed on decadal and multi- decadal timescales. The case for additionality is bolstered when carbon sequestration commitments coincide with the long-term timeframes in which natural systems are managed. On leakage, shorter time commitments for projects also have direct impacts, with the literature suggesting that any short-term reduction in harvest volumes is easily made up for by local or regional wood consumers. With shorter, year-to-year commitments, leakage may be nearly 100%. The NCX methodology proposes a 10% leakage deduction for projects less than 7 years in duration. This methodology proposes a baseline model that aims to evaluate the probability of harvest in the absence of the project. We find that there may be a disconnect between the baseline probability of harvest at or close to 100% (indicating a high level of demand for timber) and the 10% leakage risk. A 10% leakage deduction is not supported by the literature, which suggests that in a market with relatively inelastic demand, such as the timber market, wood product production is easily substituted during small market disruptions such as a 1-year time commitment. In the case of a single-year harvest deferral, the timber market would surely make up for that volume elsewhere, indicating closer to a 100% leakage rate.		Projects are additional when the carbon stocks in the project scenario are greater than the carbon stocks expected under the baseline scenario–this is the basis for any carbon project verified against any standard. Because additionality, and therefore, creditable carbon is dependent on an accurate baseline, eligibility is limited to forests that are truly at risk of being harvested in the next year. Deferring that harvest results in additional carbon in the landscape. Leakage is poorly studied across existing IFM projects, especially short-term harvest deferral projects. We agree that leakage is a possible outcome of purposefully delaying a harvest. Based on comments received, we have updated the methodological approach to include a more conservative deduction. We look forward to working with other developers and academic researchers to explore methods of measuring leakage directly in the future.
78	International Emissions Trading Association (IETA)	Ellen Lourie		See IETA's comments on tonne-year accounting from our submission to Verra on the VCS program updates.		Thank you for your comments; we welcome feedback.
79	International Emissions Trading Association (IETA)	Ellen Lourie		Members within IETA's broad and diverse membership have a variety of views on tonne-year accounting. We recognize the flexibility that it can provide, potential enrollment of new landowners who are unwilling or unable to enroll in programs that require long-term commitments, the focus on achieved climate benefits that are not at risk of reversal – thereby adding certainty related to permanence and providing an alternative approach to non-permanence risk. However, there are also several concerns that have been raised, that we urge Verra to consider as the proposed updates and methodology developments are approved and finalized.		Thank you for your comments; we welcome feedback.

80	International Emissions Trading Association (IETA)	Ellen Lourie		Many of the "pros" listed above are accompanied by a drawback, or "con". These will be outlined below. While the approval of tonne-year accounting for the VCS program may lead to enrolment of new landowners, on the other hand, it can be used to justify short-term project commitment periods, which has implications for other aspects of project quality and is also likely to lead to an abandonment of landowners enrolling in programs that require a longer commitment. Furthermore, with lower barriers to entry, including no need to commit credits to a buffer pool and no penalties upon exiting a commitment, there is a risk that a large number of temporary credits could flood the market, lowering prices for existing developers who have committed to traditional long-term commitments, and reducing the incentive for enrollment in long-term commitments, as mentioned above. Long-term commitment periods (ranging from 30-200 years), provide the necessary confidence in the counterfactual scenario provided by the project proponent. This shift towards shorter timeframes is concerning, considering the concept as stands has not been tested in the carbon market and its validity is highly dependent upon specific assessment method and assumptions.		We agree that additionality is key for any carbon project to work, whether 1 year or 100 years. That is why we rigorously measure additionality in our program and transparently share the results of all project cycles. No nature-based solutions are permanent. However, in this critical decade increasing sequestration and storage is critical to meet global goals. Therefore, we are incentivizing immediate action when it counts. When tonne-year accounting is combined with ex post crediting, climate impact is delivered immediately and cannot be reversed. Acknowledging and designing for temporary storage using tonne-year accounting and short-term crediting provides accountability when fires, pests, and climate change itself make long-term forest predictions near impossible. More credits coming to the market in this critical decade is not a weakness of our approach, but a strength, as the current supply of traditional credits isn't near the required amount to limit warming to 2° C.
81	International Emissions Trading Association (IETA)	Ellen Lourie		The concerns related to additionality and leakage also apply beyond the short-term harvest methodology and were also stated in our more general comments on tonne-year accounting in IETA's response to the VCS program updates.		Thank you for your comments; we welcome feedback.
82	International Emissions Trading Association (IETA)	Ellen Lourie		Furthermore, tonne-year accounting assumes that the short-term climate benefits of delaying emissions are sufficient to offset the long-term impact of the same emissions. From a physical science perspective, it is not clear that this is the case. Temporary storage will by definition lead to higher temperatures after the commitment period, because the emissions are released. If the commitment period is 100 years, this may not make a difference – but if the temporary period is 1-2 years from now, it will likely negatively affect climate goals. In other words, it is not clear that the negative impact of releasing 1 tonne 1 year from now can be negated by simply combining 100 1-year temporary periods. If this is the case, the full impacts of the emissions would still occur, and the credits would effectively be meaningless.		The goal of climate mitigation is more about mitigating the damage caused by climate change, rather than the actual quantity of carbon in the atmosphere. The carbon in the atmosphere causes increased temperatures through climate forcing, which in turn lead to costly economic and social damages to our water, homes, businesses, and livelihoods. The long-standing research and implementation of the Social Cost of Carbon approximates the net present value of the perpetual stream of future costs and damages caused by climate change. For our methodology, we apply a similar economic framing and a net discount rate of 3.0% to identify the equivalence ratio between the benefits of delaying emissions for 1 year compared with 100 years. See Parisa et al. 2022 for a full explanation of how this economic model yields an economic equivalence between credits of different durations. In order to incentivize action today to avoid those future damages, it is appropriate to use a similar economic framework to calculate the benefits of near-term climate action. While a ratio does not signify a physical equivalence, it does appropriately value the future economic benefits of physical action today.
83	International Emissions Trading Association (IETA)	Ellen Lourie		These concerns are amplified by the suggestion to allow tonne-year accounting across the entire Verra AFOLU portfolio. At this broad level, we are concerned it will be difficult to impossible to provide adequate public disclosure, expert analysis, and public comment. If tonne-year accounting is to be considered, it should only be at the methodology level.		Thank you for your comments; we welcome feedback.

84	International Emissions Trading Association (IETA)	Ellen Lourie		In summary, tonne-year accounting can be a useful accounting framework but must be paired with careful consideration for minimum time-commitments, additionality, and leakage provisions that are appropriate for specific project types and sectors. If it is adopted, there should be a clear differentiation between credits generated based on tonne-year accounting and those based on buffer pools.		We agree that additionality is key for any carbon project to work, whether 1 year or 100 years. That is why we rigorously measure additionality in our program and transparently share the results of all project cycles. No nature-based solutions are permanent. However, in this critical decade increasing sequestration and storage is critical to meet global goals. Therefore, we are incentivizing immediate action when it counts. When tonne-year accounting is combined with ex post crediting, climate impact is delivered immediately and cannot be reversed. Acknowledging and designing for temporary storage using tonne-year accounting and short-term crediting provides accountability when fires, pests, and climate change itself make long-term forest predictions near impossible.
85	International Emissions Trading Association (IETA)	Ellen Lourie	1b. Project boundary	In relation to the project boundary, IETA is concerned with the exclusion of harvested wood products (HWPs). The exclusion of HWPs from the baseline is not conservative and doesn't follow the best practices established in other forestry methodologies. The additionality of the project is based on the premise of avoiding harvest that would otherwise 100% occur in a specific year. Much of the carbon removed in baseline harvests would continue to be stored long-lived wood products. The carbon is these products is not emitted to the atmosphere immediately upon harvest as the methodology currently suggests. It is common and best practice to include HWP's in their carbon accounting, this is because it is realistic and conservative to compare harvested wood occurring under the baseline and project scenario. Excluding HWP risks resulting in a significant pool of dubious credits being issued.		We appreciate the detailed comments raised about the absence of HWP accounting in the initial draft of our methodology. The carbon stored in trees is released into the atmosphere when a tree dies, some of it almost instantaneously and sometimes over years to decades. We believe it is important to account for all reasonable pools of emissions related to a harvest, and our revised methodology takes the storage of carbon in, and subsequent release of carbon from, harvest wood products into account.
86	International Emissions Trading Association (IETA)	Ellen Lourie	1c. Quantification of GHG emission reductions & removals	Leakage. As described in the section above (section 1A) where we describe our position on tonne-year accounting, IETA has concerns with the proposed 10% leakage estimate, and specifically that it is not nearly conservative enough. There must be different considerations for leakage when short-term commitments are proposed (in contrast to leakage policies for long-term commitments). IETA is also concerned that the proposed ability for a landowner to enroll the land covered under a single manager. This may allow for "activity-shifting leakage" and cause gaps in reporting.		Leakage is poorly studied across existing IFM projects, especially short-term harvest deferral projects. We agree that leakage is a possible outcome of purposefully delaying a harvest. Based on comments received, we have updated the methodological approach to include a more conservative deduction. We look forward to working with other developers and academic researchers to explore methods of measuring leakage directly in the future.
87	International Emissions Trading Association (IETA)	Ellen Lourie		**Uncertainty.** IETA requests clarity on how uncertainty will be considered and accounted for. As currently stated, the methodology is not clear and contains some confusing statements. While the methodology states in many instances references a sampling approach based on the 90% confidence interval at +/- 10% of the mean, we understand the NCX methodology does not employ sample plots within specific project areas. If sample plots are not employed in the project area, how will sampling error be accounted for? If FIA plots are being employed, are there concerns with spatial autocorrelation when extrapolating a nationwide dataset to a specific project area? It is also unclear if/how model uncertainty will be accounted for.		We agree that accounting for uncertainty is very important in any forest carbon project. Our revised methodology accounts for and requires a deduction associated with the uncertainty of carbon stocks in the project and baseline scenarios.
88	International Emissions Trading Association (IETA)	Ellen Lourie	1e. Appendix a: baseline common practice harvest model (addressing transparency)	In Appendix A, the proposed methodology provides a high level, generalized framework for project implementation. Based on the information provided, projects using this methodology could seemingly take very different implementation approaches, leading to inconsistencies in approaches that affect the quality of one project to the next. Although the NCX generalized methodology in Appendix A was approved by an expert panel, the results of this expert analysis are not available for public review. It states future proposed approaches may also be proposed and must pass expert review. This raises several concerns, including: will there be consistency in who is selected for the panel; against what criteria will the panel be assessing baseline models; will the verification body review the model, or simply rely on the approval of the approach by the expert panel? IETA requests that Verra make the results of the expert analysis available for public review, and implement a transparent process for selecting expert panels, and the expert review process (including the criteria and review). We encourage Verra to make the methodology more thorough, conservative, and replicable, by increasing transparency.		We appreciate comments noting that the structure and performance of the baseline model used within this methodology is strongly influential on the predicted and realized climate impact of projects. As we are advancing this methodology independently, we will be moving to increase transparency rather than following an expert review process. This includes both detailed documentation of particular models used, as well as sharing benchmarking and performance information for baseline models. Finally, the revised approach to uncertainty explicitly accounts for imprecision in the baseline model in calculating the final number of credits generated from projects developed under this methodology.

89	Berkeley Carbon Trading Project, Environmental Center, Goldman School of Public Policy University of California, Berkeley	Barbara Haya	5	**Suggested change: Carbon in harvested wood products should be accounted for:** The tonne-year accounting methodology over-credits the benefit of deferring harvest by ignoring carbon held in harvested wood products. The goal of the methodology is to credit the temporary reduction of carbon dioxide (CO_2) in the atmosphere from a short-term postponement in harvesting. When the methodology defers harvest it also defers the transition of some portion (typically a significant portion) of forest carbon into lumber and other wood products that can remain in these products for several years to several centuries. The actual reduction in atmospheric CO_2 from delayed harvesting is the reduction in carbon released to the atmosphere from timber harvesting, which does not include the carbon converted into harvested wood products. Accounting for carbon held in harvested wood products can be a straightforward correction to the current methodology.	This methodology aims to create an incentive program for small landowners to defer harvesting through the carbon market. An offsetting approach is not appropriate because the effects are difficult to measure for individual plots for individual years due to adverse selection, and short term harvesting deferrals can not be equated with, and therefore legitimately traded with, reductions in fossil fuel emissions. The proposed program can create incentives, if offset prices are high enough, for changes in harvest practice over a sustained time programmatically over a landscape.	We appreciate the detailed comments raised about the absence of HWP accounting in the initial draft of our methodology. The carbon stored in trees is released into the atmosphere when a tree dies, some of it almost instantaneously and sometimes over years to decades. We believe it is important to account for all reasonable pools of emissions related to a harvest, and our revised methodology takes the storage of carbon in, and subsequent release of carbon from, harvest wood products into account.
90	Berkeley Carbon Trading Project, Environmental Center, Goldman School of Public Policy University of California, Berkeley	Barbara Haya	Comment on overarching approach - Additionality: The proposed methodology is vulnerable to non-additional crediting from adverse selection.	Additionality is trickier with tonne-year accounting than with land use methodologies requiring longer-term storage. If we knew perfectly what each participating forestland owner would do each year without offsets we could accurately measure the effect of offsets on on-site forest carbon stocks and credit appropriately. In practice, baseline stocks are uncertain in a long time frame and are even more uncertain in any particular year. Forest management differs between parcels with similar characteristics because of a myriad of factors. This is especially true for small-scale landowners, who are the main focus of this protocol. Compared to large industrial timberlands which can have established harvesting schedules, small landowner harvesting decisions are commonly affected by less predictable and less modelable circumstances such as the financial needs and forest management goals of forestland owners. Models can statistically estimate what a landowner is likely to do by comparing with other similar lands using dynamic baselines and taking into account the landowner's past practice. But it is not possible to predict with confidence what would happen on all plots in any particular year. This means that carbon offsets will result in adverse selection. Of the pool of similar landowners, those that would not have harvested in the credited years are most likely to participate, because they can be paid for what they would have done anyway. To provide a quantitative example of adverse selection, let's say that ten small landowners each have a modeled 50% chance of harvesting this year. We don't know which ones would have harvested and which would not have; we only know that they all have a 50% chance of harvesting under current conditions. When we offer these ten landowners the chance to sell carbon credits for not harvesting this year, those who actually would not have harvested are likely to be the first to respond. Ideally the funds would be sufficient to convince some of the other landowners, who would have harvested, to decide to postpone harvesting by one year. But if participation is less than 100%, there is a good chance that more than half of the participants are from the set that would not have harvested anyway.	Verra might consider selling something other than offset credits, perhaps "tonne-year carbon credits." This would involve estimating effects programmatically, based on discernible changes in land management over the pool of participating lands and adjusting discount rates as needed to accurately reflect overall program impact.	Projects are additional when the carbon stocks in the project scenario are greater than the carbon stocks expected under the baseline scenario–this is the basis for any carbon project verified against any standard. Because additionality, and therefore, creditable carbon is dependent on an accurate baseline, eligibility is limited to forests that are truly at risk of being harvested in the next year. Deferring that harvest results in additional carbon in the landscape. Longer project terms do not give higher confidence in model results as modeling forest management behavior over very long periods is in fact more difficult and uncertain than modeling over short periods. Furthermore, where the methodology is not explicitly prescriptive, it is expected that project developers will implement appropriate safeguards to avoid adverse selection. NCX signs a legal agreement with landowners that affirms their willingness to harvest the volume they are instead credited with deferring. We look forward to working with other developers and academic researchers to explore methods of measuring adverse selection directly in the future.
91	Berkeley Carbon Trading Project, Environmental Center, Goldman School of Public Policy University of California, Berkeley	Barbara Haya		Non-additional crediting due to adverse selection is an inevitable challenge with any offsetting program and must be managed to avoid over-crediting. Current improved forest management (IFM) methodologies use baselines designed to average over many years. The long-term commitment to hold carbon can partially remedy any over-crediting at the project start. Even if initial credits are non-additional, the offset program acts like an easement, preventing management changes over decades. For some plots (but not all) non-additional credits generated early in the project can become addition over time as landowner management choices are constrained. It can be argued that the biggest effect of current IFM methodologies is the long-term commitment – the year on year requirement to avoid forest conversion or carbon reduction. Even though there is still a timing disconnect – credits generated for reductions that could happen over many decades are used to offset immediate emissions from the buyer – the offset program can still reduce forest carbon loss over the project life.		Where the methodology is not explicitly prescriptive, it is expected that project developers will implement appropriate safeguards to avoid adverse selection. NCX signs a legal agreement with landowners that affirms their willingness to harvest the volume they are instead credited with deferring. We look forward to working with other developers and academic researchers to explore methods of measuring adverse selection directly in the future.
92	Berkeley Carbon Trading Project, Environmental Center, Goldman School of Public Policy University of California, Berkeley	Barbara Haya		Tonne-year accounting abandons that long-term commitment, significantly weakening the effect of the offset program and making it essential that credits are truly additional each year. Additionally, with tonne-year accounting, even more business-as-usual land management could be credited since the lack of long-term commitment creates a lower barrier to entry and more opportunity for gaming.		One of the aims of our program is to reach small landowners that have been historically excluded from carbon markets. Participants are not required to have an authorized management plan or program in place. We note that this position allows for engagement with more family forest owners in the US, where we know that there is a substantial gap between the percentage of owners who have a written management plan and the percentage of owners who have or intend to commercially harvest – many family forest owners who harvest do not have a written management plan. See Butler, Brett J. 2021. America's family forest owners. Society of American Foresters, Washington, D.C.

93	Berkeley Carbon Trading Project, Environmental Center, Goldman School of Public Policy University of California, Berkeley	Barbara Haya	Comment on overarching approach - tonne-year accounting: short-term tonne-years of carbon storage cannot "offset" CO2 emissions	More broadly, I believe that the overall goal of the protocol to try to equate short term deferrals in emissions with emissions of greenhouse gasses is ill-founded. Tonne-year accounting attempts to create an equivalence between the emission of one tonne of CO2 and the temporary removal or storage of a greater quantity of CO2 from the atmosphere. But the nature of the effects are different enough to make an equivalence claim problematic. In the long-run, short-term storage has little to no climate benefit. All else being equal, over the long run, drawing carbon temporarily out of the atmosphere does not change the amount of warming caused by that carbon - it only shifts that warming back in time.		The goal of climate mitigation is more about mitigating the damage caused by climate change, rather than the actual quantity of carbon in the atmosphere. The carbon in the atmosphere causes increased temperatures through climate forcing, which in turn lead to costly economic and social damages to our water, homes, businesses, and livelihoods. The long-standing research and implementation of the Social Cost of Carbon approximates the net present value of the perpetual stream of future costs and damages caused by climate change. For our methodology, we apply a similar economic framing and a net discount rate of 3.0% to identify the equivalence ratio between the benefits of delaying emissions for 1 year compared with 100 years. See Parisa et al. 2022 for a full explanation of how this economic model yields an economic equivalence between credits of different durations. In order to incentivize action today to avoid those future damages, it is appropriate to use a similar economic framework to calculate the benefits of near-term climate action. While a ratio does not signify a physical equivalence, it does appropriately value the future economic benefits of physical action today.
94	Berkeley Carbon Trading Project, Environmental Center, Goldman School of Public Policy University of California, Berkeley	Barbara Haya		Additionally, all else is not equal. Since temperatures are rising, pushing back when carbon is in the atmosphere by short periods of time causes more climate impact over the atmospheric lifetime of that carbon, because each tonne of atmospheric CO2 causes more damage when temperatures are higher. If that temporary storage is used to offset the release of a tonne of CO2 it doesn't neutralize or counterbalance the climate effects of those emissions. It only reduces warming temporarily and may cause even more warming in the future.		The aim of the short-term harvest deferral program is to increase the average age of working forests in the U.S., increasing their average carbon storage. Forests that have a higher average carbon stock compared to a business as usual baseline have a positive climate benefit.
95	Berkeley Carbon Trading Project, Environmental Center, Goldman School of Public Policy University of California, Berkeley	Barbara Haya		Temporary storage therefore cannot truly "offset" the climate impacts of releases of CO2 into the atmosphere. If they are used in addition to (not instead of) emissions reductions, temporary removals can potentially help to "buy time" or smooth emissions peaks until dramatic emissions reductions and significant removals are performed. But this is a different type of impact from reducing fossil fuel emissions.		The goal of climate mitigation is more about mitigating the damage caused by climate change, rather than the actual quantity of carbon in the atmosphere. The carbon in the atmosphere causes increased temperatures through climate forcing, which in turn lead to costly economic and social damages to our water, homes, businesses, and livelihoods. The long-standing research and implementation of the Social Cost of Carbon approximates the net present value of the perpetual stream of future costs and damages caused by climate change. For our methodology, we apply a similar economic framing and a net discount rate of 3.0% to identify the equivalence ratio between the benefits of delaying emissions for 1 year compared with 100 years. See Parisa et al. 2022 for a full explanation of how this economic model yields an economic equivalence between credits of different durations. In order to incentivize action today to avoid those future damages, it is appropriate to use a similar economic framework to calculate the benefits of near-term climate action. While a ratio does not signify a physical equivalence, it does appropriately value the future economic benefits of physical action today.

96	Carbon Market Watch	Gilles Dufrasne		**Lack of additionality.** The methodology does not require any additionality testing, and simply demands proof of regulatory surplus, i.e. proving that the activity is not already legally required. It assumes that all reductions below the baseline are additional, i.e. that any deferral of timber harvest is necessarily due to the possibility of issuing carbon credits. This is an unrealistic assumption which goes against one of the most fundamental principles underpinning carbon markets: proving additionality. Harvesting of timber could fall below the baseline for numerous reasons, and the incentives provided by carbon markets is only one of them. Owners could change their management strategy and decide to let trees grow wider before harvesting them (independently of carbon credit revenues). There could be exogenous market forces such as a sudden and major drop in timber prices that make it temporarily uneconomical to harvest the timber. There could be shortages in skilled workers or functioning equipment, thus reducing harvest possibilities. The list goes on. Assuming that all harvest deferrals are a result of carbon market forces, and that activities are therefore additional, is completely inappropriate and could lead to the creation of vast amounts of non-additional carbon credits.		Projects are additional when the carbon stocks in the project scenario are greater than the carbon stocks expected under the baseline scenario–this is the basis for any carbon project verified against any standard. Because additionality, and therefore, creditable carbon is dependent on an accurate baseline, eligibility is limited to forests that are truly at risk of being harvested in the next year. Deferring that harvest results in additional carbon in the landscape. The business as usual model is a hierarchical statistical model that predicts one-year harvest risk and intensity based on FIA training data and a suite of covariates that include geographic, biological, economic, and sociological factors. Partial pooling across forest types ensures that the model is able to leverage the similarity and ubiquity of covariate relationships across the forests of the continental U.S. while still allowing for regionally specific differences.
97	Carbon Market Watch	Gilles Dufrasne		**Artificial build-up of non-additional credits**. The methodology includes a specific feature which is designed in a way that will increase issuance of non-additional credits as time passes, for specific types of projects. This is because landowners sometimes face constraints with respect to the maximum timber they can harvest in a given year, e.g. regulatory or technical or economic constraints. This means that, if they defer harvest in one year, they will not be able to 'make up for it' through increased harvesting in the following year. In this situation, the methodology foresees that, in years subsequent to the year in which harvest was actually deferred, carbon credits can continue to be issued for the extra carbon that is stored in the timber that was initially not harvested. The baseline would be raised to include not only the timber at real risk of being harvested, but also the timber that was not harvested in the past, and which still cannot be harvested in the present. This is incompatible with basic additionality rules. If landowners face constraints in the amount of timber they can harvest, then the 'extra' timber is by definition not at risk of being harvested. Including this timber in the baseline is an obvious case of artificial baseline inflation which will result in over-crediting. In addition, the methodology foresees that this can be done for as long as the owner remains active in the programme. This means that, a landowner who defers 10% of their harvest each year, and faces a harvesting constraint which means that they are never able to harvest more to make up for past deferrals, will, in year 10, receive credits as if he had deferred 100% of harvest, despite only deferring 10%2. In year 11 and beyond, the owner will receive credits equivalent to more than 100% of deferral, which is nonsensical. This is simply driven by the methodology which allows an artificial baseline increase that builds up over time.		A landowner would not be credited for deferred harvests that could not be 'made up for' during subsequent performance periods. Crediting for previously deferred harvest that is inaccessible on the landscape after the first performance period would be calculated as only that portion that is inaccessible under a maximum harvest rate (greater than the baseline harvest rate). If operational capacity (harvest, transport, and mill capacity) were able to harvest all previously deferred carbon, that landowner would generate no additional credits. Also, all credits issued under this methodology make use of tonne-year accounting and capture the climate impact of one year of change.
98	Carbon Market Watch	Gilles Dufrasne		**Adverse selection from baseline setting** The proposed method for baseline setting is likely to result in adverse selection, with the option for some landowners to get credits for no action. The proposed method bases the risk of timber harvest in a given year on an econometric model that estimates the risk based on various factors (like timber product prices, distance to mills, etc.). This means that any landowner can run the model using the parameters specific to their land, and decide to enter the scheme if the model creates a baseline that is higher than their actual harvesting plan. This obvious adverse selection impact does not seem to be addressed, nor mentioned, in the methodology, and yet creates a large loophole with the risk of creating hot air credits generated against inaccurate baseline.As a side note, the method also proposes that all lands where an exercisable option for timber harvest exists, can assume a harvesting rate of 100%. This does not seem adequate. For example, what would prevent a landowner and a timber buyer to agree on an option for timber harvest, with the clear understanding that the option will not be exercised, and simply cash in all the carbon credits from a forest that was in reality not at all threatened? This is an open door to abusive behaviour.		Where the methodology is not explicitly prescriptive, it is expected that project developers will implement appropriate safeguards to avoid adverse selection. NCX signs a legal agreement with landowners that affirms their willingness to harvest the volume they are instead credited with deferring. We look forward to working with other developers and academic researchers to explore methods of measuring adverse selection directly in the future.

99	Carbon Market Watch	Gilles Dufrasne		**Inappropriate tonne-year accounting.** The methodology makes use of tonne-year accounting, aiming to generate permanent credits for temporary storage, which could be as short as one year. This is inappropriate. From a carbon budget perspective, temporary storage does not contribute in any significant way to meeting climate targets. meeting climate targets. Such short term storage is by no means comparable to the long-term impacts of carbon which is released to the atmosphere. Please see CMW's more detailed response on tonne-year accounting here (https://carbonmarketwatch.org/publications/carbon-market-watch-response-to-verras-proposed-tonne-year-accounting-method/).		The goal of climate mitigation is more about mitigating the damage caused by climate change, rather than the actual quantity of carbon in the atmosphere. The carbon in the atmosphere causes increased temperatures through climate forcing, which in turn lead to costly economic and social damages to our water, homes, businesses, and livelihoods. The long-standing research and implementation of the Social Cost of Carbon approximates the net present value of the perpetual stream of future costs and damages caused by climate change. For our methodology, we apply a similar economic framing and a net discount rate of 3.0% to identify the equivalence ratio between the benefits of delaying emissions for 1 year compared with 100 years. See Parisa et al. 2022 for a full explanation of how this economic model yields an economic equivalence between credits of different durations. In order to incentivize action today to avoid those future damages, it is appropriate to use a similar economic framework to calculate the benefits of near-term climate action. While a ratio does not signify a physical equivalence, it does appropriately value the future economic benefits of physical action today.
100	Carbon Market Watch	Gilles Dufrasne		**High leakage uncertainty.** Finally, provisions to assess leakage lack a credible scientific basis. While they mostly rely on the VCS standard v.4.2 provisions on leakage, it is unclear what the scientific basis for these is. The proposed leakage default factors of 10%, 20%, 40% and 70% are not justified anywhere. Nor is there a justification for the thresholds in the comparison of ratios of merchantable to total biomass in the activity and project areas, which are used to select the default leakage factor.		Leakage is poorly studied across existing IFM projects, especially short-term harvest deferral projects. We agree that leakage is a possible outcome of purposefully delaying a harvest. Based on comments received, we have updated the methodological approach to include a more conservative deduction. We look forward to working with other developers and academic researchers to explore methods of measuring leakage directly in the future.
101	Forest Carbon Alliance Inc.	Etienne Green	5-1 Selected Carbon Pools	The methodology currently states that harvested wood products are not included as carbon pools. This is incorrect. The baseline scenario is a harvesting event that will cause transfers from the carbon stocks stored in above-ground tree biomass in T0 into other relevant wood product pools, or dead biomass by T1. The harvest will cause some release of carbon from decay of slash, or waste at the mill facility, but the carbon stored in wood products during this time is still relevant to the project accounting since it is measured at T0. It is particularly relevant to include harvest wood products in the accounting of the baseline when the methodology includes a modeling exercise that considers mill demands to justify the harvest risk and additionality. Surely mill consumption/production by product types (sawlog, chips, pulp) by each facility are assumptions relevant to this modeling exercise and can be used to determine decay rates by product. Even more concerning, because this methodology employs tonne-year accounting, excluding harvested wood products during the one-year term is akin to assuming all decay of biomass stored in the wood product harvested from the project area takes place in one year, and that is not possible. Excluding harvested wood products in this methodology will lead to an over estimation of offsets.	The methodology must include harvested wood products in the baseline estimates. And apply this change across all calculation. This should be by products produced. The decay rate of these products must reflect the first year of decay following harvest and repeated in each subsequent period (since the baseline/additionality is recalculated in each period). This cannot be an annualized amount over 100 years.	We appreciate the detailed comments raised about the absence of HWP accounting in the initial draft of our methodology. The carbon stored in trees is released into the atmosphere when a tree dies, some of it almost instantaneously and sometimes over years to decades. We believe it is important to account for all reasonable pools of emissions related to a harvest, and our revised methodology takes the storage of carbon in, and subsequent release of carbon from, harvest wood products into account.
102	Forest Carbon Alliance Inc.	Etienne Green	6 - Baseline Scenario 7 - Additionality	The use of the phrase "carbon at risk of removal due to harvesting" throughout this section is awkward and somewhat misleading. Carbon stored in live above ground biomass is transferred into dead organic pools and harvested wood products pools following a harvest event. The notion that carbon is removed is overly simplistic.	Address the comment by referring the to harvest causing transfers into HWP and dead biomass throught each section.	We appreciate the detailed comments raised about the absence of HWP accounting in the initial draft of our methodology. The carbon stored in trees is released into the atmosphere when a tree dies, some of it almost instantaneously and sometimes over years to decades. We believe it is important to account for all reasonable pools of emissions related to a harvest, and our revised methodology takes the storage of carbon in, and subsequent release of carbon from, harvest wood products into account.

103	Forest Carbon Alliance Inc.	Etienne Green	8.1 Baseline Emissions	Baseline stocks equation should include the carbon stocks equal to the proportion of above grould live biomass retained in harvested wood product * decay rate in year 1. The carbon pool is still part of the stocks changes within the program area. This will increase the carbon stock contained in the project baseline for the one year term (correctly so) and result in a lower overall net project GHG assertion.	Include HWD * decay for the year in the equations.	We appreciate the detailed comments raised about the absence of HWP accounting in the initial draft of our methodology. The carbon stored in trees is released into the atmosphere when a tree dies, some of it almost instantaneously and sometimes over years to decades. We believe it is important to account for all reasonable pools of emissions related to a harvest, and our revised methodology takes the storage of carbon in, and subsequent release of carbon from, harvest wood products into account.
104	Forest Carbon Alliance Inc.	Etienne Green	8.3 Leakage	Not being intimately familiar with mill wood supply mechanism in the US, I cannot comment on this assumption with confidence. However, it seems that since a program area is represented in a model, its unlikely that the mill sources all its annual supply from one landowner, in all cases. Consequently, one landowner's decision to participate for a one-year short term deferral will cause the mill to source material elsewhere within the program area. The risk of harvest quantified by the model and discussed in this methodology is inherently an acknowledgement that mills have some wood supply flexibility, possibly to absorb short term deferrals of harvest, otherwise harvest risk would always be 100%.	Provide additional context/criteria that would allow project developers to assume zero activity leakage consistently across program areas. Some context regarding the project areas supply relative to the total available supply within the program area would help assess this.	Leakage is poorly studied across existing IFM projects, especially short-term harvest deferral projects. We agree that leakage is a possible outcome of purposefully delaying a harvest. Based on comments received, we have updated the methodological approach to include a more conservative deduction. We look forward to working with other developers and academic researchers to explore methods of measuring leakage directly in the future.
105	Forest Carbon Alliance Inc.	Etienne Green	8.4 Uncertaint y	The statement on page 18 "...It is assumed that no uncertainty is associated with other variables...", and the statement on page 20..." To be conservative, the minimum uncertainty factor is set to 1.5% to account for possible uncertainty within other unmeasured assumptions used in calculations and modeling."... This is at a minimum, contradicting and optimistic. Unmeasured modeling assumptions puts the methodology in jeopardy of fabricating GHG benefits. All models are wrong, if they were only wrong 1.5 % with would be an excellent outcome. Since the net GHG assertion is fundamentally linked to the performance of modeled baseline it creates a considerable risk that modeled outcomes for the baseline are under/overestimated in a given year. Over time, that risk might be mitigated by replicatingthe analysis and establishing trends. Since this methodology uses tonne-year accounting with the shortest term possible being 1 year, with no buffer pools is place, there is a real risk that tonne-year offsets are issued that are simply because of modeling methodology/assumption in the baseline and not because of the project activity.	Suggest the creation of an uncertainty matrix that balances the rigour of the modeling assumptions. The minimum allowable uncertainty factor should be set at least 5%. Default uncertainty should be closer to 15%. Project proponents should be permitted to reduce the uncertainty factor only if they can demonstrate modeling assumption meet a particular set of criteria. For example, program areas/projects that perform modeling sensitivity analysis on assumptions that are based on trends that are seen in forest management plans, annual report information on volume harvested, recovery information, mill consumption, and responses lumber price fluctuation should be in the lowest risk category. Conversely, project what base all modeling assumption on regional averages and generalised market conditions should be required to increase the uncertanty risk.	We agree that accounting for uncertainty is very important in any forest carbon project. Our revised methodology accounts for and requires a deduction associated with the uncertainty of carbon stocks in the project and baseline scenarios.
106	The Nature Conservancy	Ethan Belair	2	No buffer pool is required, but what happens in the event that emissions on a with project property exceed the baseline? Will that be accounted for by the group approach, by retiring benefits from one instance to cover the debt incurred by another? This section says that grouped projects are typically expected, but they do not appear to be required.	Provide further clarity of how this methodology will deal with the possibility of reversals.	No buffer pool would be required regardless of the number of properties within a project. Under this methodology credits are not generated or sold until after the performance period, which mitigates the risk of reversal.
107	The Nature Conservancy	Ethan Belair	9,3	Section describes that "Stock changes over an activity period are monitored through field-based measurements that may be supplemented with remote sensing measurements", but no detail is given regarding the acceptability of various remote sensing products. Most projects that rely on plot based systems have specific ground based measurements that must be included. Which of the covariates tracked in this methodology may be substituted with remote sensing equivalents? Som or all? What level of accuracy is required of remote sensing data to substitute for ground based measurements?	Provide more detail regarding the specific plot based measurements that may be substituted with remote sensing products, the specific cremote sensing products that are deemed acceptable, or the level of accuracy required for remote sensing layers to be used in this capacity.	As we have revised our methodology we have clarified the emphasis on leveraging remote sensing-derived data products for generating inventory estimates at scale. We have further emphasized methods for incorporating field measurements into estimates of forest disturbance and change.
108	The Nature Conservancy	Ethan Belair	11	This section provides insufficient information regarding the link between the specified model and the individual parcels owned by enrolling landowners. I am making the assumption that the authors intend that project proponents will 1) build a generalizable model based on the described inputs largely from FIA data, then 2) calculate model predictions for novel locations outside the FIS plot system based on a combination of field and remote sensing data collection. Is that right? If so, this section should describe that process in detail to avoid ambiguity.		We appreciate comments noting that the structure and performance of the baseline model used within this methodology is strongly influential on the predicted and realized climate impact of projects. As we are advancing this methodology independently, we will be moving to increase transparency rather than following an expert review process. This includes both detailed documentation of particular models used, as well as sharing benchmarking and performance information for baseline models. Finally, the revised approach to uncertainty explicitly accounts for imprecision in the baseline model in calculating the final number of credits generated from projects developed under this methodology.

109	The Nature Conservancy	Ethan Belair	11.3.d.ii	Percent of carbon removed is calculated as carbon at T1 minus (carbon at T0 plus estimated growth from T0 to T1). This essntially assumes that the harvest occurred immediately before remeasurement, which is a non-conservative assumption. Making this assumption maximizes that percent of carbon removed, thereby having a lower baseline, thereby maximizing carbon benefit in the with project scenario.	Percent carbon removed should incorporate growth from T0 to T0.5, to better account for the range of actual harvest times occurring across the breadth of FIA plot locations.	By selling the option to harvest for one year, landowners produce an additional carbon storage benefit beyond what their forest would have provided if they had not engaged in the deferral activity. Under BAU, the landowner's option to harvest is exercisable at any time of the year and therefore each increment of time within the performance period where that option is forfeited is considered additional. Since the contract is for a full year, 1 year of additional carbon storage is creditable.
110	The Nature Conservancy	Ethan Belair	11,4	The implementation of a property size dependent adjustment to harvest risk makes sense, but the method applied here does not. While the authors attempt to make a logical connection between data points, I do think this logic holds. For small landowners, they are likely overestimating the proportion of a property that would reasonably be harvested in any given year. A landowner with 200 acres is unlikely to harvest all of that land in any one given year, yet the Property-Level Harvest Rsik Adjustment assumes that nearly 100% of that landowner's carbon is "at risk". Furthermore, for large landowners, the assumption that 1) a logging firm is only able to harvest 355 ac/year, and that 2) a landowner is working with a single logging firm, are both spurious. A landowner who controls 10,000 acres could reasonably harvest more than 600 acres in a year, were they motivated to do so and hired more than a single logging firm (or a firm with more than 1 crew). While I do not have hard evidence or data to these effects, I think most foresters would have an intuitive sense that the risk adjustment here applied is likely misguided.		Many commenters raised questions about the assumptions within the baseline model regarding the relationship between property size (< 355 acres, >10000 acres) and acreage likely to be harvested in a given year. We have clarified the assumptions and framework of the baseline modeling process that specify this relationship.
111	Wagner Forest Management, Ltd.	Daniel H. Hudnut	3	This definition states that timber that is not cut (but for which payment for harvest deferral could occur) then 'cannot reasonably be expected to be harvested at a future date due to operational constraints.' This is foolish. Either it is inoperable ground no matter what the timber stocking, or its operability increases with timber stocking. Loggers will figure out ways to access higher volume, higher value stands.	Persistence of harvest deferral credits is limited to the contracted interval of the harvest deferral.	A landowner would not be credited for deferred harvests that could not be 'made up for' during subsequent performance periods. Crediting for previously deferred harvest that is inaccessible on the landscape after the first performance period would be calculated as only that portion that is inaccessible under a maximum harvest rate (greater than the baseline harvest rate). If operational capacity (harvest, transport, and mill capacity) were able to harvest all previously deferred carbon, that landowner would generate no additional credits. Also, all credits issued under this methodology make use of tonne-year accounting and capture the climate impact of one year of change.
112	Wagner Forest Management, Ltd.	Daniel H. Hudnut	3 and 4	It is essential to have a step to verify landowners' claim of legal authority to sign project documentation. There should be a verification step, covering at least 10% of the landowners, and 10% of the enrolled acres in the project. Ideally, sample strata would be established by geography, forest ownership class, and size of forest ownership. In program materials, it appears NCX relies on assertions by the signatory as to legal authority. NCX asserts that they have a verification step relating to property title, but without articulating their sampling scheme.	Establish a clear and reliable verification methodology or right, title and interest to property and legal authority to sign on behalf of the landowner.	Project developers should put in place safeguards to verify the authenticity of a landowners' claim of legal authority to sign project documentation. Furthermore, before credits are verified and sold, authenticity of titles and landowners' claims will be audited by a third party.
113	Wagner Forest Management, Ltd.	Daniel H. Hudnut	5	On carbon growth, the methodology seemingly argues that by getting the forest to grow one more year, the growth increment is somehow permanent. However, the participant can cut that incremental growth the following year. The text here seems to suggest that deferral does not lead to increased availability of timber to harvest, but it absolutely does. Increased timber stocking in turn often leads to increased harvest and, as a result, increased sequestration of carbon in wood products. If one year's additional growth matters, so does one year's additional storage of carbon in durable wood products.	Include wood products.	We appreciate the detailed comments raised about the absence of HWP accounting in the initial draft of our methodology. The carbon stored in trees is released into the atmosphere when a tree dies, some of it almost instantaneously and sometimes over years to decades. We believe it is important to account for all reasonable pools of emissions related to a harvest, and our revised methodology takes the storage of carbon in, and subsequent release of carbon from, harvest wood products into account.

114	Wagner Forest Management, Ltd.	Daniel H. Hudnut	6	This is one of the big black boxes. This is presented as a deterministic function, however each of the independent variables is suject to appreciable uncertainty, resulting in a very muddy estimate of the probability of harvest, and there is no acknowledgement of the uncertainty and no means for evaluating it. Further, this equation does not recognize the real-life timing constraints of a timber harvest - including site considerations, seasonal limitations, logging contractor availability, markets for timber, etc. There is often a disconnect for small landowners between wanting to harvest your timber and being able to harvest your timber. However, the biggest problem here is that there is no direct assessment of whether the landowner actually is a candidate for timber harvest. Have they ever harvested timber on land they own? How do they feel about timber harvest? Why do they own the land? Do they have a forest management plan? What are their goals as a landowner?	Add owner-oriented measures of harvest probability. In NCX's tempate contract, Section 3.1.H. provides a meaningful mechanism for ensuring that sellers are indeed candidates for harvesting timber - they must agree to give good faith consideration to solicitations for timber harvest. A methodology should have to both make a certain number of such offers and consummate a certain number of such timber harvests, in order to cull out participants that have no intention of harvesting timber on their woodlot. This would also be a good test of the probability of harvest framework. Also note that NCX has a built-in control group for evaluating its probability of harvest framework - being the auction participants whose credits are not purchased.	The business as usual model is a hierarchical statistical model that predicts one-year harvest risk and intensity based on FIA training data and a suite of covariates that include geographic, biological, economic, and sociological factors. Partial pooling across forest types ensures that the model is able to leverage the similarity and ubiquity of covariate relationships across the forests of the continental U.S. while still allowing for regionally specific differences. We explicitly address and account for uncertainty in pixel-scale harvest preditions and we also include some site considerations and economic constraints related to markets in the baseline scenario.
115	Wagner Forest Management, Ltd.	Daniel H. Hudnut	7	The entirety of their claim of additionality rests on two elements: (1) that the program motivated a change in landowner behavior reducing the probability or intensity of harvest and (2) that by deferring growth for one year, a permanent increase in growth increment is obtained. Both are false and based on unfounded assumptions. The project proponents have proposed an equation to estimate harvest probability expressed as a harvest rate. There is no peer reviewed research to support the equation proposed as a means of reliably predicting harvest rates across the contintental US under prevailing economic and social conditions. See (ri) discussion below. And growth rate does not increase with initial stocking. See discussion of growth expressed as % below.	Zero additionality.	Projects are additional when the carbon stocks in the project scenario are greater than the carbon stocks expected under the baseline scenario–this is the basis for any carbon project verified against any standard. Because additionality, and therefore, creditable carbon is dependent on an accurate baseline, eligibility is limited to forests that are truly at risk of being harvested in the next year. Deferring that harvest results in additional carbon in the landscape.
116	Wagner Forest Management, Ltd.	Daniel H. Hudnut	8	In Table 5-1, the proponent states that inclusion of wood products is "not required as harvest deferral leads only to a shift in the harvested wood products decay curve" - meaning that there is no difference in the amount of timber harvested. See also Leakage -2 item below. Also, regardless of the effect on a participating landowner's property, the methodology will not yield any reduction in the amount of timber harvested in the region (or globally). A small proportion of all landowners harvests their timber in any given year. Participation by some landowners in a short-term harvest deferral program will not have a meaningful impact on available timber to logging contractors or consuming mills.	Make claims regarding timber harvest consistent. Clarify claim that while older forests store more carbon overall, they grow less on a percentage basis than younger forests. See discussion of growth rate below.	We appreciate the detailed comments raised about the absence of HWP accounting in the initial draft of our methodology. The carbon stored in trees is released into the atmosphere when a tree dies, some of it almost instantaneously and sometimes over years to decades. We believe it is important to account for all reasonable pools of emissions related to a harvest, and our revised methodology takes the storage of carbon in, and subsequent release of carbon from, harvest wood products into account.
117	Wagner Forest Management, Ltd.	Daniel H. Hudnut	8	It is easy to conceive of a pattern of nearly universal landowner participation under this methodology that would result in no change in annual harvests or carbon storage on a regional (or global) scale! Especially in a region like the Northeastern US, where timber growth is already exceeding drain and timber (and carbon) inventories are increasing dramatically without a short-term harvest deferral program. Unless and until the program exerts an effect on regional timber removals, it is not increasing the average age of forests in the region relative to the baseline scenario. If a region has a growth: removals ratio of, say, 1.25 : 1.00, then 100% of the landowners could enroll and promise not to cut 25% of their eligible harvest deferral credits. They would all get paid for their deferral, yet there would be no impact on regional (or global) carbon sequestration or storage.		Only landowners who have a known probability of harvesting are enrolled and are credited for a relative amount of carbon they would have harvested otherwise therefore it is not realistic to conceive of a scenario where 100% of landowners could enroll. Where growth exceeds removals in a region, only landowners that would have harvested are eligible to enroll resulting in the ratio of growth to removals increasing, providing additionality above the baseline. While it is true that adverse selection is a difficult issue for all IFM projects, we think short term contracts provide more rapid opportunities to adapt our program to deal with adverse selection problems over time.
118	Wagner Forest Management, Ltd.	Daniel H. Hudnut	8,1	This equation assumes that annual growth occurs prior to harvest - the growth rate (Gbsl,t,i) is applied to the aboveground live tree biomass at the beginning of the activity period (Ct0,i). In the Northeast, assuming harvests occur over ten months of the year (June to March), and growth over two+ months (July-August), the best case scenario would be to have the beginning of the activity period coincide with the beginning of the growth season. Even then, some fraction of harvests would have to be assumed to occur during the growth season - not after. And NCX has started some acticvity periods well before the start of the growing season. With an activity period that started in September, more than 75% of the projected harvest would occur before or during the growing season - not after. Applying the growth rate to the initial stocking creates a systematic bias to overestimate growth in the project carbon pool.	Use remote sensing to figure out timing expectations of harvest and growth in the project area (or FIA analysis area). Adjust equation appropriately.	Growth rates are calculated on an annual basis using empirical data, and consistently applied. Due to the expectation that planning and seasonal preference for behavior would remain constant and are unchanged by the harvest deferral process, the calculations we apply are appropriately representative at the portfolio scale.
119	Wagner Forest Management, Ltd.	Daniel H. Hudnut	8,1	This equation expresses the growth rate (Gbsl,t,i) as a percent, which is applied to the initial carbon stock. The lower the stocking, the lower the growth component of change in carbon stocks; the higher the stocking, the higher the growth component of change in carbon stocks. This equation describes an exponential growth curve, with growth on the y-axis and stocking on the x-axis. This is contrary to what foresters know to be true, and what NCX includes in its FAQs for Sellers (dated 11/16/21 - downloaded April 2022) on pages 10 and 11.	The growth function should recognize that the growth rate (expressed as a percent) declines as the initial carbon stocking of a stand increases.	We believe that a one year contract mitigates the risk of simple growth models in the short term, and in the long term offers us the opportunity to rapidly iterate and improve.

120	Wagner Forest Management, Ltd.	Daniel H. Hudnut	8,1	Anticipated harvest removal rate (ri) is also expressed as a percentage. The derivation of these values relies on a single paper from North Carolina and the probit equations derived therein. However, probit equations only offer binary insights - did harvest occur or not. Prestomon and Wear's paper seemingly offers no insights about harvest removal rates. The proponent has provided no evidence that such a model revised or applied outside of North Carolina's coastal plain in the 1990s will provide reliable binary predictions of harvest or no harvest, much less provide reliable estimates of removals (ri). Note, too that economic and social conditions have changed markedly since the publication of this paper in 2000. The very carbon concerns that the methodology proposes to address were wholly absent from most forest landowners' minds; now they are demonstrably affecting landowners' management decisions.	Conduct peer-reviewed research to support use of an appropriate model to estimate ri across all project areas.	We note the confusion around this line in the methodology and have reworded this section to clarify the intent which is that the owner of the exercisable option may generate carbon credits
121	Wagner Forest Management, Ltd.	Daniel H. Hudnut	8.1 and 8.2. Also 9.2	This is not the method of carbon stock estimation described by NCX in its program materials or on page 23. Each equation says that the estimate is based on multiplying the average stocking per hectare times the number of hectares. NCX materials indicate that its 'Basemap' analysis estimates volumes on a smaller 'stand' or pixel basis. Page 23 refers to 'wall-to-wall estimates of carbon and biomass'.		Thank you for your comment. We are updating our methodology to make our formulae and accompanying documentation more transparent and specific.
122	Wagner Forest Management, Ltd.	Daniel H. Hudnut	8,2	Note that under this construct, delta $CO2p,t$ equals estimated carbon stock at t=1 minus estimated carbon stock at t=0; and delta $CO2bsl,t$ equals modeled carbon stock at t=1 minus estimated carbon stock at t=0. Estimated carbon stock at t=0 may be subtracted from each term, leaving estimated carbon stock at t=1 minus modeled carbon stock at t=1. The estimated carbon stock at t=0 is mathematically irrelevant. However, the uncertainty in each of these estimates must be fully explored and understood.		Our business-as-usual model is a hierarchical model that predicts one-year harvest risk and intensity based on FIA training data and a suite of covariates that include geographic, biological, economic, and sociological factors. Partial pooling across forest types ensures that the model is able to leverage the similarity and ubiquity of covariate relationships across the forests of the continental U.S. while still allowing for regionally specific differences. Predicting behavior of any type, which is the basis for any forest carbon program, is not straightforward, and depends on models whose performance can be measured. Our revised methodology requires the propagation of model uncertainty through to the calculation of final credits, as well as reporting of benchmarks for all models.
123	Wagner Forest Management, Ltd.	Daniel H. Hudnut	8,3	This short-term harvest deferral methodology will exert no impact on regional (or global) carbon storage or sequestration. Whether you call this zero additionality or 100% leakage is up to you, but this methodology will cause no change of regional (or global) forest growth, and no decrease in regional (or global) removals of timber. The proponent seems to want say that the methodology has limited leakage, because it only affects harvest timing, not total harvest. If you find this argument compelling, then you should give them no credit for additionality.	100% market leakage for any carbon deemed additional. Regional (and global) timber harvest will not be affected by the program. Where program participants defer harvest, timber harvested from the lands of non-participating landowners will make up the difference in that year. The commitment lenght of one year is insufficient to cause price increases in regional markets or to affect regional timber harvest levels.	Leakage is poorly studied across existing IFM projects, especially short-term harvest deferral projects. We agree that leakage is a possible outcome of purposefully delaying a harvest. Based on comments received, we have updated the methodological approach to include a more conservative deduction. We look forward to working with other developers and academic researchers to explore methods of measuring leakage directly in the future. We will be measuring and monitoring our projects to understand the impact of our work over time.
124	Wagner Forest Management, Ltd.	Daniel H. Hudnut	8,3	The last paragraph on this page clearly implies that harvest deferral of 7 or fewer years is 'associated with a minimal change in harvest over time.' This contradicts the prior assertions about 'reducing the amount of timber harvested… relative to the baseline scenario...'		Our program is one year old and we sign one year contracts at a time with landowners. As we move towards some landowners deferring their harvest for longer periods of time, we will better understand effects on leakage.
125	Wagner Forest Management, Ltd.	Daniel H. Hudnut	8,4	The project design basically lays out a methodology for estimating the basal area of live trees, using remote sensing to stratify the forested areas, and then using sample points wihtin those strata to derive estimates of stocking by forest type. Conducted correctly, this sampling regime shold provide a solid mean estimate of the basal area of live trees over 5.0" in DBH in the project area, with reliable sampling statistics. However, the methodology does not want estimates of the basal area of live trees over 5.0" of DBH. It wants the total aboveground carbon stock in live trees. So it proceeds to apply various projections and estimates to move from basal area to bole volume, to sound bole volume, to bole biomass, to bole bark biomass, then adding stump wood volume and stump bark volume, then estimating top biomass, and adjusting the whole thing once more -- all to obtain an estimate of total aboveground volume of trees over 5.0", and then one mor equation to estimate the aboveground volume of trees under 5.0" in DBH. See pages 23-26. Along the way, it converts all of these to dry metric tons of carbon equivalent.	Full disclosure and calculation of uncertainty relating to estimation of total aboveground live tree carbon stocks.	We agree that accounting for uncertainty is very important in any forest carbon project. Our revised methodology propagates and accounts for uncertainty and requires a deduction associated with the uncertainty of carbon stocks in the project and baseline scenarios.

126	Wagner Forest Management, Ltd.	Daniel H. Hudnut	8,4	All of these conversions are conducted as if there were no uncertainty in the conversion factors. Nothing could be further from the truth. In the methodology, the terms prediction and estimation are frequently used. These are not mathematical conversions. An inventory procedure that yields a mean estimate of basal area that is +/- 10% at a 90% confidence interval gets converted into a mean estimate of the carbon stock, but the confidence interval around that estimate does not get updated for the uncertainty in the predictions and estimations used to churn out the carbon stock estimate.		We agree that accounting for uncertainty is very important in any forest carbon project. Our revised methodology propagates and accounts for uncertainty and requires a deduction associated with the uncertainty of carbon stocks in the project and baseline scenarios.
127	Wagner Forest Management, Ltd.	Daniel H. Hudnut	8,4	The proponent must model an estimated carbon stocking under BAU at t=1. This entails further uncertainty around the predicted harvest levels. This is not acknowledged or discussed.	Full disclosure and calculation of uncertainty relating to estimation of total aboveground live tree carbon stocks and projected harvest removals under BAU.	Only landowners who have a known probability of harvesting are eligible to enroll in a project and are credited for a relative amount of carbon they would have harvested otherwise. Therefore it is not realistic to conceive of a scenario where 100% of landowners could enroll. Where growth exceeds removals in a region, only landowners that would have harvested are eligible to enroll, resulting in the ratio of growth to removals increasing, providing additionality above the baseline. While it is true that adverse selection is a difficult issue for all IFM projects, we think short term contracts provide more rapid opportunities to adapt our program to deal with adverse selection problems over time.
128	Wagner Forest Management, Ltd.	Daniel H. Hudnut	9,2	The US National Forest Inventory (USFS FIA) data is collected and processed to provide area-based estimates of growth, not the individual tree estimates of growth that the proponent is deriving, making it difficult to 'annualiz(e) appropriately.' Expectations here are under-specified to a fault. What is the source of forest type classifications for the plots and project area? Uncertainty? What is specified - species assemblage? Site index? Stand stocking? How is the relevant geography established? It is not immediately obvious why the most recent pair of remeasurement data should be used. Calculating the annualized individual tree growth rate for aboveground live tree biomass again relies on a series of equations that should properly yield a range of values, rather than a single estimate.	The FIA data provides area based estimates of growth. Work with those, controlling for (at a minimum) geography, species assemblage and initial stocking levels, rather than % growth from individual tree data.	We appreciate comments noting that the structure and performance of the baseline model used within this methodology is strongly influential on the predicted and realized climate impact of projects. As we are advancing this methodology independently, we will be moving to increase transparency rather than following an expert review process. This includes both detailed documentation of particular models used, as well as sharing benchmarking and performance information for baseline models. Finally, the revised approach to uncertainty explicitly accounts for imprecision in the baseline model in calculating the final number of credits generated from projects developed under this methodology.
129	Wagner Forest Management, Ltd.	Daniel H. Hudnut	9,2	It may well be that with appropriate consideration of uncertainty, the mean estimate of the volume of that tree at t=1 is not statistically different from the mean estimate of the volume of that tree at t=1. Put another way, the growth estimate would not be statistically different from zero. One should expect a project developer to provide an estimate of the incremental carbon sequestered over the course of the crediting period, and it would seem that 10% uncertainty at 90% confidence should be the bar. But under this methodology, 10% uncertainty at 90% confidence is the expectation for the beginning and ending inventory points, not the difference between them. In northern New England, expected annual growth rates in timber inventory typically are in the 2-5% range. When the inventory endpoints have uncertainty of 10% at the 90% confidence level, it is hard (if not statistically impossible) to discern 2-5% growth over the course of one year. Still, under this proposed methodology, growth will get expressed as a percent of stocking and applied to all levels of stocking, resulting in an exponential growth function.	Focus on the uncertainty around the estimates of the carbon to be credited - not the uncertainty around the beginning and end inventory points from which change is calculated.	We agree that accounting for uncertainty is very important in any forest carbon project. Our revised methodology propagates and accounts for uncertainty and requires a deduction associated with the uncertainty of carbon stocks in the project and baseline scenarios.
130	Wagner Forest Management, Ltd.	Daniel H. Hudnut	11	"A baseline common practice harvest model should be applied to each individual half-hectate(or smaller unit) of each participating property." An acre is not an economical harvest unit, and the interplay of neighboring or nearby acres will influence whether a particular acre can be harvested. This spatial element appears to be wholly absent from the model, as does a cumulative consideration of whether the overall harvest predicted would actually meet market expectations for harvest volume and value, or yield positive stumpage returns following road building, etc.	Explain how spatial considerations should be incorporated in some meaningful way (or discuss convincingly why they should not be).	Thank you for your comment. We are working to continually improve our modeling to include on property and across property dynamics.
131	Wagner Forest Management, Ltd.	Daniel H. Hudnut	11,1	A reminder that Prestemon and Wear's model only looked at binary harvest or no-harvest decisions in North Carolina in the 1990s. The 'inflated beta' portion of this model is not supported by any cited peer reviewed literature.	Find or publish peer-reviewed literature supporting the harvest probability model.	Our baseline modeling used the Prestemon and Wear publication cited as a foundation, but extends the concepts of that work to other geographies to allow a range of harvesting probabilities (0 to 1) as well as removal rates.
132	Wagner Forest Management, Ltd.	Daniel H. Hudnut	11,2	Stand volume and stand value inputs are estimates, with uncertainty, means and confidence intervals. Future timber values are notoriously difficult to predict with certainty.	Every estimate should acknowlege and discuss uncertainty.	We agree that accounting for uncertainty is very important in any forest carbon project. Our revised methodology propagates and accounts for uncertainty and requires a deduction associated with the uncertainty of carbon stocks in the project and baseline scenarios.

133	Wagner Forest Management, Ltd.	Daniel H. Hudnut	11.3.c)ii.	In the Northeastern US, FIA merchantability specifications do not match market specifications.	Proponent should include steps to ensure that timber value pricing is on an apples-to-apples basis.	Timber prices for softwoods and hardwoods are combined at the L3 ecoregion level. These prices are updated moving forward whenever new prices for a county or region becomes available (generally quarterly to annually). Ecoregion-level pricing is combined with information regarding mill haul distances, which are also updated quarterly to account for openings and closings. As the comment notes, the prices available in regions such as New England are voluntary surveys and can vary dramatically between reporting periods depending on survey responses. The system in place to use regular updates and combine reported prices within and L3-ecoregion is designed to avoid artificial rapid swings in price when only low or high value species are reported within a survey period.
134	Wagner Forest Management, Ltd.	Daniel H. Hudnut	11.3.c)iii.	As I understand it, the proponent's methodology blends together all hardwood and softwood pricing across a Level III ecoregion for 2020, and then adjusts pricing going forward based on aggregated FAO and BLS figures. There are only three Level III ecoregions in New England. Timber markets are much more nuanced! This procedure first misses very real market disctinctions within ecoregions, and then miss very real regional market changes, and it appears to have no mechanism for re-adjusting to reflect these changes! Proponent argues that these prices are critical to the predicting the likelihood that a landowner will harvest timber, yet the inputs used start as a mush, and then inevitably lose whatever connection they had to regional markets. (In the Northeast there is little tranparency in regional stumpage prices, and published sources are based on voluntary surveys and lag markets.)	Proponents should develop pricing inputs that have reliability and relevance at a woodbasket scale. USFS FIA regions within each state?	Timber prices for softwoods and hardwoods are combined at the L3 ecoregion level. These prices are updated moving forward whenever new prices for a county or region becomes available (generally quarterly to annually). Ecoregion-level pricing is combined with information regarding mill haul distances, which are also updated quarterly to account for openings and closings. As the comment notes, the prices available in regions such as New England are voluntary surveys and can vary dramatically between reporting periods depending on survey responses. The system in place to use regular updates and combine reported prices within and L3-ecoregion is designed to avoid artificial rapid swings in price when only low or high value species are reported within a survey period.
135	Wagner Forest Management, Ltd.	Daniel H. Hudnut	11.3.d)i.	Growth rates were calculated by forest type…' Again, forest types are not specified, but should include geography, species assemblage, and initial stocking, which all strongly affect percentage growth rates.		We believe that a one year contract mitigates the risk of such simple growth models in the short term, and in the long term offers us the opportunity to rapidly iterate and improve.
136	Wagner Forest Management, Ltd.	Daniel H. Hudnut	11,4	As a program participant, I was never asked whether I had a forest management plan for the property.		This is correct, this methodology does not require management plans for participating properties.
137	Wagner Forest Management, Ltd.	Daniel H. Hudnut	11,4	There is no correlation between the mean annual harvest area of logging firms in West Virginia and Tennessee and the upper limit for property size that could reasonably be entirely harvested within a single year. First of all, there is no info on the studies cited. Are these full-time operations? Mechanized harvest crews in northern New England harvest over 1200 acres in a year. And who says that a landowner or logger won't put multiple crews on a single property? They do it all the time.		These studies are publicly available and report data from full-time firms using a range of operational models in the stated regions. While there are scenarios where higher productivity is possible, we chose to use these as they are drawn from publicly available research and any discrepancy between regions and forest types are expected to result in conservative estimates of harvested volumes.
138	Private Individual and Forester	Anonymous	8,5	Using tonne year accounting in this manner is greenwashing. It is the climate equivalent of Eron's "mark to market" accounting. If carbon is only held out of the atmosphere for a year, you have done nothing. Permeance needs to be real and long lasting. You cannot apply a simple discount rate to the climate as it fails to take into account the drastic effects of the climate crisis, negative feedback loops inherent in climate change, and the human cost of climate change	Tonne year accounting is unacceptable, and SHOULD NOT be used	A tonne-year is simply a unit of carbon account like a kilowatt hour is to a kilowatt for electricity, a unit of volume over time. While tonne-year accounting may not be used widely today in the voluntary carbon market, it has been supported as an alternative to traditional carbon accounting in the scientific literature for many years. One cannot adequately know the full benefit of a solution without adding in the time or duration term. Fundamentally, tonne-year accounting allows for the delivery of realized impact, not presumed future impact on timescales incongruent with the variability of natural systems. Furthermore, tonne-year accounting allows the direct comparison of benefits of different carbon offsets approaches over many different time scales and technologies.

139		Anonymous		BAU. This must be defined and publicly available. In order to understand the calculation and veracity of the credit, the public and the buyer need to know what the assumptions are.	BAUs need to outlined and published prior to approval in an appendix	We appreciate comments noting that the structure and performance of the baseline model used within this methodology is strongly influential on the predicted and realized climate impact of projects. As we are advancing this methodology independently, we will be moving to increase transparency rather than following an expert review process. This includes both detailed documentation of particular models used, as well as sharing benchmarking and performance information for baseline models. Finally, the revised approach to uncertainty explicitly accounts for imprecision in the baseline model in calculating the final number of credits generated from projects developed under this methodology.
140		Anonymous	11,1	Proximity to mill an inappropriate method for estimating likelihood to harvest. Wood moves through mediums other more than roads. In Pennsylvania, we regularly ship round logs to mills in China, Spain, and Germany (just to name a few) via ship. While logs of that value are rare, their presence drives harvest. Forests regularly generate cooperage logs that are send by rail to cooperages in KT or TN, again this would be outside of the range of truck but are a huge driver in making a harvest viable. Additionally, many large logging firms across the country have log yards where they store logs to be shipped via rail or ship to mills that would be well outside the economic range of a truck. The range to mills needs to be disclosed for buyers to understand the validity of these credits.	Distance to a mill should be discarded	Where alternative methods of transportation are evidently significant to timber harvesting decisions, we expect to incorporate them as we continue to improve our baseline models over time.
141		Anonymous	11,1	Distance to roads can be important to determining the economics of a harvest, but that is not necessarily true. It is not uncommon for loggers to build roads as part of the harvest and be paid for it by the landowner. A landowner paying for an access road to be built would completely undermine this model.	Discard distance to road	Where alternative methods of transportation are evidently significant to timber harvesting decisions, we expect to incorporate them as we continue to improve our baseline models over time.
142		Anonymous	6	It cannot be assumed that management plans will be followed. Even with a forester managing a forest, management often deviate from plans a forest pest maybe moving into an area, harvests maybe be heavier or lighter because of a request from the landowner or logger, the logger may violate contract, or the science changes and different management practice is used. In my experience, almost every harvest varies in someway from the plan; some more than others. I've had single tree selections turn into clearcuts or shelterwoods become seedtrees.	Management should be based on what happens not what is predicted to happen.	Our business as usual model is a hierarchical statistical model that predicts one-year harvest risk and intensity based on FIA training data and a suite of covariates that include geographic, biological, economic, and sociological factors. Partial pooling across forest types ensures that the model is able to leverage the similarity and ubiquity of covariate relationships across the forests of the continental U.S. while still allowing for regionally specific differences. Predicting behavior of any type, which is the basis for any forest carbon program, is not straightforward, and depends on models whose performance can be measured. Our revised methodology requires the propagation of model uncertainty through to calcation of final credits, as well as reporting of benchmarking for all models.
143		Anonymous	8,1	Gbsl,t,i-How is this determined? What models are used?	Define how this is being determined	The business as usual model is a hierarchical statistical model that predicts one-year harvest risk and intensity based on FIA training data and a suite of covariates that include geographic, biological, economic, and sociological factors. Partial pooling across forest types ensures that the model is able to leverage the similarity and ubiquity of covariate relationships across the forests of the continental U.S. while still allowing for regionally specific differences. We explicitly address and account for uncertainty in pixel-scale harvest preditions and we also include some site considerations and economic constraints related to markets in the baseline scenario.

144		Anonymous	8,3	A leakage rate of 10% is a massive underestimate. Current research points to longer programs having a leakage rate of 30-50%, so I could only imagine that a short-term program would have much higher leakage	Increase leakage to 50%	Leakage is poorly studied across existing IFM projects, especially short-term harvest deferral projects. We agree that leakage is a possible outcome of purposefully delaying a harvest. Based on comments received, we have updated the methodological approach to include a more conservative deduction. We look forward to working with other developers and academic researchers to explore methods of measuring leakage directly in the future.
145		Anonymous	8,3	NFI is used to abbreviate "National Forest Inventories". This is a bad abbreviation as NFI is the abbreviation of the National Forest Inventory-an inventory of Canadian forests preformed by governments in Canada.	Change the abbreviation to something less confusing.	Thank you for your comment. We will clarify this confusion in the revised methodology.
146		Anonymous	8,4	A 90% confidence interval is used, but the use of 90% is never justified. The academic average for forestry is 95%, but other fields have much higher standards.	Justify the use of 90%	Carbon standards often use a 90% confidence interval. Moving forward we will be using a 95% confidence interval. Furthermore, our revised methodology accounts for and requires a deduction associated with the uncertainty of carbon stocks in the project and baseline scenarios.
147		Anonymous	8,5	ERt- This is not a reduction or removal. This is an offset. A reduction would be switching from coal powered electricity to solar power not trees growing.	Call it an offset	Carbon markets generally accept the term emission reduction or removal to apply to the reduction/removal of emissions from fossil fuels as well as the reduction/removal from natural systems like forests and agriculture.
148		Anonymous	9,1	National Forest Inventory would be fine for estimating growth in Canada, where it is conducted, but it is impossible to use this in the US. For example-loblolly pine doesn't grow in Canada but it is an important timber species in the US, so it would be impossible to the National Forest Inventory to estimate it's growth.	Use national datasets from the whole continent	Thank you for your comment. The acronym used here, NFI, refers to the National Forest Inventory of any nation and not solely that of Canda. We will clarify this confusion in the revised methodology.
149		Anonymous	9,1	Using undisturbed plots limits plots to basically none as at some point every forest has been disturbed either by humans, forest health issues, or other events	Define "undisturbed plot"	Undisturbed in this context refers to plots that have not recently been harvested.
150		Anonymous	11,2	Using Prestemon & Wear in this circumstance is highly inappropriate. It's a paper from 2000 based on pricing and volumes from the early 90s, and it assumes that any harvest is a clearcut. Pine plantations in the Southeast are currently on generation 5 or 6 of improved pines-so current volume are much higher- and there are so many new factors in price like the pellet market and new OSB plants. The authors never ask landowners what they think about the non-timber value of their forest, and the authors even say this is useful for the South. The authors also state that any harvest will be a clearcut, which is not the case outside of plantations. This paper shouldn't used for what it's being used for. There are a lot of newer articles about timber markets, volumes, and non-timber value of forests to landowners that are regional specific.	Use more and different sources	Our baseline modeling used the Prestemon and Wear publication cited as a foundation, but extends the concepts of that work to other geographies to allow a range of harvesting probabilities (0 to 1) as well as removal rates.
151		Anonymous	11,2	Pokharel & Latta 2020 assumes that wood is only moving by truck, which is a fine assumption for the paper but highly inappropriate for this study. Logs are moved by rail and ship frequently.	Use more and different sources	Where alternative methods of transportation are evidently significant to timber harvesting decisions, we expect to incorporate them as we continue to improve our baseline models over time.
152		Anonymous	11,3	Zhang et al (2015) is a fine paper for the Southeastern US, but it should not be expanded out to the rest of the US. There are different dynamics in different parts of the country, as noted by the authors of this paper!	Use more and different sources	Zhang et al. provides a precedent in the peer-reviewed literature for using ownership group as a hierarchy for modelling forest landowner behavior. This does not constrain models to southeastern landowner types and behavior, but rather offers some guidance for considering a hierarchy within a baseline model.

153		Anonymous	11,3	Grouping species by hardwood and softwood only is a gross oversimplification of timber markets. In my state, the lowest value hardwood is worth $600 per mbf less than the most valuable hardwood! That is a massive difference! Species drives harvest and it needs to be valued. If the remote sensing is not detailed enough to capture species remotely, than on the ground measurements should be used.	Use species dependent pricing	Timber prices for softwoods and hardwoods are combined at the L3 ecoregion level. These prices are updated moving forward whenever new prices for a county or region becomes available (generally quarterly to annually). Ecoregion-level pricing is combined with information regarding mill haul distances, which are also updated quarterly to account for openings and closings. As the comment notes, the prices available in regions such as New England are voluntary surveys and can vary dramatically between reporting periods depending on survey responses. The system in place to use regular updates and combine reported prices within and L3-ecoregion is designed to avoid artificial rapid swings in price when only low or high value species are reported within a survey period.
154	Forest Carbon Works	Briana Capra	Section 2 Additionality	The methodology fails to meet the requirements of a performance-based method: Methodologies shall provide a description and analysis of the current distribution of performance within the sector as such performance relates to the applicability of the methodology or each performance benchmark. Methodologies shall discuss and evaluate the trade-off between false negatives and false positives and shall describe objectively and transparently the evidence used (including reference to primary and secondary data sources), experts consulted, assumptions made, and analysis (including numerical analysis) and process undertaken in determining the selected level(s) of the performance benchmark metric (noting that expert consultation is a key part of this process, as set out below). The process of determining the level(s) of the performance benchmark metric shall include and be informed by an expert consultation process, undertaken by the methodology developer	VCS Reference: VCS Methodology Requirements Section 2.3.7	Our credits do take into account the growth that happens over a year based on industry-used and accepted timber growth rates. Final performance for individual properties, and at the project scale, is determined by comparing the stocking expected under the baseline and project scenarios, including growth anticipated under each scenario.
155	Forest Carbon Works	Briana Capra	Justification for the performance method cites “growth and yield modeling that is necessary in most IFM project types is not employed” (page 6) which is in direct conflict with the definition of Gti (page 27)	A model to predict growth (Gti) is allowed which negates the justification for a performancebased approach to assessing additionality, that it is a “performance-based methodology that relies on measurements to demonstrate harvest deferrals” which is not accurate.		Performance in the case of a harvest deferral is no harvest. Non-harvest is measured using change detection remote sensing. In addition, our credits do take into account the growth that happens over a year based on industry-used and accepted timber growth rates. Final performance for individual properties, and at the project scale, is determined by comparing the stocking expected under the baseline and project scenarios, including growth anticipated under each scenario.
156	Forest Carbon Works	Briana Capra	Section 2 Additionality	The methodology does not specify a minimum harvest area for modeling the baseline scenario. The methodology acknowledges properties that may be as large as 2,000 hectares. Therefore the methodology encompasses both larger and smaller scale project activities. For smallscale activities, baseline harvesting may not be feasible because the harvest area is too small to be commercially viable. For large-scale activities, the baseline harvesting across such large areas in a single year may not be feasible. Therefore, the methodology fails to meet the requirement for the performance benchmark that requires these scales be assessed differently:The methodology encompasses both larger and smaller scale project activities and the performance (measured in terms of the performance benchmark metric) that may be practicability achieved in eachcase is substantially different	VCS Rerefence: VCS Methodology Requirements Section 2.3.8	Many commenters raised questions about the assumptions within the baseline model regarding the relationship between property size (< 355 acres, >10000 acres) and acreage likely to be harvested in a given year. We have clarified the assumptions and framework of the baseline modeling process that specify this relationship.

157	Forest Carbon Works	Briana Capra	Gti, the biological growth rate	As defined, the "growth rate is determined from the project area" but the measurement method allows the use of National Forest Inventory data and the creation of a model. However, NFI data may not be available for the project area. Further, no criteria or methods for determining an acceptable model are provided such as criteria for goodness-of-fit or model validation steps employing real data collected from the project area		We appreciate comments noting that the structure and performance of the baseline model used within this methodology is strongly influential on the predicted and realized climate impact of projects. As we are advancing this methodology independently from, we will be moving to increase transparency rather than following an expert review process. This includes both detailed documentation of particular models used, as well as sharing benchmarking and performance information for baseline models. Finally, the revised approach to uncertainty explicitly accounts for imprecision in the baseline model in calculating the final number of credits generated from projects developed under this methodology.
158	Forest Carbon Works	Briana Capra	Model for carbon-at-risk of removal (section 11)	The methodology employs a model to determine baseline emissions to predict the carbonat-risk of removal. However, the model is not from a reputable and recognized source, rather an unpublished model proposed by a developer.The requirement is: Models shall be publicly available, though not necessarily free of charge, from a reputable and recognized source	VCS Rerefence: VCS Methodology Requirements Section 2.5.1	We appreciate comments noting that the structure and performance of the baseline model used within this methodology is strongly influential on the predicted and realized climate impact of projects. As we are advancing this methodology independently, we will be moving to increase transparency rather than following an expert review process. This includes both detailed documentation of particular models used, as well as sharing benchmarking and performance information for baseline models. Finally, the revised approach to uncertainty explicitly accounts for imprecision in the baseline model in calculating the final number of credits generated from projects developed under this methodology.
159	Forest Carbon Works	Briana Capra	Model for carbon-at-risk of removal (section 11)	The methodology employs a model to determine baseline emissions to predict the carbonat-risk of removal. However, the model has not been appropriately reviewed and tested by a recognized, competent organization using ground-truthed empirical data. The requirement is: Models shall have been appropriately reviewed and tested (e.g., ground-truthed using empirical data or results compared against results of similar models) by a recognized, competent organization, or an appropriate peer review group	VCS Rerefence: VCS Methodology Requirements Section 2.5.1	We appreciate comments noting that the structure and performance of the baseline model used within this methodology is strongly influential on the predicted and realized climate impact of projects. As we are advancing this methodology independently, we will be moving to increase transparency rather than following an expert review process. This includes both detailed documentation of particular models used, as well as sharing benchmarking and performance information for baseline models. Finally, the revised approach to uncertainty explicitly accounts for imprecision in the baseline model in calculating the final number of credits generated from projects developed under this methodology.
160	Forest Carbon Works	Briana Capra	Model for carbon-at-risk of removal (section 11)	The methodology employs a model to determine baseline emissions to predict the carbonat-risk of removal. However, the model uncertainty has not been assessed. The requirement is: All plausible sources of model uncertainty, such as structural uncertainty or parameter uncertainty, shall be assessed using recognized statistical approaches such as those described in 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 1, Chapter 3.	VCS Rerefence: VCS Methodology Requirements Section 2.5.1	We appreciate comments noting that the structure and performance of the baseline model used within this methodology is strongly influential on the predicted and realized climate impact of projects. As we are advancing this methodology independently, we will be moving to increase transparency rather than following an expert review process. This includes both detailed documentation of particular models used, as well as sharing benchmarking and performance information for baseline models. Finally, the revised approach to uncertainty explicitly accounts for imprecision in the baseline model in calculating the final number of credits generated from projects developed under this methodology.

161	Forest Carbon Works	Briana Capra	Model for carbon-at-risk of removal (section 11)	The methodology employs a model to determine baseline emissions to predict the carbonat-risk of removal. However, no requirements are provided for assessing uncertainty or calibrating such models to local data. The requirement is: Models shall have comprehensive and appropriate requirements for estimating uncertainty in keeping with IPCC or other appropriate guidance, and the model shall be calibrated by parameters such as geographic location and local climate data.	VCS Rerefence: VCS Methodology Requirements Section 2.5.1	We appreciate comments noting that the structure and performance of the baseline model used within this methodology is strongly influential on the predicted and realized climate impact of projects. As we are advancing this methodology independently, we will be moving to increase transparency rather than following an expert review process. This includes both detailed documentation of particular models used, as well as sharing benchmarking and performance information for baseline models. Finally, the revised approach to uncertainty explicitly accounts for imprecision in the baseline model in calculating the final number of credits generated from projects developed under this methodology.
162	Forest Carbon Works	Briana Capra	Model for carbon-at-risk of removal (section 11)	The methodology employs a model to determine baseline emissions to predict the carbonat-risk of removal. However, no conservative factors are required to discount for model uncertainty. Studies cited by the methodology show there could be massive uncertainty. The requirement is: Models shall apply conservative factors to discount for model uncertainty (in accordance with the requirements set out in Section 2.1.3), and shall use conservative assumptions and parameters that are likely to underestimate, rather than overestimate, the GHG emission reductions or removals.	VCS Rerefence: VCS Methodology Requirements Section 2.5.1	We appreciate comments noting that the structure and performance of the baseline model used within this methodology is strongly influential on the predicted and realized climate impact of projects. As we are advancing this methodology independently, we will be moving to increase transparency rather than following an expert review process. This includes both detailed documentation of particular models used, as well as sharing benchmarking and performance information for baseline models. Finally, the revised approach to uncertainty explicitly accounts for imprecision in the baseline model in calculating the final number of credits generated from projects developed under this methodology.
163	Forest Carbon Works	Briana Capra	Section 4 Applicability Conditions	The methodology is for the Extended Rotation Age (ERA), however no applicability conditions prevent the methodology from being applied to RIL, LtPF or LtHP. The methodology should include applicability conditions to ensure only ERA activities are being credited, or the methodology should adhere to all requirements for IFM (such as inclusion of dead wood and wood products). The requirement is: Where a methodology combines AFOLU project categories, the methodology shall adhere to all sets of requirements pertaining to each and every project category covered, either separating activities, or where activities cannot be separated, taking a conservative approach to each requirement.	VCS Rerefence: VCS Methodology Requirements Section 2.6.2	The only activity eligible to receive credits under this methodology is extension of rotation age. The revised version of the methodology will be explicit about which activity types are eligible and which are not.
164	Forest Carbon Works	Briana Capra	Section 4 Applicability Conditions	The methodology does not provide an applicability condition to prevent lands from being credited where the activity of harvest deferral has already been implemented. Project lands where harvests that have been deferred in the past are eligible for crediting and therefore there is no new measure implemented that reduces emissions. In these cases, the methodology is simply crediting harvest deferrals that happened in prior years and not as a result of implementation of any new technology or measure. The requirement is: Activities that have not implemented any such technologies and/or measures, or that have implemented them on a date that is earlier than that permitted under the VCS rules on project start date, shall be excluded from the methodology.	VCS Rerefence: VCS Methodology Requirements Section 3.2.4	This methodology allows any forestland that is at risk of harvest and is not currently generating credits for any other forest carbon project to participate. Even if a landowner previously deferred harvest on their property, there could still be a risk of harvest. The baseline model used calculates risk of harvest on a yearly basis and would exclude any property not at risk.
165	Forest Carbon Works	Briana Capra	Section 4 Applicability Conditions	The methodology uses a performance benchmark but fails to establish applicability conditions for each performance benchmark. The requirement is: The applicability conditions shall establish the scope of validity of the methodology, and where multiple benchmarks are established, each performance benchmark, including the geographic scope	VCS Rerefence: VCS Methodology Requirements Section 3.2.5	Our credits do take into account the growth that happens over a year based on industry-used and accepted timber growth rates. Final performance for individual properties, and at the project scale, is determined by comparing the stocking expected under the baseline and project scenarios, including growth anticipated under each scenario.

166	Forest Carbon Works	Briana Capra	Section 4 Applicability Conditions, Table 11-1 and 11-2 Appendix A	The methodology fails to clearly demonstrate similarity across the many sub areas of the geographic scope. It does not specify sub area a parameter to the carbon-at-risk model nor does it require sub area to be considered in the parametrization of the model. The methodology is not in conformance with the requirements for establishing and validating a performance benchmark. The requirement is: In establishing the scope of validity of the methodology or each performance benchmark, the methodology shall clearly demonstrate that there is similarity across the sub areas of the geographic scope in factors such as socioeconomic conditions, climatic conditions, energy prices, raw material availability and electricity grid emission factors, as such factors relate to the baseline scenario and additionality, noting that variation is permitted where correction factors address such variation as set out in Section 2.3.8.	VCS Rerefence: VCS Methodology Requirements Section 3.2.5	Contemporary statistical practice has moved beyond trying to derive design unbiased estimators based on blocking the data into homogeneous groups. Our business as usual model is a hierarchical statistical model that predicts one-year harvest risk and intensity based on FIA training data and a suite of covariates that include geographic, biological, economic, and sociological factors. Partial pooling across forest types ensures that the model is able to leverage the similarity and ubiquity of covariate relationships across the forests of the continental U.S. while still allowing for regionally specific differences. Predicting behavior of any type, which is the basis for any forest carbon program, is not straightforward, and depends on models whose performance can be measured.
167	Forest Carbon Works	Briana Capra	Section 4 Applicability Conditions	The applicability of a methodology or a performance benchmark shall be limited to the geographic area for which data are available, however the methodology does explicitly limit applicability to the area where data are available.	VCS Rerefence: VCS Methodology Requirements Section 3.2.6	Correct, our methodology is only applicable where appropriate data are available.
168	Forest Carbon Works	Briana Capra	Section 4 Applicability Conditions	The methodology fails to provide applicability conditions sufficient to prevent crediting WRC activities on wetlands. If the methodology is to include crediting ERA activities on wetlands, then WRC requirements should be addressed by the methodology.		The only activity eligible to receive credits under this methodology is extension of rotation age. The revised version of the methodology will be explicit about which activity types are eligible and which are not.
169	Forest Carbon Works	Briana Capra	Section 5 Project Boundary	The methodology ignores carbon stored in wood products in favor of crediting all baseline harvesting without accounting for the portion that is stored in long-lived wood products. Existing ERA methodologies such as VM0003 conservatively require the accounting of carbon stored in wood products, as do other methodologies approved for use by CAR and CARB. The methodology fails to establish criteria and procedures for the exclusion of the wood products GHG source in the baseline scenario. The requirement is: Specific carbon pools and GHG sources do not have to be accounted for if their exclusion leads to conservative estimates of the total GHG emission reductions or removals generated. The methodology shall establish criteria and procedures by which a project proponent may determine a carbon pool or GHG source to be conservatively excluded. And further that: IFM methodologies applicable to activities that reduce harvested timber shall account for the GHG emissions associated with changes in the wood products pool to avoid overestimating project net GHG benefits. The quantity of live biomass going into wood products shall be quantified where above de minimis (as set out in Section 3.3.6).	VCS Rerefence: VCS Methodology Requirements Section 3.3.7 and 3.3.15	We appreciate the detailed comments raised about the absence of HWP accounting in the initial draft of our methodology. The carbon stored in trees is released into the atmosphere when a tree dies, some of it almost instantaneously and sometimes over years to decades. We believe it is important to account for all reasonable pools of emissions related to a harvest, and our revised methodology takes the storage of carbon in, and subsequent release of carbon from, harvest wood products into account.
170	Forest Carbon Works	Briana Capra	Section 5 Project Boundary	Although the methodology is for ERA, no applicability conditions exist to prevent the application of the methodology to RIL and LtPF. Therefore, the project boundaries should include the dead wood pool. The requirement is: RIL and LtPF methodologies shall include the dead wood carbon pool in the project and baseline scenario. Both of these activities reduce the amount of timber extracted per unit area, which, in turn, may reduce the dead wood pool in the project scenario	VCS Rerefence: VCS Methodology Requirements Section 3.3.17	The only activity eligible to receive credits under this methodology is extension of rotation age. The revised version of the methodology will be explicit about which activity types are eligible and which are not.
171	Forest Carbon Works	Briana Capra	Section 5 Project Boundary	The methodology does not specify methods to demonstrate whether the dead wood pool may increase above de mininis, and therefore cannot be an excluded pool. The requirement is: Accounting for the dead wood carbon pool in ERA methodologies is complex because GHG emissions will depend on how post-harvest slash is treated. Slash may either be piled and burned on site, as typically happens in fire prone areas, or left on site to decompose. Extending a harvest rotation or cutting cycle would result in larger trees at harvest, which would increase the amount of dead wood produced at each harvest, but not necessarily the total amount of dead wood produced over time. Because the dead wood pool may increase above the de minimis in the baseline or project scenario, this carbon pool is deemed optional	VCS Rerefence: VCS Methodology Requirements Section 3.3.18	The only activity eligible to receive credits under this methodology is extension of rotation age. The revised version of the methodology will be explicit about which activity types are eligible and which are not.
172	Forest Carbon Works	Briana Capra	Section 6 Baseline Scenario	The methodology only identifies one baseline scenario: harvesting. The requirement is to identity alternative baseline scenarios and determine the most plausible scenario. The requirement is: Methodologies shall identify alternative baseline scenarios and determine either the most plausible baseline scenario or an aggregate baseline scenario for the project activity. Aggregate baseline scenarios shall be determined by combining likely scenarios on a probabilistic (i.e., likelihood) basis	VCS Rerefence: VCS Methodology Requirements Section 3.4.4	Only properties that are at risk of harvest are eligible to join a project. Therefore, the only reasonable baseline scenario to be considered is harvesting.

173	Forest Carbon Works	Briana Capra	Section 6 Baseline Scenario, Appendix A	The methodology does not analyze or even consider the trend in the baseline scenario. A clear trend could exist for harvest deferral within the sector, in which case such a trend should be taken into account for the baseline scenario and the carbon-at-risk model. The requirement is: Performance benchmarks shall be established based upon available technologies and/or current practices, and trends, within the sector. Where the analysis of trends shows a clear trend of improvement in the baseline scenario over time, the performance benchmark shall take account of the trend	VCS Rerefence: VCS Methodology Requirements Section 3.4.5	The business as usual model is a hierarchical statistical model that predicts one-year harvest risk and intensity based on FIA training data and a suite of covariates that include geographic, biological, economic, and sociological factors. Partial pooling across forest types ensures that the model is able to leverage the similarity and ubiquity of covariate relationships across the forests of the continental U.S. while still allowing for regionally specific differences. That said, we are continually improving our model to be able to better capture historical trends in the baseline scenario.
174	Forest Carbon Works	Briana Capra	Section 6 Baseline Scenario, Appendix A	The methodology developer shall demonstrate that sampling results provide an unbiased and reliable estimate of the true mean value (i.e., the sampling does not systematically underestimate or overestimate the true mean value), however no such analysis is provided in the methodology and no requirements to demonstrate unbiasedness in the carbon-atrisk model.	VCS Rerefence: VCS Methodology Requirements Section 3.4.6 (4)	We agree that accounting for uncertainty is very important in any forest carbon project. Our revised methodology propagates and accounts for uncertainty and requires a deduction associated with the uncertainty of carbon stocks in the project and baseline scenarios.
175	Forest Carbon Works	Briana Capra	Section 6 Baseline Scenario, Appendix A	Data shall be publicly available or made publicly available, however the methodology fails to require disclosure of data and the format for disclosure of such data	VCS Rerefence: VCS Methodology Requirements Section 3.4.6 (5)	We appreciate comments noting that the structure and performance of the baseline model used within this methodology is strongly influential on the predicted and realized climate impact of projects. As we are advancing this methodology independently, we will be moving to increase transparency rather than following an expert review process. This includes both detailed documentation of particular models used, as well as sharing benchmarking and performance information for baseline models. Finally, the revised approach to uncertainty explicitly accounts for imprecision in the baseline model in calculating the final number of credits generated from projects developed under this methodology.
176	Forest Carbon Works	Briana Capra	Appendix A	The dataset [used to determine the performance benchmark] may be documented and contained within the methodology, or may be maintained in a separate repository that is referenced by the methodology, however no data are provided.	VCS Rerefence: VCS Methodology Requirements Section 3.4.7	We appreciate comments noting that the structure and performance of the baseline model used within this methodology is strongly influential on the predicted and realized climate impact of projects. As we are advancing this methodology independently, we will be moving to increase transparency rather than following an expert review process. This includes both detailed documentation of particular models used, as well as sharing benchmarking and performance information for baseline models. Finally, the revised approach to uncertainty explicitly accounts for imprecision in the baseline model in calculating the final number of credits generated from projects developed under this methodology.
177	Forest Carbon Works	Briana Capra	Appendix A	The determination and establishment of a baseline scenario shall follow an internationally accepted GHG inventory protocol, such as the IPCC 2006 Guidelines for National GHG Inventories, however no such requirement is presented in the methodology. Rather, the methodology allows for remotely-sensed data that may not conform to the requirements of any internationally accepted GHG inventory protocol.	VCS Rerefence: VCS Methodology Requirements Section 3.4.9	Our model makes high fidelity predictions on the basis of remotely sensed data combined with robust field measurements to create a dynamic and spatially resolved baseline.
178	Forest Carbon Works	Briana Capra	Section 6 Baseline Scenario, Appendix A	The methodology does not require the use of VT0005 Tool for measuring aboveground live forest biomass using remote sensing, v1.0 or a similar method for remote-sensing of biomass despite allowing remote sensing of forest biomass.		As we have revised our methodology we have clarified the emphasis on leveraging remote sensing-derived data products for generating inventory estimates at scale. We have further emphasized methods for incorporating field measurements into estimates of forest disturbance and change.,
179	Forest Carbon Works	Briana Capra	Appendix A	The IPCC Guidelines shall also be followed in terms of quality assurance/quality control (QA/QC) and uncertainty analysis, however the guidelines are not applied in the establishment of model parameters for the carbon-atrisk model or the quantification of uncertainty in in the carbonat-risk model.	VCS Rerefence: VCS Methodology Requirements Section 3.6.2	We agree that accounting for uncertainty is very important in any forest carbon project. Our revised methodology accounts for and requires a deduction associated with the uncertainty of carbon stocks in the project and baseline scenarios.

180	Forest Carbon Works	Briana Capra	Section 6 Baseline Scenario, Equation 1	Where carbon would have been lost in the baseline scenario due to land use conversion or disturbance, GHG emissions from soil carbon, belowground biomass, wood products and dead wood carbon pools generally occur over a period of time following the event. It shall not be assumed that all GHG emissions from these carbon pools in the project categories specified below occur instantaneously or within a short period of time, however the methodology assumes exactly this scenario which is not in conformance with the VCS requirements.	VCS Rerefence: VCS Methodology Requirements Section 3.6.4	We appreciate the detailed comments raised about the absence of HWP accounting in the initial draft of our methodology. The carbon stored in trees is released into the atmosphere when a tree dies, some of it almost instantaneously and sometimes over years to decades. We believe it is important to account for all reasonable pools of emissions related to a harvest, and our revised methodology takes the storage of carbon in, and subsequent release of carbon from, harvest wood products into account.
181	Carbon Direct, Inc.	Bodie Cabiyo, Van Butsic, John Dees	8,4	Uncertainty is based solely on uncertainty around carbon accounting. However, because the baseline is a model, there is uncertainty in the baseline model that goes beyond simply carbon accounting. Section 6: Baseline scenario broadly describes a type of probabilistic model which can predict the amount of harvest that would take place under the project scenario. However, from the requirements of Section 6, there is no way for an independent verifier to interrogate the quality of the model. While we believe the generalized model presented is a good starting place to assure the model accurately predicts forest harvest we suggest some changes.	The developers using this methodology must present in their documentation: (1) a statistical measure of goodness-of-fit appropriate for the model type used and (2) estimated coefficients for each variable in the model such that an independent verifier can confirm the model results are logical. A conservative suggestion is that the uncertainty should be propagated in the baseline estimate by estimating the baseline likelihood one standard deviation below the mean, instead of the mean itself. This would encourage developers to select landowners with higher certainty and improve models.	We agree that accounting for uncertainty is very important in any forest carbon project. Our revised methodology accounts for and requires a deduction associated with the uncertainty of carbon stocks in the project and baseline scenarios.
182	Carbon Direct, Inc.	Bodie Cabiyo, Van Butsic, John Dees	6	Line: “In the event there is an existing exercisable option for timber purchase on the land in question, the likelihood of harvest may be appropriately set at 100%” A 100% probability of harvest is a misunderstanding of a timber option. An option, in and of itself, is not equivalent to a 100% chance of timber being harvested in any given year. Indeed, in the timber industry it is common for options to not be exercised or for option terms to be for many years. Certainly, the percent of options exercised in a given year is not 100%. Therefore setting the baseline at 100% for any land with an option is overstating the probability of harvest. We suggest that the existence of an exercisable option may increase the probability of harvest, but it does not make it 100%.	When a parcel has an exercisable option, (1) ten percentage points should be added to the likelihood of harvest or (2) in the event the underlying baseline model includes existing timber harvest in its set of estimated coefficients, the likelihood of harvest is estimated directly inducing this coefficient.	We note the confusion around this line in the methodology and have reworded this section to clarify the intent which is that the owner of the exercisable option may generate carbon credits
183	Carbon Direct, Inc.	Bodie Cabiyo, Van Butsic, John Dees	Intro	This statement makes false equivalence between tonne-year accounting and physical permanence. It is not scientifically defensible to claim equivalence between a delayed emission and a permanent carbon removal/avoided emissions. Tonne-year accounting can be an expression of the value of “buying time”, e.g. through an economic framework, but should never claim physical equivalence with permanent removal/avoided emissions.	Change: “incorporates tonne year accounting to determine and assure equivalent impact to permanent storage.” to: “incorporates tonne-year accounting, which approximates equivalent cumulative radiative forcing over a 100-year time horizon relative to permanent storage over the same period. This equivalence serves as a proxy for the cumulative benefits accrued from delaying emissions.” Similar changes may also be applied in Section 2, Paragraph 3.	The goal of climate mitigation is more about mitigating the damage caused by climate change, rather than the actual quantity of carbon in the atmosphere. The carbon in the atmosphere causes increased temperatures through climate forcing, which in turn lead to costly economic and social damages to our water, homes, businesses, and livelihoods. The long-standing research and implementation of the Social Cost of Carbon approximates the net present value of the perpetual stream of future costs and damages caused by climate change. For our methodology, we apply a similar economic framing and a net discount rate of 3.0% to identify the equivalence ratio between the benefits of delaying emissions for 1 year compared with 100 years. See Parisa et al. 2022 for a full explanation of how this economic model yields an economic equivalence between credits of different durations. In order to incentivize action today to avoid those future damages, it is appropriate to use a similar economic framework to calculate the benefits of near-term climate action. While a ratio does not signify a physical equivalence, it does appropriately value the future economic benefits of physical action today.

Feedback on 1 Year Projects Utilizing Tonne Year Accounting	Baker River Forestry, LLC	Bob Berti,		NCX's program of deferring annual harvests categorically will not create carbon additionality. It will simply pay small woodlot clients that I represent, an annual payment that does not change the "business as usual practice" of selective harvests on a 15-20 year re-entry cycle. It is a disingenuous approach that simply pays people to defer harvests they were not planning on, while distributing wealth from penance seeking carbon offset buyers who think this nature backed solution really works when it does nothing to change behavior. Let me share a real-world example. I have managed over 39 acres for one client over the past 60 years. In that time, her property has always had a minimum stocking of 14 cords/acre of merchantable wood. During these 60 years, I have arranged four different harvest operations, with roughly 15 years between harvests. The goal of our management has been to provide periodic income while taking good care of the underlying forest capital. Under NCX's methodology, my client could sign up and be paid for deferring harvesting for the next 14 years, because the property has additional standing timber that could be harvested, even immediately after harvest. But since harvests are an episodic event spaced roughly 15 years apart, my client will have exactly the same stocking on her land today as she would have if she was paid to defer harvests for 14 years between logging operations. No change in behavior, no change in stocking. NCX would pay my client to do what she was going to do anyways, and NCX would create, in my opinion, a "bogus" carbon offset to sell on the voluntary market to an under-educated offset buyer seeking indulgences. This is not the way to incentivize meaningful climate change action. There is no additionality. Markets for timber cycle up and down, so we might delay a harvest entry during poor markets, waiting for prices to come up. When prices increase, we would implement the same kind of harvest, taking a little more wood, and putting us right back on the same cycle we were on before. NCX's methodology would pay my client for this delay. But again, there is no enduring change in the carbon sequestered or stored on the forest. There is a divergence from the prior expectation, but a fairly prompt return to the plan. Now imagine a region with many such landowners, each harvesting sustainably on a periodic basis, as described. They harvest about as much timber as they grow and sell it to local markets. How does the addition of NCX payments affect carbon sequestration and storage in this scenario? Not at all! The forest grows the same amount and the mills consume the same amount. Across the landscape, the amount of carbon sequestered and stored does not change. Verra has an obligation to not simply accept NCX's proposed methodology as prima facia evidence that their algorithms and satellite imagery will magically measure, verify, and generate new carbon offsets. For Verra to be a credible verifier, you must also understand incentives that change behavior. Carbon offsets are incentives to prompt behavior changes. But if the offsets are rewarded without a change in business as usual behavior, they do nothing for the environment. Paying woodlot owners, a one-year harvest deferral does not change behavior, period. There is no additionality, period. In the final analysis, this methodology is flawed and not worthy of VCS's approval. I fear you might believe it is not your purview to give a thumbs		Projects are additional when the carbon stocks in the project scenario are greater than the carbon stocks expected under the baseline scenario–this is the basis for any carbon project verified against any standard. Because additionality, and therefore, creditable carbon is dependent on an accurate baseline, eligibility is limited to forests that are truly at risk of being harvested in the next year. Deferring that harvest results in additional carbon in the landscape.
Feedback on 1 Year Projects Utilizin						
185	Bluesource LLC	Ben Parkhurst	11	The crediting from this methodology is almost entirely driven by a relatively opaque and complex model to predict the risk of harvesting for any given property in the baseline. However, we believe that this harvest model has not been sufficiently vetted by the peer review process at this point. The methodology notes that the common practice harvest model was fully reviewed by an expert panel, but no details of issues brought up by this panel or responses from NCX have been posted to the VCS website along with this methodology. This model is the fundamental quantification tool for estimating emissions reductions from deferred harvest, but due to the lack of transparency behind the panel review or precedent in the academic community for use of such a model for carbon quantification, we believe that this methodology should be delayed until further details on the review process can be publicly provided. The baseline model is far too complex and unprecedented for use in the carbon market without thorough review by qualified stakeholders and deserves more transparency regarding the review process. The uncertainties in this model are not adequately addressed or acknowledged in the methodology, and there should be more elements of conservativeness applied throughout the quantification to account for model uncertainties.		We appreciate comments noting that the structure and performance of the baseline model used within this methodology is strongly influential on the predicted and realized climate impact of projects. As we are advancing this methodology independently, we will be moving to increase transparency rather than following an expert review process. This includes both detailed documentation of particular models used, as well as sharing benchmarking and performance information for baseline models. Finally, the revised approach to uncertainty explicitly accounts for imprecision in the baseline model in calculating the final number of credits generated from projects developed under this methodology.

186	Bluesource LLC	Ben Parkhurst	11	While Appendix A provides a theoretical overview of the baseline model, it is nowhere near specific enough in clarifying how it is to be applied consistently among project proponents. Other IFM methodologies make it very clear how projects are to be implemented and provide clear language and default factors on how project emissions reductions are to be quantified and verified. This ensures integrity and consistency among projects that are developed by different entities. This methodology would be nearly impossible to apply consistently among project proponents, and different approaches could easily lead to situations where emissions reductions from different projects are simply not equivalent due to varying assumptions and methodologies. We recommend Verra make all information from the panel review process publicly available to allow for additional stakeholders to evaluate the integrity of baseline quantification model and the ability for project proponents to utilize the methodology consistently across projects.		The business as usual model is a hierarchical statistical model that predicts one-year harvest risk and intensity based on FIA training data and a suite of covariates that include geographic, biological, economic, and sociological factors. Partial pooling across forest types ensures that the model is able to leverage the similarity and ubiquity of covariate relationships across the forests of the continental U.S. while still allowing for regionally specific differences. We appreciate comments noting that the structure and performance of the baseline model used within this methodology is strongly influential on the predicted and realized climate impact of projects. As we are advancing this methodology independently, we will be moving to increase transparency rather than following an expert review process. This includes both detailed documentation of particular models used, as well as sharing benchmarking and performance information for baseline models. Finally, the revised approach to uncertainty explicitly accounts for imprecision in the baseline model in calculating the final number of credits generated from projects developed under this methodology.
187	Bluesource LLC	Ben Parkhurst	11	We would like to advocate to make the baseline quantification methodology as clear as possible to ensure parity across projects developed by different project proponents. Similar to other IFM methodologies, there should be a clear step-by-step process with and example models on how projects should be implemented so that there is no ambiguity. In addition, there needs to be more explicit and replicable guidelines on how the baseline quantification should be verified to ensure projects are held to consistent verification standards.		The business as usual model is a hierarchical statistical model that predicts one-year harvest risk and intensity based on FIA training data and a suite of covariates that include geographic, biological, economic, and sociological factors. Partial pooling across forest types ensures that the model is able to leverage the similarity and ubiquity of covariate relationships across the forests of the continental U.S. while still allowing for regionally specific differences. We appreciate comments noting that the structure and performance of the baseline model used within this methodology is strongly influential on the predicted and realized climate impact of projects. As we are advancing this methodology independently, we will be moving to increase transparency rather than following an expert review process. This includes both detailed documentation of particular models used, as well as sharing benchmarking and performance information for baseline models. Finally, the revised approach to uncertainty explicitly accounts for imprecision in the baseline model in calculating the final number of credits generated from projects developed under this methodology.
188	The Lyme Timber Company	Jim Hourdequin	Tonne-Year Accounting (TYA):	Tonne-Year Accounting (TYA): TYA has merit as an accounting and financing tool, however, I do not believe that TYA should accommodate short-term activity periods as proposed.		A tonne-year is simply a unit of carbon account like a kilowatt hour is to a kilowatt for electricity, a unit of volume over time. While tonne-year accounting may not be used widely today in the voluntary carbon market, it has been supported as an alternative to traditional carbon accounting in the scientific literature for many years. One cannot adequately know the full benefit of a solution without adding in the time or duration term. Fundamentally, tonne-year accounting allows for the delivery of realized impact, not presumed future impact on timescales incongruent with the variability of natural systems. Furthermore, tonne-year accounting allows the direct comparison of benefits of different carbon offsets approaches over many different time scales and technologies.

189	The Lyme Timber Company	Jim Hourdequin	Additionality	Higher Additionality Risk resulting from Short-Term Activity Periods and Targeting Smaller NonIndustrial Landowners: The Proposal implies that one of the goals of the methodology is "opening carbon markets to smaller-size landowners with historically low rates of participation". While this may well be a worthy goal for reasons unrelated to climate, the combination of a shorter timeframe and the targeting of smaller land ownerships make it much more difficult to establish realistic baseline conditions. Small, non-industrial landowners have many reasons for owning land, and according to several studies, income from timber harvesting ranks relatively low among their priorities. They tend to harvest episodically and in most years do not harvest at all. While it may be theoretically possible to predict an aggregate level of harvest by all non-industrial landowners in a given region, I am not convinced that we have adequate tools to predict the likelihood of harvesting by the subset of landowners who elect to participate in a 1-year harvest deferral program. Thus, I believe that "adverse selection" – participation by landowners who would not otherwise be harvesting in the year – is a serious risk to a 1-year accounting period. While adverse selection can be addressed in certain markets(insurance, for example), it's not clear that the buyer orseller in a carbon market has an incentive to fully address the risk because neither suffers a loss because of the adverse selection (in contrast, if an insurer misprices an insurance product relative to the pool of insurance buyers it targets, it ultimately suffers an underwriting loss). Thus, it's incumbent on the protocol standard to fully study this area and develop a high degree of confidence in baseline projections. The evaluation of adverse selection risk is far simpler and more robust on larger land ownerships and/ or in consideration of harvesting over longer time periods. As land ownership area increases, the likelihood that the owner is financially motivated also increases and consequently the likelihood that timber harvesting would otherwise occur increases. In addition, larger landowners are more likely to have data on historical activities, which enables calibration between predicted baseline activity and historical		Where the methodology is not explicitly prescriptive, it is expected that project developers will implement appropriate safeguards to avoid adverse selection. For example, NCX signs a legal agreement with landowners that affirms their willingness to harvest the volume they are instead credited with deferring. We look forward to working with other developers and academic researchers to explore methods of measuring adverse selection directly in the future. Projects are additional when the carbon stocks in the project scenario are greater than the carbon stocks expected under the baseline scenario–this is the basis for any carbon project verified against any standard. Because additionality, and therefore, creditable carbon is dependent on an accurate baseline, eligibility is limited to forests that are truly at risk of being harvested in the next year. Deferring that harvest results in additional carbon in the landscape. Our business as usual model is a hierarchical statistical model that predicts one-year harvest risk and intensity based on FIA training data and a suite of covariates that include geographic, biological, economic, and sociological factors. Partial pooling across forest types ensures that the model is able to leverage the similarity and ubiquity of covariate relationships across the forests of the continental
190	The Lyme Timber Company	Jim Hourdequin	Additionality	Higher Additionality Risk from Assumption that Adequate Baseline Models can be developed across all Forest Types: The assertion is made that it's possible to create baseline models in a range of forest types. While I agree with the assertion that, aside from the elements described in #2 above, the establishment of a baseline in plantation should be possible, I am not convinced that there are good and thoroughly tested models that do not rely on historical activity to predict landowner behavior on non-plantation lands in the US. The heterogeneity of forests, terrain, markets, access & road costs, landowner objectives, contractor availability, etc. on non-plantation forests is vastly greater than on plantation forests. I believe that any predictive model on these lands has to take into account historical practice on relatively large subject properties (>5,000 acres) over a period of years, and thus I am skeptical of the broad statement that predictive models can be developed across forest types. At a minimum, there should be a requirement to demonstrate that the predictive models are calibrated with historical practice on similarly situated subject properties. In general, I am not convinced that there has been sufficient study and/or academic support for the use of predictive models to forecast baseline activity over a 1-year period. Experience in the compliance market has demonstrated that forecasting baseline activity can be fraught over 100-year periods on large ownerships which ceteris paribus should be far easier given higher likelihood of activity over long timeframes and larger areas. The baseline models described in Section 6 and Appendices A and B strike me as highly theoretical and stylized, with little basis in empirical data and potentially little opportunity for calibration with empirical data.		Our business as usual model is a hierarchical statistical model that predicts one-year harvest risk and intensity based on FIA training data and a suite of covariates that include geographic, biological, economic, and sociological factors. Partial pooling across forest types ensures that the model is able to leverage the similarity and ubiquity of covariate relationships across the forests of the continental U.S. while still allowing for regionally specific differences. Predicting behavior of any type, which is the basis for any forest carbon program, is not straightforward, and depends on models whose performance can be measured. Our revised methodology requires the propagation of model uncertainty through to calcation of final credits, as well as reporting of benchmarking for all models.
191	The Lyme Timber Company	Jim Hourdequin	Leakage	Short-term Leakage Maybe 100%, not 10%: The Proposal suggests a fixed, low level of leakage during the first seven years of a project. I don't understand the basis for this level of leakage. Within a given woodbasket, wood consumption in a given year is generally based on overall market dynamics affecting the installed base of wood consuming mills. These are "fixed cost" businesses where there is a high marginal cost of not consuming wood necessary to achieve their desired level of production. Consequently, over the short-term, I assume that any reductions in harvest by a subset of landowners will be offset by increased harvests (potentially at higher stumpage prices) from other landowners (perhaps landowners who would not otherwise harvest but for the higher stumpage prices). Over the longer-term, higher wood procurement costs resulting from landowner participation in harvest deferral programs may affect decisions of wood consumers to reduce or expand capacity, and this could reduce levels of leakage within the woodbasket. In general, I question the theoretical basis for the proposed leakage equations and suggest that this area requires substantially more study and empirical evidence when applied to short-term harvest deferrals.		Leakage is poorly studied across existing IFM projects, especially short-term harvest deferral projects. We agree that leakage is a possible outcome of purposefully delaying a harvest. Based on comments received, we have updated the methodological approach to include a more conservative deduction. We look forward to working with other developers and academic researchers to explore methods of measuring leakage directly in the future.

192	NCASI	Steve Prisley	5 (Harvested wood products)	**The methodology overstates carbon benefits of delayed harvest due to its omission of carbon stored in harvested wood products;**:The NCX methodology does not include any accounting for carbon stored in harvested wood. The methodology states that carbon in wood products is not included because "harvest deferral leads only to a shift in the harvested wood products decay curve, whose impact differs depending on the number of years harvest is deferred during and after participation." While this statement is true, the methodology ignores the fact that substantial portions of carbon in harvested wood remain stored for longer than 100 years (Hoover et al. 2014). Computing harvest deferral credits based on what would have been harvested, rather than what would have been emitted, overstates the climate benefits obtained. For example, using US Forest Service factors for logging residues and decay of harvested wood products , if 100 tons of CO2e is removed from the live tree inventory in a pine stand in the US South, approximately 24 tons remains in the forest as logging residue where it will gradually decay, and approximately 30 tons is emitted from manufacturing residues within the first year after delivery to a mill. Some of the remaining carbon is emitted slowly over time, while up 30% remains in storage after 100 years. Even if we assume that all logging and manufacturing residues are emitted instantaneously, only about 54 tons of what is harvested is actually emitted the first year after harvest. Therefore, instead of the 100 ton-years credited under the harvest deferral scheme, the atmospheric benefit is only a deferral of 54 tons of CO2e. The methodology proposed by NCX appears to be unique among similar Verified Carbon Standard methodologies in not recognizing the climate benefit of long-term storage of carbon in harvested wood. It does not seem that incorporating harvested wood in the NCX proposed methodology would add insurmountable complexity, given the high-level modeling that is required in other elements (computing the common practice baseline, leakage, etc.).	Deduct carbon stored in harvested wood products after one year from the carbon in deferred harvest to accurately reflect that not all harvested carbon is emitted in the deferral period. Or, include ton-year accounting for the gradual release of CO2 from harvested carbon over a 100-year period using, for example data from Hoover et al. 2014 or Smith et al. 2006. Hoover, C., R. Birdsey, B. Goines, P. Lahm, Y. Fan, D. Nowak, S. Prisley, E. Reinhardt, K. Skog, D. Skole, J. Smith, C. Trettin, and C. Woodall. 2014. Chapter 6: Quantifying greenhouse gas sources and sinks in managed forest systems. Quantifying Greenhouse Gas Fluxes in Agriculture and Forestry: Methods for Entity-Scale Inventory. Technical Bulletin. 1939., 6-1-6.114. Smith, J.E., L.S. Heath, K.E. Skog, and R.A. Birdsey. 2006. Methods for calculating forest ecosystem and harvested carbon with standard estimates for forest types of the United States. General Technical Report NE-343. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northeastern Research Station. 216 p.	We appreciate the detailed comments raised about the absence of HWP accounting in the initial draft of our methodology. The carbon stored in trees is released into the atmosphere when a tree dies, some of it almost instantaneously and sometimes over years to decades. We believe it is important to account for all reasonable pools of emissions related to a harvest, and our revised methodology takes the storage of carbon in, and subsequent release of carbon from, harvest wood products into account.
193	NCASI	Steve Prisley	Additionality	The methodology is likely to result in carbon benefits that are not additional, thereby crediting behavior that would have happened anyway without payment.There is substantial literature about the harvesting behavior of private landowners, and many efforts have been made to reliably predict the willingness of landowners to harvest timber. Factors related to likelihood of harvesting include market price, landowner type, size of forested tract, family debt, landowner wealth, timber characteristics, and numerous others (Dennis 1989; Kuuluvainen et al. 1996; Conway et al. 2003; Joshi and Mehmood 2011). It remains very difficult to predict with any accuracy or precision whether a given landowner will be receptive to a bid for their timber, based only on publicly available data. But it is clearly known that landowners differ in their attitudes and expectations regarding their forest land, and these differences are important in understanding their aggregate behavior. To recognize the effect of landowner heterogeneity on aggregate behavior, researchers have attempted to characterize groups or classes of forest landowners based on their behavior (Finley and Kittredge 2006; Favada et al. 2009; Henderson and Abt 2016). Evaluating the actions of different classes of landowners provides valuable insights into the functioning of timber markets. For example, Henderson and Abt (2016) characterize private forest landowners in two types: those who own or manage their land primarily for economic benefits, and those who own their land primarily for amenity values3 . For simplicity, we refer to the first group as "income-seekers" and the second group as "amenity-seekers". Results from the National Woodland Owner Survey (Butler et al. 2021) suggest that amenityseekers greatly outnumber income-seekers. For example, of family forest landowners with at least 10 acres of forest, only 21% indicated that timber harvesting was either very important or important to them (Butler et al. 2021, Appendix 1). On the other hand, amenity values were more important considerations for these landowners4 : beauty or scenery (81%), nature protection (72%), wildlife habitat (77%), and privacy (72%). Therefore, it appears there are three to four times more amenityseekers than income-seekers. It is reasonable to expect that these two classes of landowners would behave differently regarding a harvest deferral program. It is logical to assume that income-seekers are more aware of the market value of their timber and of financial implications of harvesting decisions		We appreciate the detailed comments raised about the absence of HWP accounting in the initial draft of our methodology. The carbon stored in trees is released into the atmosphere when a tree dies, some of it almost instantaneously and sometimes over years to decades. We believe it is important to account for all reasonable pools of emissions related to a harvest, and our revised methodology takes the storage of carbon in, and subsequent release of carbon from, harvest wood products into account.

				the market value of their timber, and of financial implications of harvesting decisions. They are more likely to be price-responsive; that is, their probability of harvesting timber increases with increased stumpage prices. Amenity-seekers, it might be assumed, are less concerned about market value and less likely to know or care about current market prices, and their management decisions are focused on other considerations. For example, amenity-seekers that are interested in recreational hunting may engage in timber harvesting because they know that certain silvicultural treatments result in vegetation conditions that can attract game species of interest to their land. While they may harvest timber, the price they receive for that timber is not the driving concern, nor the primary basis for their decision to harvest. The opportunity cost incurred by a landowner for deferring harvest will be quite different for income-seekers versus amenity-seekers. For these reasons, income-seekers would be expected to require a higher price for harvest deferral credits. They might only agree to delay harvest when the price they receive for deferral credits exceeds their opportunity cost for postponing harvest. Amenity-seekers, for whom income is less important, might be expected to accept much lower prices for harvest deferral credits, especially if they had no intention to harvest in the first place. Their opportunity cost would be near zero, so they would likely bid lower than income-seekers for those credits. The result of this differential behavior is that a bidding system such as currently defined by NCX is likely to result in more amenity-seekers than income-seekers receiving payments. When a system such as implemented by NCX awards contracts based on the price bid by landowners, those who bid low will receive contracts for deferral credits and the highest bidders will not. Therefore, a potentially high proportion of harvest deferral credits will go to amenity-seekers. In such cases, the carbon benefits of many of the NCX contracts would not be additional; they would have occurred, at least partially and perhaps substantially, regardless of the existence of the market. Furthermore, the structure of the NCX bidding process benefits low bidders. If a landowner faces no or low opportunity cost for harvest deferral and therefore sets their bid at $1 per credit, then as long as the market-clearing price determined by NCX is above $1, they will receive the marketclearing price. If they truly want to participate in the program and the deferral costs nothing, then they have a strong incentive to bid low (and therefore have a greater chance of receiving at least some payment). Furthermore, there is no cost to continue bidding, year after year, until		
194	NCASI	Steve Prisley		Carbon markets, in a variety of forms, can benefit forest landowners and climate mitigation goals. However, if benefits are overstated, or if they are not additional to what would have happened in the absence of the market, then buyers of credits will lose confidence in the value of their purchases and policy-makers and the general public will lose confidence in the ability of carbon markets to be part of the climate solution. It appears that the NCX methodology, due to omission of carbon in harvested wood and the differential behavior of forest landowners, will overstate emissions reductions.		We appreciate the detailed comments raised about the absence of HWP accounting in the initial draft of our methodology. The carbon stored in trees is released into the atmosphere when a tree dies, some of it almost instantaneously and sometimes over years to decades. We believe it is important to account for all reasonable pools of emissions related to a harvest, and our revised methodology takes the storage of carbon in, and subsequent release of carbon from, harvest wood products into account.
195	CarbonPlan	Danny Cullenward	9,1	Ton-year accounting is not aligned with net-zero goals or climate stabilization. See attached comment letter submitted in response to Verra's Proposed Updates to the VCS Program (Feb 2022).	Clearly label ton-year credits to inform consumer that ton-year credits are inconsistent with net zero goals and temperature stabilization. See comment letter.	A tonne-year is simply a unit of carbon account like a kilowatt hour is to a kilowatt for electricity, a unit of volume over time. While tonne-year accounting may not be used widely today in the voluntary carbon market, it has been supported as an alternative to traditional carbon accounting in the scientific literature for many years. One cannot adequately know the full benefit of a solution without adding in the time or duration term. Fundamentally, tonne-year accounting allows for the delivery of realized impact, not presumed future impact on timescales incongruent with the variability of natural systems. Furthermore, tonne-year accounting allows the direct comparison of benefits of different carbon offsets approaches over many different time scales and technologies.
196	CarbonPlan	Danny Cullenward	7	The Proposed Methodology fails to ensure additionality because it relies on unspecified, proprietary methods to account for the unique additionality risks associated with short-duration harvest deferrals. See attached comment letter submitted in response to Methodology for Improved Forest Management through Targeted, Short-Term Harvest Deferral (March 2022).	Require full public disclosure of all baseline scenario models and validation benchmarks approved for use with this methodology. See comment letter.	Projects are additional when the carbon stocks in the project scenario are greater than the carbon stocks expected under the baseline scenario–this is the basis for any carbon project verified against any standard. Because additionality, and therefore, creditable carbon is dependent on an accurate baseline, eligibility is limited to forests that are truly at risk of being harvested in the next year. Deferring that harvest results in additional carbon in the landscape.

197	CarbonPlan	Danny Cullenward	6	The Proposed Methodology fails to ensure additionality because it relies on unspecified, proprietary methods to account for the unique additionality risks associated with short-duration harvest deferrals. See attached comment letter submitted in response to Methodology for Improved Forest Management through Targeted, Short-Term Harvest Deferral (March 2022).	Require full public disclosure of all baseline scenario models and validation benchmarks approved for use with this methodology. See comment letter.	As we are advancing this methodology independently, we will be moving to increase transparency rather than following an expert review process. This includes both detailed documentation of particular models used, as well as sharing benchmarking and performance information for baseline models.
198	CarbonPlan	Danny Cullenward	11,3	Cited reference Thompson et al. (2017) concludes that FIA data provide "little predictive information" about "reactive harvest behavior" of private woodland landowners. This provides evidence of the need for additional disclosure in order to evaluate if a proposed baseline model accurately characterizes these documented, real-world, forest management dynamics, which are critical for ensuring additionality. See attached comment letter submitted in response to Methodology for Improved Forest Management through Targeted, Short-Term Harvest Deferral (March 2022).	Require full public disclosure of all baseline scenario models and validation benchmarks approved for use with this methodology. See comment letter.	Thank you for your comment; we welcome feedback.
199	CarbonPlan	Danny Cullenward	6	The Proposed Methodology explicitly contemplates crediting forests whose landowners have sold the option to harvest to third parties. In this situation, option holders control the decision to harvest, not the landowners being credited for business-as-usual outcomes. See attached comment letter submitted in response to Methodology for Improved Forest Management through Targeted, Short-Term Harvest Deferral (March 2022).	Prohibit landowners with outstanding harvest options from claiming credits for avoiding harvests that they no longer control. See comment letter.	We note the confusion around this line in the methodology and have reworded this section to clarify the intent which is that the owner of the exercisable option may generate carbon credits.
200	CarbonPlan	Danny Cullenward	8,3	The Proposed Methodology's assumption that there is no activity-shifting leakage rests on a loose definition of the term "project area" that is defined by project proponents and subject to potential maniupulation. See attached comment letter submitted in response to Methodology for Improved Forest Management through Targeted, Short-Term Harvest Deferral (March 2022).	Set clear, objective guidance to define "project area" or assign a non-zero activity-shifting leakage factor. See comment letter.	Where the methodology is not explicitly prescriptive, it is expected that project developers will implement appropriate safeguards. For example, NCX signs a legal agreement with landowners that affirms their control over harvesting decisions of all land under their ownership.
201	CarbonPlan	Danny Cullenward	8,3	The Proposed Methodology relies on old and potentially inaccurate estimates of market leakage from broader VCS program standards (see Equation 6). Because the entire concept of the Proposed Methodology is based on models that can predict the probability of harvest, these models, if accurate, can and should be used to develop market leakage parameters.	Require any model that is approved to calculate the probability of timber harvest for baseline scenario purposes to be used to evaluate market leakage factors and update those factors as necessary. See comment letter.	Leakage is poorly studied across existing IFM projects, especially short-term harvest deferral projects. We agree that leakage is a possible outcome of purposefully delaying a harvest. Based on comments received, we have updated the methodological approach to include a more conservative deduction. We look forward to working with other developers and academic researchers to explore methods of measuring leakage directly in the future.
202	CarbonPlan	Danny Cullenward		Earlier this month, we submitted comments on Verra's Proposed Updates to the VCS Program that specifically addressed the implications of issuing offset credits based on ton-year accounting. 2 We incorporate our earlier comments here by reference and write separately to reiterate our concerns with the use of ton-year accounting to issue offset credits to projects that, as proposed here, could store carbon for as little as one year. These approaches are inconsistent with net-zero climate goals and global temperature stabilization. They should be labeled accordingly. We also urge Verra and NCX to directly and transparently address the novel additionality risks posed by ton-year accounting, which the Proposed Methodology fails to do. Ton-year accounting effectively gives projects an open option to exit from carbon storage commitments, which enables strategic, non-additional enrollment behaviors. We do not see adequate protections in the Proposed Methodology that foreclose these risks, as the only meaningful constraints are imposed through a proprietary baseline scenario model that cannot be evaluated in this public consultation. We also discuss a significant loophole that illustrates these additionality problems in concrete terms. Finally, we express concerns with the Proposed Methodology's treatment of emissions leakage from short-term harvest deferrals.As detailed below, we encourage Verra and NCX to make public any baseline scenario models used to ensure additionality under the Proposed Methodology and to close obvious loopholes that would lead to non-additional crediting. We also suggest ways Verra and NCX should improve their treatment of emissions leakage		A tonne-year is simply a unit of carbon account like a kilowatt hour is to a kilowatt for electricity, a unit of volume over time. While tonne-year accounting may not be used widely today in the voluntary carbon market, it has been supported as an alternative to traditional carbon accounting in the scientific literature for many years. One cannot adequately know the full benefit of a solution without adding in the time or duration term. Fundamentally, tonne-year accounting allows for the delivery of realized impact, not presumed future impact on timescales incongruent with the variability of natural systems. Furthermore, tonne-year accounting allows the direct comparison of benefits of different carbon offsets approaches over many different time scales and technologies. The goal of climate mitigation is more about mitigating the damage caused by climate change, rather than the actual quantity of carbon in the atmosphere. The carbon in the atmosphere causes increased temperatures through climate forcing, which in turn lead to costly economic and social damages to our water, homes, businesses, and livelihoods. The long-standing research and implementation of the Social Cost of Carbon approximates the net present value of the perpetual stream of future costs and damages caused by climate change. For our methodology, we apply a similar economic framing and a net

						we apply a similar economic framing and a net discount rate of 3.0% to identify the equivalence ratio between the benefits of delaying emissions for 1 year compared with 100 years. See Parisa et al. 2022 for a full explanation of how this economic model yields an economic equivalence between credits of different durations. In order to incentivize action today to avoid those future damages, it is appropriate to use a similar economic framework to calculate the benefits of near-term climate action. While a ratio does not
203	CarbonPlan	Danny Cullenward		The Proposed Methodology fails to ensure additionality because it relies on unspecified, proprietary methods to account for the unique additionality risks associated with short-duration harvest deferrals. As we addressed in our earlier comments to Verra, ton-year accounting allows for 1-year crediting periods and creates the ongoing option for landowners to exit from their carbon storage commitment. These characteristics enable new opportunities for landowners to strategically enroll and un-enroll in forest offset projects to earn credits around business-as-usual harvest cycles. Ton-year's novel additionality risks must be addressed and mitigated within each methodology, but the Proposed Methodology punts management of this critical problem to unspecified, proprietary methods. Accurately crediting harvest deferrals hinges on predicting the baseline scenario — how forests would have been harvested in the absence of carbon finance. The Proposed Methodology credits harvest deferrals by comparing observed on-site carbon to predicted at-risk carbon. All carbon savings above the modeled baseline scenario are considered additional. 3 Thus, evaluating additionality outcomes requires understanding the details of the baseline model because the accuracy of the baseline model determines what the Proposed Methodology considers additional. 4 Despite the fact that the choice and use of baseline models determines the Proposed Methodology's definition of additionality, the Proposed Methodology does not prescribe specific methods or models that can be used. 5 Instead, the Methodology describes high-level characteristics that a baseline model must consider, but outsources model development and application to financially interested project proponents like NCX. 6		Projects are additional when the carbon stocks in the project scenario are greater than the carbon stocks expected under the baseline scenario–this is the basis for any carbon project verified against any standard. Because additionality, and therefore, creditable carbon is dependent on an accurate baseline, eligibility is limited to forests that are truly at risk of being harvested in the next year. Deferring that harvest results in additional carbon in the landscape.
204	CarbonPlan	Danny Cullenward		It is striking that we aren't able to review the method or see any comprehensive description of its accuracy or comparison against validation benchmarks. As far as we are aware, there is no complete and publicly reviewable description of NCX's baseline modeling approach — neither in the Proposed Methodology nor in any other forum. 7 Under these conditions, it is not possible to tell what exactly the baseline model is, let alone if it adequately mitigates ton-year accounting's unique additionality risks. To be clear, we do not wish to prejudge the accuracy of NCX's models (or any other models that might be developed for use under the Proposed Methodology). But without more detail, it is impossible to evaluate the rigor of NCX's modeling approach. As a result, we are unable to test the Proposed Methodology's technical accuracy in projecting baseline scenarios nor its vulnerability to additionality gaming — including the novel risks introduced with 1-year crediting periods. 8 The opacity of what is actually being proposed is more than a theoretical concern. For example, Appendix A of the Proposed Methodology indicates that the model developed by NCX to predict common practice harvest patterns would be an acceptable approach. We are told that this model is trained on FIA data. 9 However, predicting harvest patterns from FIA data is a very difficult problem, especially for the small, family landowners NCX targets in its marketing efforts. 10 As described by a paper NCX itself cites in Appendix A: "[W]e found little predictive information either from the FIA, census, or NWOS data to explain harvest behavior within the private woodland owner-class … [T]heir reactive harvest behavior due to external stimuli or unplanned financial need[] confounds the ability to predict future conditions in a consistent way[.]" 11 We recognize that the Proposed Methodology requires baseline models like NCX's to be reviewed by an expert panel and approved by Verra. 12 However, since the process does not specify formal criteria or model validation benchmarks, it does not alleviate our concern about the opacity of the baseline modeling approach and inscrutability of the Proposed Methodology's additionality protection.	Verra should require full public disclosure of all baseline scenario models approved for use with this methodology	Our business as usual model is a hierarchical statistical model that predicts one-year harvest risk and intensity based on FIA training data and a suite of covariates that include geographic, biological, economic, and sociological factors. Partial pooling across forest types ensures that the model is able to leverage the similarity and ubiquity of covariate relationships across the forests of the continental U.S. while still allowing for regionally specific differences. Predicting behavior of any type, which is the basis for any forest carbon program, is not straightforward, and depends on models whose performance can be measured. Our revised methodology requires the propagation of model uncertainty through to calcation of final credits, as well as reporting of benchmarking for all models.

205	CarbonPlan	Danny Cullenward		The Proposed Methodology explicitly contemplates crediting forests whose landowners have sold the option to harvest to third parties, illustrating its failure to screen obviously non-additional behavior. Option holders control the decision to harvest, not the landowners being credited for outcomes outside their control. Timber sale contracts often provide a third party with the right to harvest the landowner's timber within a specified period of time. 13 The Proposed Methodology mentions this arrangement in passing, asserting that an exercisable harvest option could reasonably be interpreted as implying a 100% probability of future harvest. 14 This example illustrates the Proposed Methodology's profound failure to screen obviously non-additional behavior. When a landowner sells a harvest option to a third party, the landowner no longer controls the decision to harvest or not harvest. That decision rests with the third-party option holder. Nevertheless, the Proposed Methodology allows projects to assign a 100% probability of harvest to lands subject to an exercisable third-party option. This would allow the landowner who has sold a harvest option to claim full credit for deferring harvest for every year the third-party rightsholder elects not to harvest timber. But contractually, the decision to harvest rests exclusively with the third-party option holder. In this situation, it makes no sense to claim that compensating a landowner with credits induces a change in harvest behavior. This potential loophole calls into question the Proposed Methodology's ability to screen non-additional behaviors that are particularly concerning in light of the unique challenges of short-duration crediting periods.	Verra should prohibit landowners with outstanding harvest options from claiming credits for avoiding harvests that they no longer control.	We note the confusion around this line in the methodology and have reworded this section to clarify the intent which is that the owner of the exercisable option may generate carbon credits.
206	CarbonPlan	Danny Cullenward		The Proposed Methodology does not adequately justify the leakage deductions applied to carbon credits issued for harvest deferrals. To the extent baseline models can accurately predict the probability of timber harvest, the same models can and should be used to provide leakage estimates. Leakage and additionality are closely related. To the extent a landowner is actually deferring harvest, leakage risks increase because deferred harvests from one parcel can lead to increased harvests elsewhere. Accordingly, it is important to connect an additionality finding to the specific mechanisms that might result in leakage. The Proposed Methodology considers but fails to adequately address two types of leakage: (1) leakage from activities shifting within a landowner's operations and (2) leakage from the market effects of reducing harvest. 15 First, the Proposed Methodology assumes there will be no activity shifting leakage based on the premise that owners/managers must enroll the entirety of their holdings, 16 but uses imprecise language that fails to ensure this outcome. The Proposed Methodology asserts that a participating landowner must enroll all forested property within the "program area" of the credited project. However, the Proposed Methodology allows project proponents to define each project's "program area." 17 In other words, project proponents get to define what satisfies the Proposed Methodology's requirement of enrolling all relevant lands on a project-by-project basis, without any programmatic guardrails. With such broad and flexible definitions, it is easy to imagine a program area that intersects only a portion of a large landowner's holdings and thus allows activity-shifting leakage that would nevertheless be ignored under the Proposed Methodology.Second, the Proposed Methodology adopts default Verra leakage deductions to account for market-wide effects of deferring harvest. 18 These deductions are not based on clear evidence, nor calibrated to the specific mechanics of the Proposed Methodology. It is not uncommon for forest offset programs to use simple assumptions precisely because it is so challenging to robustly measure leakage outcomes. For example, in a 2019 public letter reviewing the limited number of studies estimating forest carbon leakage rates, Duke University Professor Brian Murray wrote that: "The empirical work is not easy and I do not pretend that the estimates from my work with others, generated more than ten years ago [in 2004], focused on hypothetical programs are precise estimates of what happens today with real programs. But to my knowledge, they are the only (or perhaps one of a few) peer-reviewed estimates of carbon leakage in US regional programs out there." 19 Although we are sympathetic to the challenge deep uncertainty presents for climate policy decisions, and appreciate Dr. Murray's characterization of the limited evidence available today, the Proposed Methodology is premised on the notion that harvest rate probabilities can be accurately characterized in baseline modeling. If accurate, these harvest prediction models should also be capable of calculating market leakage. 20 If baseline harvest models are not capable of characterizing leakage, however, this implies that they are also incapable of	We recommend Verra either (1) introduce an activity shifting leakage factor, or (2) establish clear and appropriate guardrails on the definition of a program area. We also recommend that Verra (3) require any model deemed sufficient to predict baseline harvest risk probabilities for the purposes of additionality findings also be used to evaluate the adequacy of assumed leakage factors for market effects.	Leakage is poorly studied across existing IFM projects, especially short-term harvest deferral projects. We agree that leakage is a possible outcome of purposefully delaying a harvest. Based on comments received, we have updated the methodological approach to include a more conservative deduction. We look forward to working with other developers and academic researchers to explore methods of measuring leakage directly in the future.

207	Forest and Climate Policy	Andrea Tuttle		I strongly oppose adoption of the proposed NCX methodology based on 1) violations of core offset principles of transparency, additionality, leakage, permanence and financial additionality that are required for a credible forest carbon offset, and 2) erroneous logic in applying discount equations derived from economic analysis to the physics of climate change.		We appreciate comments noting that the structure and performance of the baseline model used within this methodology is strongly influential on the predicted and realized climate impact of projects. As we are advancing this methodology independently, we will be moving to increase transparency rather than following an expert review process. This includes both detailed documentation of particular models used, as well as sharing benchmarking and performance information for baseline models. Finally, the revised approach to uncertainty explicitly accounts for imprecision in the baseline model in calculating the final number of credits generated from projects developed under this methodology. Projects are additional when the carbon stocks in the project scenario are greater than the carbon stocks expected under the baseline scenario–this is the basis for any carbon project verified against any standard. Because additionality, and therefore, creditable carbon is dependent on an accurate baseline, eligibility is limited to forests that are truly at risk of being harvested in the next year. Deferring that harvest results in additional carbon in the landscape. Leakage is poorly studied across existing IFM projects, especially short-term harvest deferral projects. We agree that leakage is a possible outcome of purposefully delaying a harvest. Based on comments received, we have updated the methodological approach to include a more conservative deduction. We look forward to working with other developers and academic
208	Forest and Climate Policy	Andrea Tuttle		Short-term carbon storage resulting from the deferral of forest harvest for one-year provides little climate benefit. This is especially true if harvest is then doubled in the next year (a near-term reversal) – as is permitted.		We agree that additionality is key for any carbon project to work, whether 1 year or 100 years. That is why we rigorously measure additionality in our program and transparently share the results of all project cycles. No nature-based solutions are permanent. However, in this critical decade increasing sequestration and storage is critical to meet global goals. Therefore, we are incentivizing immediate action when it counts. When tonne-year accounting is combined with ex post crediting, climate impact is delivered immediately and cannot be reversed. Acknowledging and designing for temporary storage using tonne-year accounting and short-term crediting provides accountability when fires, pests, and climate change itself make long-term forest predictions near impossible.
209	Forest and Climate Policy	Andrea Tuttle		The NCX scheme will be publicly scrutinized and highlighted as a fraudulent offset claim. This will undermine the credibility of the voluntary market generally and tarnish the reputation of companies claiming net-zero based on these credits.		Thank you for your comment. We respectfully disagree and would be happy to engage on any specific concerns.

210	Forest and Climate Policy	Andrea Tuttle		The point of using forest sequestration as an emission offset is to remove and store carbon from the atmosphere 1) in amounts that exceed what the atmosphere already experiences from business-as-usual (BAU) forest harvest activity, and 2) for periods of time long enough to offset the long residence time and climate damage of carbon pollution in the atmosphere. The NCX methodology does neither of these.		We agree that additionality is key for any carbon project to work, whether 1 year or 100 years. That is why we rigorously measure additionality in our program and transparently share the results of all project cycles. No nature-based solutions are permanent. However, in this critical decade increasing sequestration and storage is critical to meet global goals. Therefore, we are incentivizing immediate action when it counts. When tonne-year accounting is combined with ex post crediting, climate impact is delivered immediately and cannot be reversed. Acknowledging and designing for temporary storage using tonne-year accounting and short-term crediting provides accountability when fires, pests, and climate change itself make long-term forest predictions near impossible.
211	Forest and Climate Policy	Andrea Tuttle		•Tonne-year methodology: The NCX proposal rests on “tonne-year” methodology that remains highly contested. I continue to oppose the assumptions that underlie the method because of the disconnect between the mathematical, theoretical construct of the approach versus the realities of actual, in field, forest growth, the natural variability of biological systems, harvest scheduling, carbon storage, the physics of carbon in the atmosphere and other real-world factors that are ignored by the method.		A tonne-year is simply a unit of carbon account like a kilowatt hour is to a kilowatt for electricity, a unit of volume over time. While tonne-year accounting may not be used widely today in the voluntary carbon market, it has been supported as an alternative to traditional carbon accounting in the scientific literature for many years. One cannot adequately know the full benefit of a solution without adding in the time or duration term. Fundamentally, tonne-year accounting allows for the delivery of realized impact, not presumed future impact on timescales incongruent with the variability of natural systems. Furthermore, tonne-year accounting allows the direct comparison of benefits of different carbon offsets approaches over many different time scales and technologies.
212	Forest and Climate Policy	Andrea Tuttle		•Additionality in forest ecosystems cannot be demonstrated over one-year periods: The method assumes that a one-year deferral of harvest which is compensated by a token payment per acre, is an action taken for climate purposes, rather than just an ordinary BAU delay of harvest due to some extraneous market force (e.g. price, labor, equipment shortage). Other IFM protocols that extend from 30 to 100 years allow a smoothing of natural variation in forest systems from year to year, enabling a forest trend signal to be separated from noise. This one-year snapshot does not.		Projects are additional when the carbon stocks in the project scenario are greater than the carbon stocks expected under the baseline scenario–this is the basis for any carbon project verified against any standard. Because additionality, and therefore, creditable carbon is dependent on an accurate baseline, eligibility is limited to forests that are truly at risk of being harvested in the next year. Deferring that harvest results in additional carbon in the landscape.

213	Forest and Climate Policy	Andrea Tuttle		•Conversion factor: Significant questions have emerged regarding the conversion factor used to calculate how many one-year tons are required to offset a full ton of carbon pollution with the equivalence of 100-year permanence. The findings cast significant doubt on the assumptions, calculations and metrics provided by NCX. Until scientific consensus emerges the method should not be approved. For reference see: CarbonPlan, Jan. 2022 https://carbonplan.org/blog/ton-year-ncx.		The goal of climate mitigation is more about mitigating the damage caused by climate change, rather than the actual quantity of carbon in the atmosphere. The carbon in the atmosphere causes increased temperatures through climate forcing, which in turn lead to costly economic and social damages to our water, homes, businesses, and livelihoods. The long-standing research and implementation of the Social Cost of Carbon approximates the net present value of the perpetual stream of future costs and damages caused by climate change. For our methodology, we apply a similar economic framing and a net discount rate of 3.0% to identify the equivalence ratio between the benefits of delaying emissions for 1 year compared with 100 years. See Parisa et al. 2022 for a full explanation of how this economic model yields an economic equivalence between credits of different durations. In order to incentivize action today to avoid those future damages, it is appropriate to use a similar economic framework to calculate the benefits of near-term climate action. While a ratio does not signify a physical equivalence, it does appropriately value the future economic benefits of physical action today.
214	Forest and Climate Policy	Andrea Tuttle		•Verification and Transparency: No standard should be approved if the calculations cannot be independently replicated and verified. The proposed methodology rests on proprietary computer modeling to generate a baseline based on machine learning and AI. The algorithm claims to predict BAU harvest behavior based on forest type, location, roads, proximity to mills, timber price and other factors. While these attributes may also be useful to other protocols in refining their FIA common practice baselines, the black box nature of the calculations makes it impossible for Verifiers to ascertain whether the baseline is skewed towards over-crediting or not.		We appreciate comments noting that the structure and performance of the baseline model used within this methodology is strongly influential on the predicted and realized climate impact of projects. As we are advancing this methodology independently, we will be moving to increase transparency rather than following an expert review process. This includes both detailed documentation of particular models used, as well as sharing benchmarking and performance information for baseline models. Finally, the revised approach to uncertainty explicitly accounts for imprecision in the baseline model in calculating the final number of credits generated from projects developed under this methodology.

215	Forest and Climate Policy	Andrea Tuttle		•Permanence: The debatable logic of the tonne-year methodology eliminates the requirements for both permanence and buffer pools, e.g. "...The tonne-year accounting approach allows for equivalence to permanent tonnes on an annual basis and therefore permanence risk assessment and buffer pool contributions are not required" (NCX p.6). Even if we accept the notion that one-year of deferred harvest is marginally meaningful to the climate, the fact that the carbon can immediately be re-emitted next year -- and in even larger quantities – hardly meets a laugh test of a meaningful climate contribution, especially in the eyes of a highly skeptical public audience.		The goal of climate mitigation is more about mitigating the damage caused by climate change, rather than the actual quantity of carbon in the atmosphere. The carbon in the atmosphere causes increased temperatures through climate forcing, which in turn lead to costly economic and social damages to our water, homes, businesses, and livelihoods. The long-standing research and implementation of the Social Cost of Carbon approximates the net present value of the perpetual stream of future costs and damages caused by climate change. For our methodology, we apply a similar economic framing and a net discount rate of 3.0% to identify the equivalence ratio between the benefits of delaying emissions for 1 year compared with 100 years. See Parisa et al. 2022 for a full explanation of how this economic model yields an economic equivalence between credits of different durations. In order to incentivize action today to avoid those future damages, it is appropriate to use a similar economic framework to calculate the benefits of near-term climate action. While a ratio does not signify a physical equivalence, it does appropriately value the future economic benefits of physical action today.
216	Forest and Climate Policy	Andrea Tuttle		•"But for" financial additionality test: A basic principle of credible offsets is that "but for" the infusion of carbon revenue the offset activity would not occur. The NCX scheme offers landowners low payments that provide little financial incentive to defer harvest beyond the ordinary BAU rotation. Landowners are being paid for what they would do anyway ("anyway tons") until the normal harvest cycle rolls around and markets are favorable. Any commitment to carbon storage is then tossed aside.		Projects are additional when the carbon stocks in the project scenario are greater than the carbon stocks expected under the baseline scenario–this is the basis for any carbon project verified against any standard. Because additionality, and therefore, creditable carbon is dependent on an accurate baseline, eligibility is limited to forests that are truly at risk of being harvested in the next year. Deferring that harvest results in additional carbon in the landscape.
217	Forest and Climate Policy	Andrea Tuttle		•Practical considerations: The method relies on continued enrollment of vast acreages, each acre contributing a small fraction of stored tons to offset the climate damage of a full ton of carbon pollution. A practical question arises as to whether the scheme will be able to meet business commitments when offering offsets at scale. An aggregation protocol for landowners, presumably through contracts, may be necessary to ensure a sufficient pool of participating acres.		We aggregrate credits across very small properties and have in place minimum thresholds for participation to ensure adequate carbon sequestration across the property over a one-year timeframe. It is a requirement that landowners enroll their cumulative landholdings, and those acres are assessed in total. Additionally, our program is also open to very large landowners and timber investment management organizations.
218	Forest and Climate Policy	Andrea Tuttle		The significance of the decision by VERRA to approve or deny this methodology cannot be overstated. The critique of the NCX proposal by CarbonPlan contains an important observation: "...No doubt one response to this criticism will be the standard line in the voluntary carbon markets: "critics can't let the perfect be the enemy of the good." The problem with this position – aside from higher emissions – is that unregulated carbon markets have no governance system to review claims and make changes over time. Instead, critical technical choices are left up to private parties, like NCX, that have a direct profit motive to sell more offset credits for a given volume of temporary carbon storage." (https://carbonplan.org/blog/ton-year-ncx) VERRA comes as close as we have towards a "governance" system that serves as a gatekeeper of integrity in voluntary standards. Thus, this decision matters.		We agree that the voluntary carbon market needs high-quality standards and governance that raise the bar for credit quality and transparency.

219	Forest and Climate Policy	Andrea Tuttle		The NCX methodology fails on many dimensions to provide a meaningful carbon offset. It short cuts every fundamental principle on which forest carbon offset standards are based, leaving no margin to buffer against errors in assumptions, models, conversion factors and natural system variation. It takes the mathematical construct of tonne-year accounting (already debatable) to the extreme, applying it to the shortest possible time interval of one year.		A tonne-year is simply a unit of carbon account like a kilowatt hour is to a kilowatt for electricity, a unit of volume over time. While tonne-year accounting may not be used widely today in the voluntary carbon market, it has been supported as an alternative to traditional carbon accounting in the scientific literature for many years. One cannot adequately know the full benefit of a solution without adding in the time or duration term. Fundamentally, tonne-year accounting allows for the delivery of realized impact, not presumed future impact on timescales incongruent with the variability of natural systems. Furthermore, tonne-year accounting allows the direct comparison of benefits of different carbon offsets approaches over many different time scales and technologies.
220	Forest and Climate Policy	Andrea Tuttle		All IFM methodologies are challenged by the setting of baselines from which additionality is measured. But this is ameliorated in 30 – 100 year protocols that use a multi-year time horizon to track and verify forest growth and carbon accrual.		Projects are additional when the carbon stocks in the project scenario are greater than the carbon stocks expected under the baseline scenario–this is the basis for any carbon project verified against any standard. Because additionality, and therefore, creditable carbon is dependent on an accurate baseline, eligibility is limited to forests that are truly at risk of being harvested in the next year. Deferring that harvest results in additional carbon in the landscape.
221	Forest and Climate Policy	Andrea Tuttle		I strongly recommend the NCX proposal not be approved based on 1) flaws in the method's underlying approach, 2) lack of transparency, and importantly 3) the larger effect in undermining public confidence in the voluntary market generally.		Thank you for your comment. We respectfully disagree and would be happy to engage on any specific concerns.
222	EP Carbon	Kyle Holland		The methodology is simply crediting the prediction of an imperfect model and fails to account for any uncertainty in those productions. As written in the proposed methodology, it is easy to show the accounting of equation 1 is the product of a model prediction for the quantity of $_r$ and the carbon stock $_{Ct}0$, both estimated quantities. Given equation 1 which is $\Delta_{CO}2_{bsl,t} = \sum_{Ct}0,_i(1 + {}_{Gbsl,t,i})(1 -_{ri}) {}_{n\ i}=1 - \sum_{Ct}0,_{i\ n\ i}=1$ consider the case of one landowner $_n$ = 1 to simply the mathematics so that $\Delta_{CO}2_{bsl,t} = {}_{Ct}0(1 + {}_{Gbsl,t})(1 - {}_r) - {}_{Ct}0$ And then further consider the case of the very start of the project crediting where $_t$ = 0 such that $_{Gbsl,t}$ = 0 represents no growth, then $\Delta_{CO}2_{bsl} = {}_{Ct}0\,(1 - {}_r) - {}_{Ct}0$ We can show that $\Delta_{CO}2_{bsl} = -{}_{rCt}0$ is simply is the amount of carbon contained in above ground biomass removed in the baseline scenario at time zero: $\Delta_{CO}2_{bsl} = {}_{Ct}0 - {}_{rCt}0 - {}_{Ct}0$ $\Delta_{CO}2_{bsl} = -{}_{rCt}0$ This shows that the methodology credits the amount of carbon contained in above ground biomass removed in the very first year as the product of the model uncertain model prediction for $_r$ and the uncertain estimate of $_{Ct}0$. The variable $_r$ appears to represent both "the fraction of total carbon contained in above ground live tree biomass removed in the baseline scenario for property" (page 14) but also the "the fraction of carbon at risk of removal during the activity period," (page 32) which are not the same. One is theoretical but unknown quantity and the other is an estimate. The authors explicitly show this by assuming $r \sim Betazoinf(\alpha, \gamma, \mu, \phi)$ for the fraction at risk of removal, which is not an absolute known quantity of total carbon contained in above ground live tree biomass removed; rather, it is only a prediction that could be massively imprecise. In fact, Prestemon and Wear (2000) show the uncertainty in related estimates could exceed 100% in some cases. Therefore, it is inappropriate to apply the estimate of $_r$, which is a random variable, as the truth in calculating $\Delta_{CO}2_{bsl,t}$. The methodology should account for the potentially massive uncertainty in $_r$ and conservatively discount the value applied in determining $\Delta_{CO}2_{bsl,t}$, especially since the entire accounting of carbon is driven by this single quantity. While Appendix A of the methodology gives fancy equations that create the appearance of rigor, ultimately it is presenting an imperfect model and asking for credit without considering the potentially massive uncertainty in the results.		We agree that accounting for uncertainty is very important in any forest carbon project. Our revised methodology accounts for and requires a deduction associated with the uncertainty of carbon stocks in the project and baseline scenarios.

223	EP Carbon	Kyle Holland		The methodology fails to acknowledge the complete uncertainty in baseline harvest emissions when FIA data are used to estimate both initial carbon stocks and the harvest risk model. Provided that baseline emissions are simply the product of a imperfect estimate for r and an initial quantity of carbon stock as shown by $\Delta_{CO}2_{bsl} = -_{r}C_{t}0$, the accounting further ignores the covariance of these two random variables, further compounding the uncertainty in the calculation of $\Delta_{CO}2_{bsl,t}$. If both the quantity of r and the quantity of $_{C}t0$ are estimated from the sample, say both from FIA data, then these two quantities are not statistically independent. The total uncertainty including the covariance factor in $\Delta_{CO}2_{bsl,t}$ should therefore be quantified to include a measure of the covariance between estimates of r and $_{C}t0$, or the methodology should prohibit the use of the same sample data in estimating the quantities of r and $_{C}t0$ as an applicability condition. The potential magnitude of the absent consideration of covariance could be very large, which underscores the need to fully quantify the uncertainty in $\Delta_{CO}2_{bsl,t}$. Equations 16 and 18, along with Table 11-1 identify eleven factors that are used to estimate the harvest risk factor r. Of these eleven factors, model parameters for as many as eight of the factors could be estimated from FIA data. Given that crediting is largely a function of only two random variables, not fully quantifying and accounting for the covariance uncertainty of these two variables presents a significant risk of over crediting.		We agree that accounting for uncertainty is very important in any forest carbon project. Our revised methodology accounts for and requires a deduction associated with the uncertainty of carbon stocks in the project and baseline scenarios.
224	EP Carbon	Kyle Holland		The methodology fails to provide criteria for model validation to infer unbiasedness. Given that crediting is largely a function of the harvest risk factor r, Appendix A should specify methods to demonstrate unbiasedness in model used estimated of r, in addition to requirements to assess predictive uncertainty in r. Specifically, the methodology should give procedures for statistical cross validation of the model to demonstrate that the model is unbiased in the prediction of r across the entire domain of the selected model. Further, it should provide specific criteria for model selection, such as the use of AIC, to ensure models are not over parameterized. Where a remote-sensing model is used to estimate $_{C}t0$, the methodology should require the use of VT0005 Tool for measuring aboveground live forest biomass using remote sensing.		The business as usual model is a hierarchical statistical model that predicts one-year harvest risk and intensity based on FIA training data and a suite of covariates that include geographic, biological, economic, and sociological factors. Partial pooling across forest types ensures that the model is able to leverage the similarity and ubiquity of covariate relationships across the forests of the continental U.S. while still allowing for regionally specific differences.
225	EP Carbon	Kyle Holland		The methodology over-credits baseline emissions by repeatedly counting the same avoided emissions year over year. The methodology is flawed because it models $r \in [0,1]$ where it should be modeled in $r \in [0,1/_{m}]$ where m is the number of years in accounting. It is easy to show that the methodology over-credits baseline emissions by taking the sum of baseline emissions over $_{m}$, that mathematically $-\sum \Delta_{CO}2_{bsl,t\ m\ t=1} > {}_{C}t0 + {}_{C}t0 \sum {}_{Gbsl,t\ m\ t=1}$ when $r > 1/_{m}$; that the sum of baseline emissions exceeds the total carbon stock including growth when r is greater than $1/_{m}$. This follows from simply writing the equation for a single landowner as the sum over time as follows: $\sum\Delta_{CO}2_{bsl,t\ m\ t=1} = \sum[{}_{C}t0(1+ {}_{Gbsl,t})(1 - r) - {}_{C}t0]_{\ m\ t=1} \sum\Delta_{CO}2_{bsl,t\ m\ t=1} = {}_{C}t0\ (1 - r)\sum(1 +{}_{Gbsl,t})_{\ m\ t=1} - {}_{m}C_{t}0$ And then substituting the upper limit on baseline emissions expressed as the opposite of reductions $-\sum \Delta_{CO}2_{bsl,t\ m\ t=1} < {}_{C}t0 + {}_{C}t0 \sum {}_{Gbsl,t\ m\ t=1}$ which cannot physically exceed the total carbon stock over time and solving for r yields $-[{}_{C}t0\ (1 - r)\sum(1 + {}_{Gbsl,t})_{\ m\ t=1} - {}_{m}C_{t}0] \leq {}_{C}t0 + {}_{C}t0\sum{}_{Gbsl,t\ m\ t=1}\ {}_{m}C_{t}0 - {}_{C}t0\ (1 - r)\sum(1 + {}_{Gbsl,t})_{\ m\ t=1} \leq {}_{C}t0 + {}_{C}t0\sum{}_{Gbsl,t\ m\ t=1}\ {}_{m} - (1 - r)\sum(1 + {}_{Gbsl,t})_{\ m\ t=1} \leq 1+ \sum{}_{Gbsl,t\ m\ t=1} - (1 - r)\sum(1 + {}_{Gbsl,t})_{\ m\ t=1} \leq 1 + \sum{}_{Gbsl,t\ m\ t=1} - {}_{m}\ r - 1 \leq 1 +\sum {}_{Gbsl,t\ m\ t=1} - {}_{m} \sum (1 + {}_{Gbsl,t})_{\ m\ t=1}\ r \leq 1 + \sum {}_{Gbsl,t\ m\ t=1} - {}_{m} \sum (1 + {}_{Gbsl,t})_{\ m\ t=1} + 1$ And then conservatively assuming zero growth rate ${}_{Gbsl,t} = 0\ r \leq 1 - {}_{m}\ {}_{m} +1\ r \leq 1$ ◆		The business as usual model is a hierarchical statistical model that predicts one-year harvest risk and intensity based on FIA training data and a suite of covariates that include geographic, biological, economic, and sociological factors. Partial pooling across forest types ensures that the model is able to leverage the similarity and ubiquity of covariate relationships across the forests of the continental U.S. while still allowing for regionally specific differences.
226	EP Carbon	Kyle Holland		By setting the upper bound of the internal of $r \in [0,1]$ the total baseline emissions are over credited by a factor of $_{m}$. For example, in a thirty-year crediting period the total emissions are overstated by as much as a factor of 30. Assuming zero growth and r = 1 one can easily see how emissions are over credited: $\sum\Delta_{CO}2_{bsl,t\ 30\ t=1} = \sum[{}_{C}t0(1+ {}_{Gbsl,t})(1 - r) - {}_{C}t0]_{\ 30\ t=1}\ \sum\Delta_{CO}2_{bsl,t\ 30\ t=1} = \sum[\ {}_{C}t0\ (1 + 0)(1 - 1)- {}_{C}t0\ ]_{\ 30\ t=1}\ \sum\Delta_{CO}2_{bsl,t\ 30\ t=1} = \sum -{}_{C}t0_{\ 30\ t=1}\ \sum\Delta_{CO}2_{bsl,t\ 30\ t=1} = -30 * {}_{C}t0$ This fundamental flaw in accounting occurs is irrespective of whether absolute tonnes of carbon or tonne-years are used the conversion from units of absolute tonnes of carbon to tonne-years as a final step in Equation 12. In converting to tonne-years in Equation 12, the final result is still overstated by a factor of $_{m}$.		The business as usual model is a hierarchical statistical model that predicts one-year harvest risk and intensity based on FIA training data and a suite of covariates that include geographic, biological, economic, and sociological factors. Partial pooling across forest types ensures that the model is able to leverage the similarity and ubiquity of covariate relationships across the forests of the continental U.S. while still allowing for regionally specific differences.

227	EP Carbon	Kyle Holland		The methodology over credits baseline emissions by ignoring carbon stored in long-lived wood products. The methodology fails to account for carbon in harvested wood products and therefore overstates baseline emissions. This is observed in the form of Equation 1 that $\Delta_{CO}2_{bsl} = -_{rCt}0$ is simply the amount of carbon contained in above ground biomass removed in the baseline scenario and inherently assumes that all carbon removed is immediately emitted into the atmosphere. Regarding wood products, Table 5-1 states that "Not required as harvest deferral leads only to a shift in the harvested wood products decay curve, whose impact differs depending on the number of years harvest is deferred during and after participation" which is simply not true for the baseline. In the baseline scenario, carbon would be stored in long-lived wood products and therefore the baseline emissions should be net of carbon storage in long-lived wood products irrespective of the project scenario. Though section 3.3.4 of the VCS Methodology Requirements states that wood products is an optional pool for Extended Rotation Age in IFM, section 3.3.15 states "IFM methodologies applicable to activities that reduce harvested timber shall account for the GHG emissions associated with changes in the wood products pool to avoid overestimating project net GHG benefits." By ignoring long-lived wood products in the baseline where the project scenario is to reduce (or eliminate) harvested timber, the methodology is overestimates net GHG benefits and therefore should be revised to account for carbon stored in long-lived wood products. This is especially the case where the methodology may be applied to project activity instances in a grouped project for only a few years and then emissions associated with any deferred harvesting occur after the participation period when there is no requirement for carbon accounting of such emissions that would otherwise be captured as project emissions. The requirement to account for wood products in an IFM project is a benchmark provided by the approved methodology VM0003 where projects must account for wood products unless "wood products are rising faster in the project case than in the baseline or are decreasing faster in the baseline than in the project case" per the requirements of Table 1. In most instances for IFM activities and all instances of the application of VM0003 to projects, wood products are not rising faster in the project case		We appreciate the detailed comments raised about the absence of HWP accounting in the initial draft of our methodology. The carbon stored in trees is released into the atmosphere when a tree dies, some of it almost instantaneously and sometimes over years to decades. We believe it is important to account for all reasonable pools of emissions related to a harvest, and our revised methodology takes the storage of carbon in, and subsequent release of carbon from, harvest wood products into account.
228	EP Carbon	Kyle Holland		The methodology over credits baseline emissions by ignoring carbon stored in slash wood not yet decayed. The methodology fails to account for the time decay of slash of deadwood in harvesting, therefore overstating baseline emissions. This is observed in the form of equation 1 that $\Delta_{CO}2_{bsl} = -_{rCt}0$ is simply the amount of carbon contained in above ground biomass removed in the baseline scenario and inherently assumes that all carbon removed is immediately emitted into the atmosphere. In reality, carbon not stored in baseline wood products would not be immediately emitted into the atmosphere and therefore a ten-year linear decay model should be applied per section 3.6.1 of the VCS Methodology Requirements. Not accounting for decay in slash from harvesting overstates baseline emissions.		The carbon stored in trees is released into the atmosphere when a tree dies, some of it almost instantaneously and sometimes over years to decades. We believe it is important to account for all reasonable pools of emissions related to a harvest, and our revised methodology takes the storage of carbon in, and subsequent release of carbon from, harvest wood products into account.
229	WWF-US	Brad Schallert		**Tonne-Year accounting:** Verra has proposed "tonne-year" accounting as a means of allowing AFOLU carbon projects of various durations (as few as 1 year) to enter the market and claim long-term (100 year) 2 "permanence". The method establishes an equivalency ratio between the impact of short-term action (such as harvest deferral) versus long-term, multi-decadal climate impact. The approval of tonne-year accounting in Verra's program may lead to enrollment of new landowners unwilling or unable to enroll in long-term carbon sequestration commitments. It is also likely to lead to an abandonment of landowners enrolling in programs that require a longer commitment. The concept as it stands is highly debated (e.g., Lesage et al. 2012; Korhonen et al., 2002; Jørgensen and Hauschild, 2013; Kirschbaum 2003). While it has been suggested by some, there is also a strong body of literature questioning the approach and cautioning that its validity is highly dependent upon the specific assessment method and assumptions therein (e.g., equivalence timeframes, discount rates, asymptotic decay of CO2, etc.). These concerns are not trivial, as recent work shows choice of these variables can affect crediting outcomes vary as much as 10-fold (Chay et al. 2022). In addition to being used as a justification for short-term project commitment periods (and as a means to avoid accounting for inevitable near-term reversals), ton year accounting also has implications for other aspects of project quality including the additionality of such an approach. Short-term commitments force the assumption that project actions (such as deferred harvest) would occur in a specific year. In reality, natural systems such as forests are managed on decadal and multi-decadal timescales. The case for additionality is bolstered when carbon sequestration commitments coincide with the long-term timeframes in which natural systems are managed. This is one reason carbon registries have traditionally required commitment periods ranging from 30-100 years for implementing such projects. While we may not be completely certain about the additionality of a management change in any given year, over a 30+ year timeframe we have significantly more confidence in the counterfactual scenario proposed by the project proponent. Although ton year accounting is a tool to quantify sequestration over a shorter commitment period, it does nothing to tell us whether that climate benefit was additional. Shorter-time commitments for projects also have direct impacts on how		Short-term credits are a way to accelerate near-term climate action and to greatly increase the supply of carbon credits. Given the rapidly increasing demand for carbon credits, we expect that there will still be demand for long-term projects for landowners who prefer those options. Landowners are free to enroll in whichever programs fit their objectives.

				additional. Shorter time commitments for projects also have direct impacts on how leakage should be viewed. As mentioned, forest management and harvest yields are planned for across decades. Leakage literature suggests that any shortterm reduction in harvest volumes is easily made up for by local or regional wood consumers (see Murray et al 2003). With shorter, year-to-year commitments, leakage may be nearly 100%. Clearly, the implications of ton year accounting go beyond permanence. To that end, strong additionality tests and leakage discounts should be included in all methodologies to ensure they are sufficient for generating real, additional, conservative emission reductions and removals. In Verra's proposed changes, it is not clear whether strong additionality tests or leakage discounts would be included. Considering this as a departure from the rigorous standards of the existing carbon market, amplified by the suggestion to allow tonne-year accounting for all AFOLU project types in the Verra project portfolio, we feel that full public disclosure and expert analysis of the proposed 3 tonne-year accounting assumptions and quantification approach is warranted in addition to ensuring additionality and appropriate discounts for leakage and uncertainty. We also request these materials be made available for public comment prior to any approval actions by Verra. Verra approving tonne-year accounting as an option for project developers without a requirement to implement additional safeguards that bolster		
230	WWF-US	Brad Schallert		**Uncertainty requirements:** Updating the statistical confidence threshold to 10% at the 90% confidence interval is a reasonable change and in line with norms of the carbon market. However, the proposed requirement 2.4.2 suggests a provision to exclude uncertainty "where it is unlikely" to exceed 10%. Section 2.4.4 (15) also suggests a VB judgement call on "…whether there is significant risk that the….confidence interval could exceed 10%…". Both random and systematic error can and should be quantified for all projects. Whether uncertainty "could" exceed a certain threshold should not be a judgement call. The only way to be sure is to quantify it. We suggest deleting these section statements and requiring a statistical quantification of uncertainty for all projects. The absence of such measures presents a serious risk of over-crediting. Section 2.4.4 also states "Where the half-width…exceeds 100%....the project is not eligible for crediting". We strongly agree any carbon claims for project-level crediting with uncertainty ≥ 100% are unfounded and should not be credited (this is essentially the same as complete uncertainty of the GHG assertion). We suggest a more stringent requirement of +/- 20% at 90% CI, aligning with other reputable carbon standards and providing a more realistic and conservative metric by which to judge the validity and accuracy of potential new quantification approaches.		We agree that accounting for uncertainty is very important in any forest carbon project. Our revised methodology propagates and accounts for uncertainty and requires a deduction associated with the uncertainty of carbon stocks in the project and baseline scenarios.
231	Finite Carbon	Sarah Wescott		Section 2 of the methodology indicates a tonne year accounting conversion rate has been separately approved by Verra. This is not quite true – there is still an open public consultation for the VCS Standard v4.2 update. Later on, in Section 9, the description of the TYC parameter acknowledges that the tonne year accounting conversion factor is still proposed and open for public comment. The TYC parameter is critical to the quantification approach contained in this methodology. Since this factor is still subject to change during the public consultation of the VCS Standard v4.2, we suggest that it is challenging to fairly evaluate this methodology without having that information finalized.	We request that Verra provide a second opportunity to comment on this methodology if the TYC parameter approved in the final version of the VCS Standard v4.2 changes.	A tonne-year is simply a unit of carbon account like a kilowatt hour is to a kilowatt for electricity, a unit of volume over time. While tonne-year accounting may not be used widely today in the voluntary carbon market, it has been supported as an alternative to traditional carbon accounting in the scientific literature for many years. One cannot adequately know the full benefit of a solution without adding in the time or duration term. Fundamentally, tonne-year accounting allows for the delivery of realized impact, not presumed future impact on timescales incongruent with the variability of natural systems. Furthermore, tonne-year accounting allows the direct comparison of benefits of different carbon offsets approaches over many different time scales and technologies.

232	Finite Carbon	Sarah Wescott		Credible high quality offsets from LULUCF projects are seeing rapidly growing demand in the marketplace. Of particular interest to consumers are offsets from forestry projects which dominate the voluntary market. Forests are benefiting from this position and perception in the market, and for good reason - no other offset comes with the ancillary benefits that forest-based credits do. However, with this increased demand has come increased scrutiny. The reality is that while strong now, the position that forestry projects have earned is not guaranteed to persist if we cannot continue to improve the integrity of what we produce as an industry. That commitment starts with registries such as Verra and the methodologies they approve for use. We are very concerned about the optics of a methodology such as the one proposed and how it may ultimately erode consumer confidence in forest offsets. Tonne year accounting has not seen wide deployment in other offset programs, and for good reason: in order to do so correctly and defensibly, TYA yields sub-feasible levels of real carbon benefit. We are very concerned that, as written, this methodology has addressed the feasibility issue with TYA through a lack of conservativeness in several areas, and does not reflect industry best practices for forest carbon projects in the areas of leakage, baselines, and harvested wood product accounting. The substance of our concerns is provided above, and we respectfully request that Verra staff and the methodology authors modify the approaches taken on those discrete topics. Finite Carbon is strongly supportive of innovation for carbon projects, so long as quality and integrity are maintained. The voluntary carbon market has become more important now than ever before. It is imperative that our industry anticipate and adapt to the scrutiny that comes with this growth. Verra has a long history of leadership in the market, and we hope this will be an opportunity to demonstrate the robust, rigorous nature of the VCM, as well as the important role played by registries. Taking less conservative approaches on leakage, additionality, and GHG accounting in a single methodology has the potential to reflect poorly on the industry as a whole. It is with that perspective in mind, and in the spirit of improving transparency and integrity across the market as a whole, that we offer this feedback.	N/A - summary comment. See proposed changes throughout.	Projects are additional when the carbon stocks in the project scenario are greater than the carbon stocks expected under the baseline scenario–this is the basis for any carbon project verified against any standard. Because additionality, and therefore, creditable carbon is dependent on an accurate baseline, eligibility is limited to forests that are truly at risk of being harvested in the next year. Deferring that harvest results in additional carbon in the landscape. We agree that accounting for uncertainty is very important in any forest carbon project. Our revised methodology accounts for and requires a deduction associated with the uncertainty of carbon stocks in the project and baseline scenarios. We appreciate the detailed comments raised about the absence of HWP accounting in the initial draft of our methodology. The carbon stored in trees is released into the atmosphere when a tree dies, some of it almost instantaneously and sometimes over years to decades. We believe it is important to account for all reasonable pools of emissions related to a harvest, and our revised methodology takes the storage of carbon in, and subsequent release of carbon from, harvest wood products into account. Leakage is poorly studied across existing IFM projects, especially short-term harvest deferral projects. We agree that leakage
233	American Forest Foundation	Lynn Riley		**Model Credibility and Recommended Addition of Ex-Post Baseline Accounting:** This methodology outlines a dynamic performance baseline approach. It could be made stronger, however, with the addition of an ex-post baseline during verification. Our understanding is that the baseline model/data would be updated frequently (annually or sub-annually), and that each update is used to inform the BAU assessment for the next cohort of enrollees. However, this does not address the frequent criticism of modeled baselines for forest carbon projects, in that even a robust, dynamic performance baseline model that learns and improves with each cohort cannot with assurance predict what will take place, even just a year ahead of time. For example, if a project instance enrolls in a 1-year program with this methodology, and it's BAU assessment said that it's carbon at risk of harvest was 70% of its merchantable volume. Two months after its project activity period begins, and the closest mill announces its closure; an unexpected pest invades the local baseline population; a global pandemic significantly alters timber prices. That 70% may not have turned out to be true, even though it was based on the best possible understanding at the time and conditions of the instance's enrollment—and "best possible understanding" in this case is not well enough laid out in the methodology, as there is not enough transparency in the baseline model as currently provided (for example, example "non-exhaustive" covariates are listed in table 11-2, leaving methodology users with no minimum requirements of covariates to inform a baseline model). Modeled dynamic performance baselines can be robust approaches if they are transparently reviewed, locally calibrated, and conservatively discounted for uncertainty (as per the VCS methodology requirements); however, due to lack of transparency around the data and model in this methodology, these requirements have not been met. This methodology would be more credible if, as they are learning and in this case, because they have the data available, they look back after T1 and see if what was modeled in the baseline to happen between T0 and T1 actually took place, rather than set the baseline between T0 and T1 prior to the activity period (and all that could transpire) having happened. We propose building in this ex-post approach to the methodology to strengthen its credibility.	Incorporate an ex-post baseline approach with the proposed model, rather than an ex-ante modeled baseline.	The business as usual model is a hierarchical statistical model that predicts one-year harvest risk and intensity based on FIA training data and a suite of covariates that include geographic, biological, economic, and sociological factors. Partial pooling across forest types ensures that the model is able to leverage the similarity and ubiquity of covariate relationships across the forests of the continental U.S. while still allowing for regionally specific differences. This comment describes a situation where the model's predicted outcome does not match reality which is a possible situation. That is why we propagate and account for uncertainty and require a deduction associated with the uncertainty of carbon stocks in the project and baseline scenarios.

234	American Forest Foundation	Lynn Riley		**Losses during validation/verification; Safeguards Against Emissions Events Going Unaccounted For:** If an instance is enrolled, and it is discovered during verification that there was a net loss during the activity for some reason, how is that handled without a buffer pool? (This may be more of a question for VERRA than this methodology, how is this handled for tonne-year accounting.) We also recommend adding in safeguards for projects using this methodology to prevent any incentive for either the project proponent or participating properties to participate in years in which a harvest was not already planned, stop reporting/participating in years of harvest/loss, and then participate once again. This scenario leaves room for emissions events to go unaccounted for, and opens up significant questionability of the additionality of any participation at all (in other words, was the harvesting schedule on that property really deferred due to the incentive of the carbon market, or would it have happened that way all along, with the harvest losses conveniently unreported?). The methodology should create safeguards for preventing this from occurring, perhaps in the form of restrictions on participating properties around having "gap years" of enrollment in a tonne-year project.	Incorporate safeguards against "gap years" of participation in project under this methodology, to increase credibility of additionality.	No buffer pool would be required regardless of the number of properties within a project. Under this methodology credits are not generated or sold until after the performance period, which avoids the scenario where credits are purchased and retired before the climate impact has occurred. If a landowner decides to harvest while not enrolled, then re-enroll, the baseline model would likely calculate little to no carbon at risk. Credit is only granted during the years that, compared to the baseline, carbon is held out of the atmosphere.
235	American Forest Foundation	Lynn Riley		**Transparency of baseline / performance benchmark models:** As currently written, the methodology does not present a final baseline/performance benchmark model but leaves the development of said model to the methodology user to be validated with each individual project. There is concern that, by not including a specific baseline model in the methodology or requiring the inclusion of the validated baseline model in the validated Project Description, that transparency could be lost and could jeopardize reasonable confidence in GHG-related information generated by this methodology (Section 3 of VCS Standard v4.2), as well as significantly constrain the use of the methodology.	It is suggested either that the methodology require the transparent inclusion of the validated baseline model in the Project Description, or that the methodology include a fully transparent required baseline model.	We appreciate comments noting that the structure and performance of the baseline model used within this methodology is strongly influential on the predicted and realized climate impact of projects. As we are advancing this methodology independently, we will be moving to increase transparency rather than following an expert review process. This includes both detailed documentation of particular models used, as well as sharing benchmarking and performance information for baseline models. Finally, the revised approach to uncertainty explicitly accounts for imprecision in the baseline model in calculating the final number of credits generated from projects developed under this methodology.
236	Carbon Solutions Lead, Pachama Inc.	Cindy Chiang		Delayed emissions are not emissions reductions. Short-term carbon storage merely delays climate change. At bottom, the motivating economic principle is to kick the can down the road until, in some unspecified future, fossil fuel alternatives decarbonize the economy. If damages are reversible, delaying them produces real benefit (i.e. time value of money). With compounding interest, I can rectify $X of damages in the future by holding less than $X aside today. However, carbon impacts (e.g., glacial melt, rising sea levels, ocean acidification, species extinction) are generally irreversible. In short, delayed storage produces a theoretical economic benefit under very specific assumptions, but does NOT produce an actual physical, climate benefit.		We agree that additionality is key for any carbon project to work, whether 1 year or 100 years. That is why we rigorously measure additionality in our program and transparently share the results of all project cycles. No nature-based solutions are permanent. However, in this critical decade increasing sequestration and storage is critical to meet global goals. Therefore, we are incentivizing immediate action when it counts. When tonne-year accounting is combined with ex post crediting, climate impact is delivered immediately and cannot be reversed. Acknowledging and designing for temporary storage using tonne-year accounting and short-term crediting provides accountability when fires, pests, and climate change itself make long-term forest predictions near impossible.
237	Carbon Solutions Lead, Pachama Inc.	Cindy Chiang		Tonne-year accounting is fundamentally arbitrary. In addition to arbitrary economic assumptions (e.g. time horizon of cost-benefit analysis, discount rate, etc.), any tonne-year method rests on enormous assumptions about the atmospheric lifetime of carbon dioxide. This atmospheric lifetime is an emergent property of the earth system. It changes through time and can only be quantified with large uncertainty. Tonne-year accounting represents this atmospheric lifetime with an impulse response curve, an extreme simplification. *Crediting outcomes are highly sensitive to the shape of this impulse response curve.*		A tonne-year is simply a unit of carbon account like a kilowatt hour is to a kilowatt for electricity, a unit of volume over time. While tonne-year accounting may not be used widely today in the voluntary carbon market, it has been supported as an alternative to traditional carbon accounting in the scientific literature for many years. One cannot adequately know the full benefit of a solution without adding in the time or duration term. Fundamentally, tonne-year accounting allows for the delivery of realized impact, not presumed future impact on timescales incongruent with the variability of natural systems. Furthermore, tonne-year accounting allows the direct comparison of benefits of different carbon offsets approaches over many different time scales and technologies.

238	Carbon Solutions Lead, Pachama Inc.	Cindy Chiang		Additionality of very short-term carbon storage is impossible to quantify. When forest carbon projects are designed at the outset to specifically offer financial incentives that last no longer than 1 year, even with discounted credit issuance, it fundamentally shifts the Voluntary Carbon Market (VCM) values of 1) financing long-term changes in GHG management behavior, 2) providing collaborative cost-effective mechanisms to achieve permanent GHG reductions. Like Verra and the VCM community, Pachama recognizes the urgency of the climate crisis, which is why it is critical to ensure that we do not adopt standards today targeting short term gain (i.e. increase supply of carbon credits) by simply delaying mitigation action for a few short years. Nature is dynamic and complex, with feedback loops and tipping points that the tonne-year approach does little to reconcile. We reiterate that a claimed 1-year harvest delay is trivially easy to make and impossible to falsify. *Such credits representing supposedly "delayed" emissions would be used to offset real permanent emissions.*		The goal of climate mitigation is more about mitigating the damage caused by climate change, rather than the actual quantity of carbon in the atmosphere. The carbon in the atmosphere causes increased temperatures through climate forcing, which in turn lead to costly economic and social damages to our water, homes, businesses, and livelihoods. The long-standing research and implementation of the Social Cost of Carbon approximates the net present value of the perpetual stream of future costs and damages caused by climate change. For our methodology, we apply a similar economic framing and a net discount rate of 3.0% to identify the equivalence ratio between the benefits of delaying emissions for 1 year compared with 100 years. See Parisa et al. 2022 for a full explanation of how this economic model yields an economic equivalence between credits of different durations. In order to incentivize action today to avoid those future damages, it is appropriate to use a similar economic framework to calculate the benefits of near-term climate action. While a ratio does not signify a physical equivalence, it does appropriately value the future economic benefits of physical action today.
239	Carbon Solutions Lead, Pachama Inc.	Cindy Chiang		Tonne-year accounting introduces confusion. Taken together, our prior concerns highlight the fact that tonne-year accounting is a black box of assumptions. The market cannot scale nor survive in the long-run without trust, transparency, and standardization. This is evidenced by the reality that there is little to no uptake of the protocols with tonne-year accounting options in the Western Climate Initiatives in Quebec. While there is uptake in Climate Action Reserve's Mexico Forest Protocol (MFP), it is worth highlighting the MFP employs tonne-year accounting based on 30-year contracts, that are renewed annually. Further, the tonne-year accounting mechanism in the MFP addresses a specific challenge unique to rural and indigenous landowners in Mexico who are not legally able to sign land management contracts longer than 30 years. The assumption that a 1-year crediting framework through tonne-year accounting will generate enough financial benefit for landowners to engage is simply not observed today in existing protocols with similar mechanisms. Demonstrating that tonne-year accounting is insufficient to address the main pain point the methodology seeks to solve for.		A tonne-year is simply a unit of carbon account like a kilowatt hour is to a kilowatt for electricity, a unit of volume over time. While tonne-year accounting may not be used widely today in the voluntary carbon market, it has been supported as an alternative to traditional carbon accounting in the scientific literature for many years. One cannot adequately know the full benefit of a solution without adding in the time or duration term. Fundamentally, tonne-year accounting allows for the delivery of realized impact, not presumed future impact on timescales incongruent with the variability of natural systems. Furthermore, tonne-year accounting allows the direct comparison of benefits of different carbon offsets approaches over many different time scales and technologies.
240	Carbon Solutions Lead, Pachama Inc.	Cindy Chiang		Transparent methodologies are required to instill market confidence. Rather than creating more accounting layers and alternative approaches on top of an already complex ecosystem of accounting methodologies, Pachama encourages Verra to leverage advancements in remote sensing technology and data availability to provide transparency and accountability on the *observed* ongoing climate benefit of Verified Carbon Units (VCUs). Alternatives such as enhanced programmatic requirements (i.e. annually for 30 years post crediting period) for ongoing monitoring is the most defensible approach to communicate the permanence of forest carbon projects. *One is able to validate the ongoing climate benefit of credits independently with data, rather than by digging into often competing white papers, research, NGO position papers about the appropriate discounts that should be applied for delaying emissions for a few short years.* We recognize that tonne-year accounting is a well-intentioned effort to change landowner incentives and enroll more landowners in the market to unlock greater supply. However, tonne-year accounting applies a short-term remedy for a systemic long-term challenge. It's akin to a doctor prescribing a painkiller, rather than curing, a patient. Pachama is focused on long-term forest restoration and protection to address climate change. We favor policies that align landowner incentives with long-term carbon sequestration and community-based conservation. Our objective is to develop easy-to-understand crediting rules backed by user-friendly computing and performance tracking tools that transparently communicate how credits are calculated. We look forward to collaborating with Verra and others in this critical endeavor.		A tonne-year is simply a unit of carbon account like a kilowatt hour is to a kilowatt for electricity, a unit of volume over time. While tonne-year accounting may not be used widely today in the voluntary carbon market, it has been supported as an alternative to traditional carbon accounting in the scientific literature for many years. One cannot adequately know the full benefit of a solution without adding in the time or duration term. Fundamentally, tonne-year accounting allows for the delivery of realized impact, not presumed future impact on timescales incongruent with the variability of natural systems. Furthermore, tonne-year accounting allows the direct comparison of benefits of different carbon offsets approaches over many different time scales and technologies.

241	South Pole	Maria Fernanda Buitrago projects		Is this deferral is consider removal or avoided emissions?		Projects developed under this methodology would include both removals from additional tree growth and avoided emissions from avoided harvests.
242	La Belle Forêt	Margaud Dieffenbacher		As explained in NCX Carbon Guide, it seems that deferring a harvest even for a year would help mitigate climate change but I am still spektical about this statement. I especially imagine a property owner who would maximize his income and choose to harvest or not, based on the market prices for carbon credits and timber. How does it change things if more carbon is released in a few years when the owner decides to harvest its wood ? Especially as the carbon stored in wood products is not take into account into this method? Moreover, with the tonne-year accounting method, I have the impression that very few tonnes of carbon (1/100) will be saleable per year. How do land owners respond to this method ? Is the market ready to sell few carbon credits which I imagine will then be quite expensive ?		Projects are additional when the carbon stocks in the project scenario are greater than the carbon stocks expected under the baseline scenario–this is the basis for any carbon project verified against any standard. Because additionality, and therefore, creditable carbon is dependent on an accurate baseline, eligibility is limited to forests that are truly at risk of being harvested in the next year. Deferring that harvest results in additional carbon in the landscape.
243	La Belle Forêt	Margaud Dieffenbacher		If an owner chooses to engage his forest in this method, is there a maximum period of enrollment ? Because, if he agrees to defer harvests for 10 or more years, isn't there a problem for natural regeneration ? If the stand is too thick, the quantity of lignt reaching the floor might not be enough for young seedlings. Can he still do some harvests if the withdrawn volume is less than what he could cut ? How does it work in that scenario ?		At this time there is no limit on the period of enrollment and a new baseline would be developed every year to accurately assess the total carbon at risk. However, we do recognize that natural regeneration impacts should be an area of future research.
244	La Belle Forêt	Margaud Dieffenbacher		And finally, I imagine that it is more profitable to have owners engage their properties for long periods of time and not for several short periods because it reduces the monitoring costs. Who does pay these costs ? And who does the monitoring ?		Monitoring costs are kept low by taking advantage of tree cover loss detection through remote sensing. Longer periods of enrollment would yield more credits and more climate benefit, but also represent a higher cost to the landowner since the carbon payments are not meant to replace the total value of a timber harvest.
245	Green Assets	Jonathan Pomp, CF, RPF		Tonne-year accounting is currently not supported by long-term climate change mitigation research and shouldn't be added to the VCS program without extensive research regarding how the method provides real and additional GHG emissions reductions consistent with established high quality carbon offset quantification methodologies and internationally published climate goals.	Additional language clarifying some of the key concepts of carbon offsets and how tonne-year accounting incorporates those principles should be required before adoption.	A tonne-year is simply a unit of carbon account like a kilowatt hour is to a kilowatt for electricity, a unit of volume over time. While tonne-year accounting may not be used widely today in the voluntary carbon market, it has been supported as an alternative to traditional carbon accounting in the scientific literature for many years. One cannot adequately know the full benefit of a solution without adding in the time or duration term. Fundamentally, tonne-year accounting allows for the delivery of realized impact, not presumed future impact on timescales incongruent with the variability of natural systems. Furthermore, tonne-year accounting allows the direct comparison of benefits of different carbon offsets approaches over many different time scales and technologies.
246	Green Assets	Jonathan Pomp, CF, RPF		The methodology lacks detailed information to ensure the integrity of the claimed emission reductions.	Further transparency is needed to align with the existing industry principles of carbon offsets.	We appreciate comments noting that the structure and performance of the baseline model used within this methodology is strongly influential on the predicted and realized climate impact of projects. As we are advancing this methodology independently, we will be moving to increase transparency rather than following an expert review process. This includes both detailed documentation of particular models used, as well as sharing benchmarking and performance information for baseline models. Finally, the revised approach to uncertainty explicitly accounts for imprecision in the baseline model in calculating the final number of credits generated from projects developed under this methodology.

247	Green Assets	Jonathan Pomp, CF, RPF		The core offset principle of additionality is not addressed by tonne-year accounting. For forestry projects, tonne year accounting disincentivizes long-term sustainable forest management and sound silviculture as PPs will look to complete projects under methodologies where shorter term commitments can be made without a responsibility for long-term forest conservation and management. Further, tonne-year accounting approaches appear to leave the door open for manipulation of "planned harvests," as well as crediting for years when a harvest is not feasible or realistic.	Explain how emission reductions are additional when harvest activities are merely delayed and subject to management manipulation.	Projects are additional when the carbon stocks in the project scenario are greater than the carbon stocks expected under the baseline scenario–this is the basis for any carbon project verified against any standard. Because additionality, and therefore, creditable carbon is dependent on an accurate baseline, eligibility is limited to forests that are truly at risk of being harvested in the next year. Deferring that harvest results in additional carbon in the landscape.
248	Green Assets	Jonathan Pomp, CF, RPF		It is unclear how a VCU generated under tonne-year accounting is permanent as it could be removed the following year. Section 4.1 confirms this as it states, "when tonne-year accounting is employed, ongoing monitoring is unnecessary." Monitoring is a key component of all well-established high quality carbon offset programs and methodologies and should be a component of any type of program that intends to produce credits that are used for the offsetting of emissions.	Explain monitoring requirements to ensure permanence similar to other high quality offset programs.	We agree that additionality is key for any carbon project to work, whether 1 year or 100 years. That is why we rigorously measure additionality in our program and transparently share the results of all project cycles. No nature-based solutions are permanent. However, in this critical decade increasing sequestration and storage is critical to meet global goals. Therefore, we are incentivizing immediate action when it counts. When tonne-year accounting is combined with ex post crediting, climate impact is delivered immediately and cannot be reversed. Acknowledging and designing for temporary storage using tonne-year accounting and short-term crediting provides accountability when fires, pests, and climate change itself make long-term forest predictions near impossible.
249	Carbon Market Watch	Gilles Dufrasne		This response covers Carbon Market Watch's (CMW) main comments on the methodology. It does not provide detailed advice on specific elements of the methodology, as we believe that the proposed document is deeply flawed and that the proposed logic is unfit for the generation of carbon credits. This methodology does not meet the basic VCS Quality Assurance Principles1 and should therefore be rejected.		Thank you for the comment; we welcome feedback.
250	Forest Carbon Alliance Inc.	Etienne Green		Congratulations to the developers of this methodology. The use of remote sensing, modeling and tonne-year accounting is an innovation that opens forest carbon offsets to more markets. There is no doubt developing this methodology has taken the team considerable effort to complete.		Thank you for the kind comments.
251	Forest Carbon Alliance Inc.	Etienne Green		As I read this methodology, I cannot help but ponder how the one-year term and tonne-year accounting creates an opportunity for some savvy landowners to exploit carbon finance, without really making any changes to their practices. This methodology could simply become integrated as harvest schedule optimisation process with the constraint of meeting the earliest eligibility criteria for a deferral/harvest risk defined in this methodology and also harvest revenues that would maximize the financial return over the rotations. Deferring harvest for 1 year is not an activity only motivated by the presence of carbon markets. There are plenty of situations where this could happen anyway; high fuel prices, labour shortage, market fluctuations, inventory surplus, greater volume potential, to name a few. Land landowners will always be incentivised to maximise the returns generated on their properties. In this case, the only cost to the landowner is the temporary opportunity loss of harvesting in that year. The value of the wood is still accruing and the oppertounity to harvest is regained. The landowner doesn't have to invest capital in new silviculture, produce new technology, incur additional cost in order to produce a benefit. The project activity is fundamentally just a business decision to receive an immediate payment while still retaining all the assets... Most of the upside is on the landowner's side. Making decisions that maximises returns will always be the business as usual, and in the best interest of the landowner. Perhaps I have not fully understood the details on the methodology or am unnecessarily overly pessimistic. I also assume this methodology works best when it is paired with the NCX auction, which determines the price paid to all landowners. This would create some level abatement to the items described above, but this context is not relevant in all jurisdictions or required by the methodology, not does the methodology address this.	Consider a requirement that the issuance of VCU be delayed for first time project enrollers. Perhaps this can be disincentivized landowners, looking to take advantage of nuances in the methodology	Projects are additional when the carbon stocks in the project scenario are greater than the carbon stocks expected under the baseline scenario–this is the basis for any carbon project verified against any standard. Because additionality, and therefore, creditable carbon is dependent on an accurate baseline, eligibility is limited to forests that are truly at risk of being harvested in the next year. Deferring that harvest results in additional carbon in the landscape.

252	The Nature Conservancy	Ethan Belair		This methodology is a distinctly new approach and does not bear resemblance to previous methodologies. As such, I think a significan burden of proof lies with the authors to ensure that, not only is a methodology reliable, but it is described in sufficient detail to allow readers, users, and members of the market place to understand the basic assumptions and methods well enough to have an intuitive sense of the quality and reliability of the overall methodology. This is espcially important given the recent criticism of carbon markets generally. I think the approach here of describing a general model approach as apposed to a specific model with parameters and covariates specified keeps the entire methodolgoy ambiguous and opens Verra and their market up to significant risk. The general model described seems highly refined and has the possibility of producing highly accurate estimates of harvest intensity and timing. However, the information provided is insufficient to allow a true review of the model. Rather, we must review the general structure and then trust to the expertise of NCX staff to produce models which claim not to be just the best in the business, but which claim to predict with precision things that others struggle to predict at all. I think in order for that claim to pass the "sniff test", we need to see a more detailed description and explaantion of this model.	I propose that NCX provide AT LEAST a subregion example where the detail specific model structure, a full list of predictors, approximate coefficients and forms. Further, there should be a proof of concept example that uses this model to predict harvest timing and intensity of previous timesteps and evaluates model performance.	We appreciate comments noting that the structure and performance of the baseline model used within this methodology is strongly influential on the predicted and realized climate impact of projects. As we are advancing this methodology independently, we will be moving to increase transparency rather than following an expert review process. This includes both detailed documentation of particular models used, as well as sharing benchmarking and performance information for baseline models. Finally, the revised approach to uncertainty explicitly accounts for imprecision in the baseline model in calculating the final number of credits generated from projects developed under this methodology.
253	Wagner Forest Management, Ltd.	Daniel H. Hudnut		In order to demonstrate additionality, the proponent should have to demonstrate that there is no 'adverse selection' within the program, whereby the population of program participants differs systematically from the general population from which data was drawn for estimating probability of and intensity of harvest. As a program participant, I can state that I had no plans to harvest timber from our NY woodlot during the activity period, and the payment we will receive will have caused in no change in behavior. While there may well be people who have deferred harvest becuase of the payments, there certainly are people who have entered into the program and accepted payment for harvest deferral when they had no intention or expectation of harvesting timber.	The proponent should have to demonstrate either that they have gotten rid of 'freeloaders' like me, or they should discount the purported carbon impact of the project to account for the fact that some payments result in no change in harvest behavior. This discount should be supported by careful research.	Where the methodology is not explicitly prescriptive, it is expected that project developers will implement appropriate safeguards to avoid adverse selection. NCX signs a legal agreement with landowners that affirms their willingness to harvest the volume they are instead credited with deferring. We look forward to working with other developers and academic researchers to explore methods of measuring adverse selection directly in the future.
254	Wagner Forest Management, Ltd.	Daniel H. Hudnut		In the NCX program landowners are paid if there is no reduction in stocking. Theoretically, a landowner could harvest growth with no penalty under the program. However, the expected growth increment is the basis for stating that there is an increase in carbon stocks on the property and therefore in the project area.	This seems like an NCX problem.	Landowners generate credits through deferring forest harvest relative to the predicted baseline (business-as-usual) harvesting levels. This is calculated by comparing carbon stocks at the end of a deferral period to the stocks anticipated under the baseline scenario; growth is included in the expected values for both scenarios.
255	Wagner Forest Management, Ltd.	Daniel H. Hudnut		Participants should be provided with sufficient information to understand the basis for the harvest deferral credits being offered. There should be transparency.		We appreciate comments noting that the structure and performance of the baseline model used within this methodology is strongly influential on the predicted and realized climate impact of projects. As we are advancing this methodology independently, we will be moving to increase transparency rather than following an expert review process. This includes both detailed documentation of particular models used, as well as sharing benchmarking and performance information for baseline models. Finally, the revised approach to uncertainty explicitly accounts for imprecision in the baseline model in calculating the final number of credits generated from projects developed under this methodology.
256	Wagner Forest Management, Ltd.	Daniel H. Hudnut		Disclosure of processes and procedures should be sufficient to enable a third party to replicate the procedure and obtain the same results. There should be no black boxes.		We appreciate comments noting that the structure and performance of the baseline model used within this methodology is strongly influential on the predicted and realized climate impact of projects. As we are advancing this methodology independently, we will be moving to increase transparency rather than following an expert review process. This includes both detailed documentation of particular models used, as well as sharing benchmarking and performance information for baseline models. Finally, the revised approach to uncertainty explicitly accounts for imprecision in the baseline model in calculating the final number of credits generated from projects developed under this methodology.

257	Wagner Forest Management, Ltd.	Daniel H. Hudnut		Any methodology that develops 'wall-to-wall' inventory estimates should publish comparisons of those against state-level (or finer scale) FIA inventory data to demonstrate that the model is well calibrated to the project area.		We appreciate comments noting that the structure and performance of the baseline model used within this methodology is strongly influential on the predicted and realized climate impact of projects. As we are advancing this methodology independently, we will be moving to increase transparency rather than following an expert review process. This includes both detailed documentation of particular models used, as well as sharing benchmarking and performance information for baseline models. Finally, the revised approach to uncertainty explicitly accounts for imprecision in the baseline model in calculating the final number of credits generated from projects developed under this methodology.
258	Wagner Forest Management, Ltd.	Daniel H. Hudnut		Any methodology that aggregates predicted harvest levels should publish 'wall-to-wall' aggregations against FIA removal data or other published timber harvest data (e.g., State of Maine) to demonstrate that the model is well calibrated to the project area.		We appreciate comments noting that the structure and performance of the baseline model used within this methodology is strongly influential on the predicted and realized climate impact of projects. As we are advancing this methodology independently, we will be moving to increase transparency rather than following an expert review process. This includes both detailed documentation of particular models used, as well as sharing benchmarking and performance information for baseline models. Finally, the revised approach to uncertainty explicitly accounts for imprecision in the baseline model in calculating the final number of credits generated from projects developed under this methodology.
259	Wagner Forest Management, Ltd.	Daniel H. Hudnut		Think of our regional carbon pool as a bathtub. Forest growth is like water coming into the tub from a showerhead. Timber harvest is like water going out the drain. In the Northeast (and some other regions), growth exceeds harvest, so the water in the tub is already rising. You can think of a landscape-level 100-year carbon project as mostly filling a milk jug with water from the tub, and then leaving it in the tub. The water in the jug isn't circulating, but the fact that it is in the jug doesn't affect the amounts in the tub, going down the drain, or entering the system. Some spray from the showerhead goes into the milk jug, but most just goes into the tub. If there were a LOT of these milk-jug projects, it might start to affect the way that mills perceive the future flow of wood through the system, reducing future mill demand. Reducing the amount of water leaving the tub would accelerate the increase in the water level in the tub. (But it would be bad for the regional forest products economy and rural communities.) An annual harvest deferral program, by contrast, is like making some ice cubes from water that was in the tub. For a brief time, they won't go down the drain, but soon enough, they are just part of the tub water again. No effect on water level (carbon stocks). No effect on rate of increase. No effect on markets leading to reduced future mill demand.	Insist upon longer-term commitment periods. Fundamentally re-assess the additionality and leakage associated with forest carbon offsets.	Projects are additional when the carbon stocks in the project scenario are greater than the carbon stocks expected under the baseline scenario–this is the basis for any carbon project verified against any standard. Because additionality, and therefore, creditable carbon is dependent on an accurate baseline, eligibility is limited to forests that are truly at risk of being harvested in the next year. Deferring that harvest results in additional carbon in the landscape.
260	Wagner Forest Management, Ltd.	Daniel H. Hudnut		The NCX program creates incentives for woodlot owners with maturing timber to enroll in the program every year, regardless of their plans. At such time as the landowner decides to harvest the timber, they simply do not get paid for that year, and they cannot participate in the program for the following three years. But their timber is re-growing anyway, so that's OK. How can NCX demonstrate that its harvest deferral payments modified the landowner's behavior?	Reduce opportunities for gaming the system (getting paid with no attendant change in behavior).	Projects are additional when the carbon stocks in the project scenario are greater than the carbon stocks expected under the baseline scenario–this is the basis for any carbon project verified against any standard. Because additionality, and therefore, creditable carbon is dependent on an accurate baseline, eligibility is limited to forests that are truly at risk of being harvested in the next year. Deferring that harvest results in additional carbon in the landscape.
261	Private Individual and Forester	Anonymous		This is not an "Improved Forest Management Practice". Extending rotations for timescales not based in forest science (e.g. biological maximum) are not improved practices, they are just aesthetic changes to the forest that very well could have negative impacts on forests, the wildlife found in them, and the stakeholders that rely on them.	Drop "Improved Forest Management" from the title	Within the Voluntary Carbon Market, Improved Forest Management refers to any management activity that increases carbon stocks within forests and/or reduces emissions from forestry activities as compared to a business as usual baseline.

262	Private Individual and Forester	Anonymous		Without the ability of buyers/outsiders to view and use the models underlying many of the assumptions in these models or Basemap, there is no way to know if the model is accurate or to understand how it works. I have serious doubts about the accuracy of Basemap and have heard this echoed by other colleagues.	Open the backbox up	We appreciate comments noting that the structure and performance of the baseline model used within this methodology is strongly influential on the predicted and realized climate impact of projects. As we are advancing this methodology independently, we will be moving to increase transparency rather than following an expert review process. This includes both detailed documentation of particular models used, as well as sharing benchmarking and performance information for baseline models. Finally, the revised approach to uncertainty explicitly accounts for imprecision in the baseline model in calculating the final number of credits generated from projects developed under this methodology.
263	Private Individual and Forester	Anonymous		There are no values listed in any of these models. If the standard is approved as is, it is impossible for a buyer or interested party to understand how what they are buy, how real it is, or what the weight of any of assumptions are.	List values in an appendix	We appreciate comments noting that the structure and performance of the baseline model used within this methodology is strongly influential on the predicted and realized climate impact of projects. As we are advancing this methodology independently, we will be moving to increase transparency rather than following an expert review process. This includes both detailed documentation of particular models used, as well as sharing benchmarking and performance information for baseline models. Finally, the revised approach to uncertainty explicitly accounts for imprecision in the baseline model in calculating the final number of credits generated from projects developed under this methodology.
264	Private Individual and Forester	Anonymous		Several times "experts" and "expert panels" are referenced. These panels and their recommendations need to be shared.	Share the recommendations of the "expert panels" and how NCX responded	We appreciate comments noting that the structure and performance of the baseline model used within this methodology is strongly influential on the predicted and realized climate impact of projects. As we are advancing this methodology independently, we will be moving to increase transparency rather than following an expert review process. This includes both detailed documentation of particular models used, as well as sharing benchmarking and performance information for baseline models. Finally, the revised approach to uncertainty explicitly accounts for imprecision in the baseline model in calculating the final number of credits generated from projects developed under this methodology.
265	Private Individual and Forester	Anonymous		This methodology is deeply flawed and should not be approved. Carbon sequestration requires time and the	Do not approve this.	We welcome additional dialogue with this commenter, who is encouraged to contact the NCX team.
266	Carbon Direct, Inc.	Bodie Cabiyo, Van Butsic, John Dees		Harvested wood products (HWPs) are not included in the project boundary because 1-year deferred harvest “leads only to a shift in the harvested wood products decay curve” (Table 5.1). This is a conservative and appropriate assumption for additional carbon stored in HWPs due to the project. It will, however, create large errors when applied to baseline modeling. The baseline methodology described tacitly assumes immediate combustion of all counterfactual harvested carbon by excluding HWPs from Equation 1. However, immediate carbon release is mostly limited to combusted logging slash, mill waste, and wood used for bioenergy. The proposed methodology should only credit those carbon pools that would be released during the one-year crediting period. HWPs will decay over time periods from multiple years to centuries, as the methodology alludes to in Table 5.1. By excluding HWPs in the baseline, this methodology is claiming to avoid carbon emissions from decay of HWPs that will occur well after the project crediting period. In some cases, this crediting error would account for nearly half of the credits claimed under the proposed methodology.	The baseline scenario should conservatively estimate the amount of carbon that would not be stored in HWPs during the one-year project period. In most cases, this will be the sum of logging slash, mill waste, and wood used for bioenergy. Existing methodologies like VM0003 and VM00012 do incorporate HWPs into baseline modeling, however, they should not be used verbatim as a template because they assume that carbon in short-lived products (3- and 5-years) is immediately released. The proposed methodology should only credit avoided emissions that are realized during the one-year harvest deferral period.	We appreciate the detailed comments raised about the absence of HWP accounting in the initial draft of our methodology. The carbon stored in trees is released into the atmosphere when a tree dies, some of it almost instantaneously and sometimes over years to decades. We believe it is important to account for all reasonable pools of emissions related to a harvest, and our revised methodology takes the storage of carbon in, and subsequent release of carbon from, harvest wood products into account.

267	Carbon Direct, Inc.	Bodie Cabiyo, Van Butsic, John Dees		Any amount of carbon stored for a single year represents a fundamentally different physical phenomenon than a long-lived carbon emission. Temporary carbon storage does not neutralize or fully "offset" cumulative radiative forcing from emitted CO2. It merely delays that forcing, exchanging short-term benefits for long-term impacts. This is particularly problematic in this proposed methodology because a significant fraction of the claimed avoided emissions from deferred harvest would actually become long-lived wood products. Thus, much of the actual emissions deferred will occur at the end of the useful life of the product, not during the one-year crediting period. This mismatch in time horizons is at odds with logic of tonne-year accounting.	The proposed methodology should strike any mention of absolute physical equivalence between short-term harvest deferral and permanent reduction or avoided emission. Delayed cumulative radiative forcing expressed in tonne-years can be indicative of the value of "buying time" but never as directly offsetting a long-lived emission. It can only delay the impacts of emitted CO2 until a later time, at which time, the marginal impact may be greater or less than the present. Such tradeoffs should be explicitly considered in the approach to tonne-year accounting.	The goal of climate mitigation is more about mitigating the damage caused by climate change, rather than the actual quantity of carbon in the atmosphere. The carbon in the atmosphere causes increased temperatures through climate forcing, which in turn lead to costly economic and social damages to our water, homes, businesses, and livelihoods. The long-standing research and implementation of the Social Cost of Carbon approximates the net present value of the perpetual stream of future costs and damages caused by climate change. For our methodology, we apply a similar economic framing and a net discount rate of 3.0% to identify the equivalence ratio between the benefits of delaying emissions for 1 year compared with 100 years. See Parisa et al. 2022 for a full explanation of how this economic model yields an economic equivalence between credits of different durations. In order to incentivize action today to avoid those future damages, it is appropriate to use a similar economic framework to calculate the benefits of near-term climate action. While a ratio does not signify a physical equivalence, it does appropriately value the future economic benefits of physical action today.
268	Bluesource LLC	Ben Parkhurst		Feedback on 1 Year Projects Utilizing Tonne Year Accounting	Although still subject to final approval in the VCS Standard 4.2 updates (which we are still awaiting responses to the public comments) the addition of tonne-year accounting (TYA) should only be considered if implemented appropriately and without loopholes to ensure that the emissions reductions are real, additional, and verifiable.	A tonne-year is simply a unit of carbon account like a kilowatt hour is to a kilowatt for electricity, a unit of volume over time. While tonne-year accounting may not be used widely today in the voluntary carbon market, it has been supported as an alternative to traditional carbon accounting in the scientific literature for many years. One cannot adequately know the full benefit of a solution without adding in the time or duration term. Fundamentally, tonne-year accounting allows for the delivery of realized impact, not presumed future impact on timescales incongruent with the variability of natural systems. Furthermore, tonne-year accounting allows the direct comparison of benefits of different carbon offsets approaches over many different time scales and technologies.
269	Bluesource LLC	Ben Parkhurst		Feedback on 1 Year Projects Utilizing Tonne Year Accounting	The primary concern around the current proposed TYA approach is the lack of a minimum crediting period for some projects. Forest management decisions are considered over the course of many decades, and therefore any reputable forest carbon project should also be maintained over a similar time scale. Where long-term management is concerned, it is unreasonable to determine additionality of a management change in any single year. However, over a multi-decadal timeframe, we can establish much greater confidence in the reasonability of the counterfactual scenario outlined in each project's baseline. This is one of the reasons why current Verra AFOLU projects require a minimum 20-year crediting period: over a multi-decadal time-frame market participants have significantly more confidence in the additionality and permanence of emissions reductions. We advocate that this methodology require that instances require a minimum time commitment of at least 20 years, consistent with the VCS Standard.	A tonne-year is simply a unit of carbon account like a kilowatt hour is to a kilowatt for electricity, a unit of volume over time. While tonne-year accounting may not be used widely today in the voluntary carbon market, it has been supported as an alternative to traditional carbon accounting in the scientific literature for many years. One cannot adequately know the full benefit of a solution without adding in the time or duration term. Fundamentally, tonne-year accounting allows for the delivery of realized impact, not presumed future impact on timescales incongruent with the variability of natural systems. Furthermore, tonne-year accounting allows the direct comparison of benefits of different carbon offsets approaches over many different time scales and technologies.

270	Bluesource LLC	Ben Parkhurst		Feedback on 1 Year Projects Utilizing Tonne Year Accounting	It is also important to consider the issue of leakage in the context of projects with single year comments. The current leakage factors prescribed for VCS AFOLU projects were designed to be applied to multi-decadal projects, and it is not clear that leakage figures calibrated in this manner are at all appropriate for projects with commitments as fleeting as one year.	Leakage is poorly studied across existing IFM projects, especially short-term harvest deferral projects. We agree that leakage is a possible outcome of purposefully delaying a harvest. Based on comments received, we have updated the methodological approach to include a more conservative deduction. We look forward to working with other developers and academic researchers to explore methods of measuring leakage directly in the future.
271	Bluesource LLC	Ben Parkhurst		Feedback on 1 Year Projects Utilizing Tonne Year Accounting	In addition, it is not clear whether Verra will allow for the use of discount rates in association with TYA. We would urge VCS to specifically disallow the application of discount rates in conjunction with TYA in this methodology.	The goal of climate mitigation is more about mitigating the damage caused by climate change, rather than the actual quantity of carbon in the atmosphere. The carbon in the atmosphere causes increased temperatures through climate forcing, which in turn lead to costly economic and social damages to our water, homes, businesses, and livelihoods. The long-standing research and implementation of the Social Cost of Carbon approximates the net present value of the perpetual stream of future costs and damages caused by climate change. For our methodology, we apply a similar economic framing and a net discount rate of 3.0% to identify the equivalence ratio between the benefits of delaying emissions for 1 year compared with 100 years. See Parisa et al. 2022 for a full explanation of how this economic model yields an economic equivalence between credits of different durations. In order to incentivize action today to avoid those future damages, it is appropriate to use a similar economic framework to calculate the benefits of near-term climate action. While a ratio does not signify a physical equivalence, it does appropriately value the future economic benefits of physical action today.
272	Bluesource LLC	Ben Parkhurst		Feedback on 1 Year Projects Utilizing Tonne Year Accounting	Finally, we would advocate for full public disclosure of the expert analysis of the proposed tonne-year accounting assumptions and quantification approach to ensure additionality and appropriate discounts for leakage and uncertainty. We also suggest these materials be made available for public comment prior to any approval actions of this methodology by Verra.	We appreciate comments noting that the structure and performance of the baseline model used within this methodology is strongly influential on the predicted and realized climate impact of projects. As we are advancing this methodology independently, we will be moving to increase transparency rather than following an expert review process. This includes both detailed documentation of particular models used, as well as sharing benchmarking and performance information for baseline models. Finally, the revised approach to uncertainty explicitly accounts for imprecision in the baseline model in calculating the final number of credits generated from projects developed under this methodology.
273	Bluesource LLC	Ben Parkhurst		Feedback on 1 Year Projects Utilizing Tonne Year Accounting	Additional Concerns on 1-Year TYA Projects:	Thank you for these comments.

274	Bluesource LLC	Ben Parkhurst		Feedback on 1 Year Projects Utilizing Tonne Year Accounting	· The original 17 to 1 ton-year to ton ratio changed to 44 to 1 and then 100 to 1. This variation does not inspire confidence in the actual number selected.	The goal of climate mitigation is more about mitigating the damage caused by climate change, rather than the actual quantity of carbon in the atmosphere. The carbon in the atmosphere causes increased temperatures through climate forcing, which in turn lead to costly economic and social damages to our water, homes, businesses, and livelihoods. The long-standing research and implementation of the Social Cost of Carbon approximates the net present value of the perpetual stream of future costs and damages caused by climate change. For our methodology, we apply a similar economic framing and a net discount rate of 3.0% to identify the equivalence ratio between the benefits of delaying emissions for 1 year compared with 100 years. See Parisa et al. 2022 for a full explanation of how this economic model yields an economic equivalence between credits of different durations. In order to incentivize action today to avoid those future damages, it is appropriate to use a similar economic framework to calculate the benefits of near-term climate action. While a ratio does not signify a physical equivalence, it does appropriately value the future economic benefits of physical action today.
275	Bluesource LLC	Ben Parkhurst		Feedback on 1 Year Projects Utilizing Tonne Year Accounting	· Landowner will be less likely sign up for projects with a 30-100-yr lifetime and obligation (which create more certain long-term climate benefits) if there is the chance to get money for a 1-yr deferral (which is likely not really a deferral at all given how difficult it is to map out exact areas that would be harvested).	We believe that this methodology does not necessarily incentivize shorter term projects over longer term projects, it simply provides the option of shorter-term projects. Landowners may still freely choose to participate in 30-100 year projects under different methodologies.
276	Bluesource LLC	Ben Parkhurst		Feedback on 1 Year Projects Utilizing Tonne Year Accounting	· The tonne-year concept will confuse buyers as they think they are getting a VER, and the integrity isn't close to the same.	The goal of climate mitigation is more about mitigating the damage caused by climate change, rather than the actual quantity of carbon in the atmosphere. The carbon in the atmosphere causes increased temperatures through climate forcing, which in turn lead to costly economic and social damages to our water, homes, businesses, and livelihoods. The long-standing research and implementation of the Social Cost of Carbon approximates the net present value of the perpetual stream of future costs and damages caused by climate change. For our methodology, we apply a similar economic framing and a net discount rate of 3.0% to identify the equivalence ratio between the benefits of delaying emissions for 1 year compared with 100 years. See Parisa et al. 2022 for a full explanation of how this economic model yields an economic equivalence between credits of different durations. In order to incentivize action today to avoid those future damages, it is appropriate to use a similar economic framework to calculate the benefits of near-term climate action. While a ratio does not signify a physical equivalence, it does appropriately value the future economic benefits of physical action today.

277	Bluesource LLC	Ben Parkhurst		Baseline Harvested Wood Products	It is inappropriate and not conservative to exclude baseline wood products from the carbon accounting. The methodology is based on the premise that a harvest would have happened in the absence of the project, and presumably this would have resulted in harvests that led to carbon being sequestered in wood products in the baseline scenario. This is a key component of every other IFM methodology. Carbon sequestered in wood products should be accounted for on the same time scale as the instance enrollment period. If a landowner is being credited for deferring harvest for one year, they should also be accounting for the carbon stored in harvested wood products in the baseline during that same period.	We appreciate the detailed comments raised about the absence of HWP accounting in the initial draft of our methodology. The carbon stored in trees is released into the atmosphere when a tree dies, some of it almost instantaneously and sometimes over years to decades. We believe it is important to account for all reasonable pools of emissions related to a harvest, and our revised methodology takes the storage of carbon in, and subsequent release of carbon from, harvest wood products into account.
278	Bluesource LLC	Ben Parkhurst		Use of FIA Data for Baseline Model	FIA data is only remeasured in 5 or 10 year cycles yet this data source is integral for training the baseline model on when harvests actually occurred, and informs the probability that properties enrolled in the program would have been harvested. It is unclear whether this has been appropriately considered in developing the probabilistic baseline model, as the timing of FIA plot remeasurement will not coincide with enrollment of new landowners every year. Timber prices fluctuate every year and will ultimately drive the probability of harvests, but changes in the FIA plots cannot reflect such annual changes driving the probability of harvest.	When preparing the training data to fit our baseline harvest risk model we adjust timber pricing to reflect the conditions present during the actual FIA measurement & remeasurement periods. Following this adjustment model training and model prediction both rely on market conditions contemporary to the recorded or predicted harvest behavior.
279	Bluesource LLC	Ben Parkhurst		Baseline Legal Restrictions	The methodology doesn't seem to adequately address legal restrictions in assessing the probability in the baseline that a given property would be harvested. Many small landowners may not understand the local laws and regulations (or may not be aware of conservation easements) as well as the permits required to harvest a given property. As a result, a landowner attestation is simply not sufficient to ensure that all legal restrictions have been accounted for in the baseline. There must be adequate an assessment and verification of the legal viability of baseline harvests, and we suggest that the methodology be bolstered to prevent properties from enrolling that could never be legally harvested, thereby overstating the claimed emissions reductions.	The business as usual model is a hierarchical statistical model that predicts one-year harvest risk and intensity based on FIA training data and a suite of covariates that include geographic, biological, economic, and sociological factors. Partial pooling across forest types ensures that the model is able to leverage the similarity and ubiquity of covariate relationships across the forests of the continental U.S. while still allowing for regionally specific differences. We also go through a post-prediction adjustment step that takes into account, for example, local constraints on harvesting.
280	NCASI	Steve Prisley		There is substantial literature about the harvesting behavior of private landowners, and many efforts have been made to reliably predict the willingness of landowners to harvest timber. Factors related to likelihood of harvesting include market price, landowner type,		Where the methodology is not explicitly prescriptive, it is expected that project developers will implement appropriate
281	Mercuria Energy Trading	Jessica Orrego	Leakage	The proposed default leakage deduction of 10% for the first 7 years of participation is far too low for this methodology. This methodology essentially hinges on the baseline harvesting probability being high (close to 100%). If the methodology assumes a high probability of baseline harvest for the deferral period, the notion that leakage risk is lower over a shorter time horizon is contradictory. The risk of leakage is present during any period that harvest is deferred, regardless of duration. It is also unclear why leakage would increase after 7 years, when research suggests that the exact opposite is more likely. Studies have shown that leakage is higher shortly after timber is withheld from the market, and then decreases over time as the market adjusts (e.g., by increasing mill efficiencies, substituting products, etc.). Because short-term reductions in timber supply are easily compensated, it could result in leakage of nearly 100%. We understand that the 10% leakage rate is sourced from the VCS Standard, however that is based on projects with 30-year (or longer) commitment periods, and is therefore not applicable to this methodology, which allows a commitment period of one year. It is also not clear how leakage dynamics are impacted by a large and dynamic aggregate of landowners with varying time commitments. This should be analyzed, and justified in the methodology. We recommend that a higher leakage rate be applied to all years of participation under this methodology.		Leakage is poorly studied across existing IFM projects, especially short-term harvest deferral projects. We agree that leakage is a possible outcome of purposefully delaying a harvest. Based on comments received, we have updated the methodological approach to include a more conservative deduction. We look forward to working with other developers and academic researchers to explore methods of measuring leakage directly in the future.

282	Mercuria Energy Trading	Jessica Orrego	Baseline	Appendix A describes an approach for developing a hierarchical model to estimate the probability that an area of forest would be harvested during the specified commitment period. However, the appendix only provides a very broad and theoretical description of how a model should be developed. This ambiguity will almost certainly result in a great deal of variability in the application of this approach across projects. Without detailed information about how to model the baseline, this methodology does not provide a framework that is verifiable. To address this the methodology indicates that the baseline models are "subject to review by an expert panel". However, important details are missing that describe how this expert panel is selected and what criteria the panel must use to assess the baseline. It is also unclear if the results of this expert panel's assessment will be publicly available. Furthermore, criteria and guidance related to validations of the baseline are also missing, which raises concerns about the resulting assurance of third party audits. We recommend that significant additional details, criteria and guidance are included in appendix A. This is necessary to enable transparent and consistent application of the methodology, and credibility of validations, verifications and expert panel reviews.		Our business as usual model is a hierarchical statistical model that predicts one-year harvest risk and intensity based on FIA training data and a suite of covariates that include geographic, biological, economic, and sociological factors. Partial pooling across forest types ensures that the model is able to leverage the similarity and ubiquity of covariate relationships across the forests of the continental U.S. while still allowing for regionally specific differences. Predicting behavior of any type, which is the basis for any forest carbon program, is not straightforward, and depends on models whose performance can be measured. We will soon be releasing our empirical benchmarks that demonstrate adequate performance for predicting business as usual behavior. Furthermore, we require landowner attestations that affirm the intent to harvest.
283	Mercuria Energy Trading	Jessica Orrego	Additionalit	Allowing a one-year crediting period is not appropriate for Improved Forest Management (IFM) projects. For IFM projects credibility relies on a robust demonstration of a multi-year baseline representing a justifiable harvest scenario that is based on mill capacities, common practice harvest practices and professional forester expertise. Most forests are managed over decades and harvesting is a result of careful long term planning, making the additionality of a single year management decision virtually impossible to demonstrate. In fact, the ability to demonstrate additionality of IFM projects effectively requires that time commitments coincide with the long-term timeframes in which natural systems are managed. We recommend that the minimum time commitment in this methodology is changed to be consistent with other VERRA AFOLU project methodologies.		Projects are additional when the carbon stocks in the project scenario are greater than the carbon stocks expected under the baseline scenario–this is the basis for any carbon project verified against any standard. Because additionality, and therefore, creditable carbon is dependent on an accurate baseline, eligibility is limited to forests that are truly at risk of being harvested in the next year. Deferring that harvest results in additional carbon in the landscape.
284	Mercuria Energy Trading	Jessica Orrego	Tonne-yea	We would like confirmation that the proposed tonne-year conversion rate is 100 years. This is not clear in the methodology. We also recommend explicitly clarifying that application of discount rates is not permissible.		A tonne-year is simply a unit of carbon account like a kilowatt hour is to a kilowatt for electricity, a unit of volume over time. While tonne-year accounting may not be used widely today in the voluntary carbon market, it has been supported as an alternative to traditional carbon accounting in the scientific literature for many years. One cannot adequately know the full benefit of a solution without adding in the time or duration term. Fundamentally, tonne-year accounting allows for the delivery of realized impact, not presumed future impact on timescales incongruent with the variability of natural systems. Furthermore, tonne-year accounting allows the direct comparison of benefits of different carbon offsets approaches over many different time scales and technologies.
285	Mercuria Energy Trading	Jessica Orrego	Harvested	It is unclear why harvested wood products are excluded from project carbon accounting. The baseline scenario assumes timber harvesting and production of wood products, some of which would store carbon for many years. Excluding this pool from baseline accounting is not conservative, as it lowers the baseline. We recommend that this pool is included in accounting to ensure credibility.		We appreciate the detailed comments raised about the absence of HWP accounting in the initial draft of our methodology. The carbon stored in trees is released into the atmosphere when a tree dies, some of it almost instantaneously and sometimes over years to decades. We believe it is important to account for all reasonable pools of emissions related to a harvest, and our revised methodology takes the storage of carbon in, and subsequent release of carbon from, harvest wood products into account.