SUMMARY OF COMMENTS & RESPONSES
DRAFT FOREST PROJECT PROTOCOL VERSION 5.0

Eight sets of comments were received during the initial public comment period for the Climate Action Reserve (Reserve) draft Forest Project Protocol Version 5.0. Staff from the Reserve provides responses to the comments below. The first public comment period for the draft protocol was November 1, 2018 to December 14, 2018.

The comment letters can be viewed on the Reserve's website at http://www.climateactionreserve.org/how/protocols/forest/revisions/.

COMMENTS RECEIVED BY:

1. Bluesource
2. California Forest Carbon Coalition (CFCC)
3. Christopher S. Galik, Ph.D.
4. Barbara Haya
5. New Forests
6. William Stewart
7. The Climate Trust
8. The Conservation Fund

General Comments

1. **COMMENT:** Verification costs continue to be prohibitive for many offset projects. Streamlining calculation and modeling, like the standardized conservative baseline approach, can help reduce verification costs. CAR's Protocol is a significant improvement from the 4.0 version by updating the verification schedule for projects with low or no credit issuances. However, improvements are still warranted to reduce verification costs. **(CFCC)**

   RESPONSE: We thank you for your comment. The Reserve agrees that improvements should continue to be made to reduce verification costs. We will continue to evaluate ways in which verification can be made more efficient without sacrificing the integrity of the program. We welcome specific suggestions on this topic.

2.3 Forest Project Aggregation

2. **COMMENT:** Section 2.3 of the revised CAR Protocol stipulates that eligible forest projects can aggregate "by meeting carbon inventory confidence standards across an aggregate, rather than within each project". CFCC supports CAR's allowance of aggregation to engage small timberland owners in California and reduce project costs. The main project costs include baseline establishment, inventory, and verification, all of which could be streamlined with an aggregated project approach. **(CFCC)**

   RESPONSE: We thank you for your comment and support for the aggregation option.

3.3.3 Enhancement Payments

3. **COMMENT:** New Forests views the following revisions in version 5.0 to be significant improvements to the prior Forest Project Protocol version 4.0… Supporting "enhancement payments" or other programs that provide financial assistance to landowners to improve environmental outcomes on their land that complement the GHG reduction benefits provided by a carbon offset project. **(New Forests)**

   RESPONSE: We thank you for your comment and support of the enhancement payment language.

4. **COMMENT:** We appreciate the discussion of enhancement payments and are very supportive of the language that clearly outlines that financial assistance to landowners for discrete practices that address natural resource concerns and deliver environmental benefits are compatible with forest projects. **(The Conservation Fund)**

   RESPONSE: We thank you for your comment and support of the enhancement payment language.

6.1.1 Estimating Baseline Onsite Carbon Stocks – Private Lands – Standardized Approach

5. **COMMENT:** CAR's Protocol adds a standardized, conservative baseline approach for eligible projects, which removes the need for project-specific baseline modeling (Section

6.1.1). This baseline is informed by analysis of previous IFM projects and features built-in, conservative multipliers. CFCC applauds this step, which will offer a lower cost and less modeling intensive, but still conservative, baseline quantification. **(CFCC)**

RESPONSE: We thank you for your comment and support of the standardized baseline methodology.

6. **COMMENT:** New Forests views the following revisions in version 5.0 to be significant improvements to the prior Forest Project Protocol version 4.0… Allowing use of a standardized baseline methodology for private land IFM projects, which is a lower-cost, conservative alternative for determining a project's baseline and will likely encourage more projects from smaller ownerships where the upfront cost associated with project development, modeling and verification can be a barrier to entry. **(New Forests)**

RESPONSE: We thank you for your comment and support of the standardized baseline methodology.

6.1.6 Quantifying Secondary Effects

7. **COMMENT:** Apart from the positive modification contained in the draft FPP, the treatment of IFM leakage deductions (Section 6.1.6) strikes us as a significant issue of concern. In stating this, we acknowledge that the addition of variable sliding scale with maximum leakage factors of 40% or 80% is an improvement upon the leakage deduction calculation in FPP v4.0, where only the 80% maximum leakage factor was present. However, we believe that the evidence provided to support both the 40% and 80% leakage factors within FPP v5.0 (i.e. An Overview of Leakage Risk and Mitigation Approaches for Land Management Activities in Merced County, California, Christopher Galik, 2018) does not provide justification for these figures for several reasons:
    - The Galik paper was intended for the very specific context of making policy recommendations for leakage management, for landuse activities in Merced County California, and therefore extrapolation of the paper's findings to the entire continental US and Alaska is hard to justify.
    - The Galik paper covers a wide variety of landuse types, and the vast majority of the sources covered in his literature review are not targeted toward IFM projects in the US.
    - A review of the source material, relevant to IFM projects, reveals a substantial range in potential leakage levels based on the circumstances in which the forest activity took place. Though Galik does suggest a 40% default rate in the Merced decision tree section of the document, he makes no assertions that this 40% figure is applicable or should be relied upon in a broader context.

    Leakage rate quantification is of the upmost importance for any carbon offset protocol and resorting to overly conservative default leakage deductions will cause meaningful carbon projects to become unfeasible, ultimately reducing the number of acres being enrolled in the carbon program and preventing real emissions reductions from being realized. Bluesource is not opposed to significant leakage deductions, in fact, when justified and accurate, we believe significant leakage deductions are good for the health of the carbon market and the planet. However, we do not believe the evidence supporting the 40% and 80% leakage factors in the Reserve's draft protocol provides sufficient justification for the proposed leakage calculation approach.

As an additional technical note on the leakage topic, Bluesource staff has applied the Reserve's FPP 5.0 leakage calculation to several existing Bluesource projects developed under earlier versions of the FPP and have found that the equation mandated for use on projects that do not harvest timber often leads to reversals in the years following first issuance. These reversals occur as the 80% leakage rate, coupled with high levels of baseline wood products, often outpaces annual growth which leads to net negative sequestration values. This would appear to be an unintended quirk in the calculation process, as it seems unlikely that the Reserve would want to discourage landowners from committing well stocked forest properties to not harvesting their timber, and thereby maintaining these high carbon stocking levels into the future.

Given the significance of arriving upon accurate leakage figures, and the lack of robust evidence to support the current FPP's leakage calculation, we believe a though [sic] and targeted study is in order, to determine the appropriate leakage levels for IFM projects across the US. We understand this would be a substantial endeavor, requiring time and resources, but given the risks involved with not getting leakage calculations right, we feel such an endeavor is merited. To this end, Bluesource would be happy to participate in, and support, any working group the Reserve might want to establish to take on this challenge. **(Bluesource)**

RESPONSE: We appreciate your comments and concerns pertaining to leakage risk. It was our intent to update the leakage risk values to promote conservative project accounting, a core principle of our program, while maintaining the flexibility needed to promote participation in the program. As can be seen from the wide range of comments in this document, stakeholders provided feedback asserting the new leakage risk values are too conservative, as well as not conservative enough.

In light of the range of disparate comments received from stakeholders, the Reserve has modified the accounting to apply a standard 20% leakage rate, in line with previous versions of the Reserve's FPP, while also adding back in the separate market response to changes in wood product production (Equation 6.1) and still addressing leakage as a risk and a long-term proposition. The Reserve had sought to simplify the accounting approach by merging a conservative estimate of market effects with the secondary effects of activity-shifting leakage, as few understood how they work together. This was the rationale for applying a 40% combined leakage rate for those projects that were capable of harvesting.

It is anticipated that many Improved Forest Management Projects will experience a long-term increase in both their onsite carbon stocks and the production of wood products, as improved stocking control and longer rotations take effect. The leakage discount is applied to address the risk of leakage occurring. Despite reverting to previously used leakage risk and market response rates, the Reserve is maintaining modifications to the accounting that consider the cumulative levels of both project and baseline harvesting and allow discounted credits due to leakage risk accounting to be recouped if and when project harvesting increases relative to baseline harvesting, which indicates the long-term risk of leakage may not be occurring.

Although prior leakage risk discounts may be recouped, leakage credits will not be issued if cumulative project harvesting increases above baseline levels. Rather, the project can carry forward the 'positive leakage' value and apply it to future reporting periods if and when project harvest amounts drop below baseline harvest amounts on a

cumulative basis. It is critical to remember that Improved Forest Management projects are 100-year commitments to maintain carbon out of the atmosphere and that project leakage is ultimately based on this same timeframe.

8. **COMMENT:** Leakage, or the shifting of harvesting activities away from project lands due to the harvest constraints of a carbon project, has changed during each recent revision of the CAR Protocol. The Leakage Deduction changed from 20% (through protocol v3.3) to the sliding scale up to 80% (protocol v4.0) to a variable sliding scale approach (Section 6.1.6). CAR has also amended its leakage calculation (eq. 6.10) to include two different maximum harvesting level deductions – 80% of the difference between actual and baseline harvesting in the case of lands with legal instruments such as a conservation easement, and 40% of the difference between actual and baseline harvesting in the case of lands that have no legal encumbrance to harvesting. The equation has also been amended so that deductions due to prior negative Secondary Effects can be recouped.

   Calculating leakage of any product is complicated. Unfortunately, the CAR protocol leakage calculations still need improvements to mirror actual market behavior. There are complex market interactions that occur within and between regions and between countries that make leakage modeling highly uncertain because the actual cause and effect data is not available and therefore modeling relies on assumptions that effect other assumptions. This kind of cause and effect scenario modeling is complicated and its reliance on assumptions means that they have unknown quantities of error.

   At a minimum, this topic deserves additional research. The CFCC supports undertaking a new study to develop leakage rates that are tailored to project-level GHG accounting of IFM and avoided conversion activities across the U.S. and thus appropriate for CAR's Protocol. **(CFCC)**

   RESPONSE: The Reserve's Forest Protocol has always provided for leakage risk deductions to be recouped. The 5.0 update highlights this fact to further clarify that leakage risk, like other protocol elements (baseline, additionality, etc.) are assessed over the 100-year project life and that leakage should be considered as a risk of leakage throughout the project. We agree that calculating actual leakage is very complicated. Please refer to the response to comment #7 for a description of the Reserve's quantification approach.

9. **COMMENT:** The current version of the revised protocol cites a literature review I conducted (Galik 2018) as the source for a default secondary effect value of 40%. I am concerned that use of that estimate without further elaboration on where the number came from, how it was derived, and how it was intended to be used is potentially confusing and misleading.

   The cited report was written to inform the development of a suite of land management and land use practices for greenhouse reduction in Merced County. As part of that project, I conducted a literature review to assess a range of leakage estimates for a variety of land use activities, and, based on that review, provided recommendations for discounts that could be applied to identified practices at either the activity or county scale. The review itself identified a wide range of estimates in the literature, some negative, some positive, some low in magnitude, others quite high. Because of this, it appears as though the 40% leakage estimate being attributed to Galik (2018) by the

revised protocol comes from a simplified flowchart that was developed to assess activity-specific leakage risk.

In describing the flowchart, I took particular care to note the challenges associated with relying on a single estimate derived from the literature:

"It is important to again remind the reader that leakage is an intervention-specific phenomenon. There are inherent tensions between development of a simplified tool for evaluating the magnitude of leakage risk for whole classes of activities and derivation of specific estimates of leakage risk based upon the unique market and carbon parameters of the specific activity in question...The figure below also does not capture the carbon density of affected land uses, nor does it fully consider the price elasticities of supply or demand. The value of the figure below should thus be seen in its conceptualization of the process for considering whether leakage is of concern, and less in the particular values assigned at the end." (Galik, 2018; p12)

This context is missing from the protocol revision, and masks both how the number was derived—in Galik (2018), it was "approximated from estimates reported in Murray et al. (2004) [and] Wear and Murray (2004)" (p12)—as well as how the estimate and the flowchart in which it is embedded was expected to be used.

I understand that there is a desire to develop approaches that provide certainty for project developers and that are easy to use, replicable, and consistent, all the while ensuring that any registered credits represent actual, real, quantifiable net GHG reductions. For the sake of transparency, however, I request that CAR substitute the simple citation of my literature review with their own justification for why a particular value was chosen and how it was derived. That will allow for a more open and transparent discussion about the appropriateness of any discount and/or the assumptions that went into its estimation. **(Christopher S. Galik, Ph.D.)**

RESPONSE: We appreciate your input on this topic, particularly in pointing out that the literature is highly variable with regards to leakage rates. We have revised our approach to leakage risk (see response to comment #7) and references to your work (and the work of others, as well) have been removed at this time as it is no longer pertinent to the current version. However, it should be noted that the protocol calculations for leakage, prior to the version circulated for public comment, often resulted in the combined secondary effects deductions (activity-shifting leakage and market responses) that approximated 40%, in cases where project harvesting is less than baseline harvest. The Reserve is returning to this approach and will seek a potentially updated approach only through broader stakeholder engagement.

10. **COMMENT:** The draft protocol revision proposes to replace the currently used 80% leakage rate with 40% for projects with no legal encumbrance that have harvested at least once in the previous 20 years (equation 6.10). In the draft protocol, the 40% leakage rate is justified with a reference to the following report: *An Overview of Leakage Risk and Mitigation Approaches for Land Management Activities in Merced County, California*, Christopher Galik, 2018.

    The 40% figure in the Galik report does not actually support the use of a 40% leakage rate in the protocol. Existing literature on leakage rates resulting from reductions in

timber harvest in the United States supports keeping in place the current 80% leakage rate if not a higher rate.

First, Galik explicitly writes that the purpose of Figure 1 from which the 40% figure is taken is to distinguish those projects that have no or de minimis leakage risk from those that have significant leakage risk, and not to offer a usable leakage rate. He writes: "The value of the figure below should thus be seen in its conceptualization of the process for considering whether leakage is of concern, and less in the particular values assigned at the end."

Second, Galik cites two articles as sources for the 40% figure. One of them, Wear and Murray (2004), estimates that the leakage associated with reduced timber harvesting on federal lands in the western United States in the late 1980s was at least 84%. Of the total reduction of harvesting on western federal lands, 43% was replaced by increased harvesting by private land-owners in the same region (western United States), and another 41% was replaced by increased harvesting elsewhere in north America. Some analysts may only be interested in local leakage. But to account for the effect of projects on carbon as is needed under an offset protocol, the 84% leakage rate is the more appropriate figure. The other article cited does not suggest a specific leakage rate.

Keeping the leakage rate at 80% is also supported by other studies that have estimated the leakage that would result from reductions in timber harvesting in the United States. Another study using general equilibrium modeling estimates that a reduction in timber harvesting in the United States as a whole would result in a displacement of 76% of that harvesting to elsewhere in the world. Reduced harvesting by projects smaller than the whole United States would result in greater leakage, because the reduced harvesting could be displaced to elsewhere within the United States, not just internationally.

Third, an established principle of offset protocol development is that they use conservative figures when emission reduction parameters are uncertain. A conservative choice of leakage rate for reduced timber harvesting on United States lands is not below 80%. **(Barbara Haya)**

RESPONSE: We appreciate your comments and concerns pertaining to leakage risk. It was our intent to update the leakage risk values to promote conservative project accounting, a core principle of our program, while attempting to address leakage in the most simplistic terms possible. As can be seen from the wide range of comments received, stakeholders provided feedback asserting the new leakage risk values are too conservative, as well as not conservative enough.

Please see the response to comment #7 for the current approach to addressing leakage risk, including how it is affected by a cumulative assessment of project harvest compared to baseline harvest.

11. **COMMENT:** The current Forest Project Protocol credits an improved forest management project for the onsite carbon stocks above the baseline at the start of the project without fully accounting for the leakage associated with the credited reduction in harvesting at the same time. The leakage associated with initial credited carbon stocks above the baseline scenario is deducted over 100-years instead of when the reduction in harvesting actually is presumed to have happened and is credited. In other words, in the first year of an improved forest management project the project receives credits

associated with the total on-site carbon storage above the baseline, but an average amount of leakage, which could be as low as 1/100th of the leakage associated with the avoided harvesting in the first year, is deducted. Any reduction in the global production of timber caused by the offset protocol has already been accounted for in the choice of a leakage rate below 100%. Spreading the leakage accounting over decades is not justified.

Spreading the deduction of leakage associated with the first year's reduced harvesting over 100 years has resulted in the generation of more credits than reductions achieved compared to the baseline scenario. This accounting discrepancy can be remedied by deducting the leakage associated with the change in forest management practice at the same time that the change is credited. The remainder of the calculated leakage over 100 years can then be deduced as an average over the remaining 99 years. **(Barbara Haya)**

RESPONSE: The project's baseline consists of onsite carbon stocks and harvested wood products. A decision was made to average these values over the 100-year modeling period to address the general characterization of harvest and growth events that are impossible to pinpoint in a counterfactual baseline simulation and to avoid the problems that occur with falling and rising baseline carbon stock values that would result in credits going back and forth between being credited and then being reversed. The Reserve will maintain the baseline of all included pools as an average to facilitate accounting, with the recognition that the forest carbon project is a 100-year event. At the end of the 100-year event, leakage calculated as you suggest is equivalent to leakage calculated as an average.

The decision to deduct for leakage risk on an annual basis or averaged over the life of the project is a policy decision related to project feasibility. Since the current accounting does not change the overall crediting throughout the life of the project, but rather shifts it, we can support this policy in order to foster a wider range of participants in the program without sacrificing any integrity in project-level accounting

12. COMMENT: While we believe that the proposed approach to IFM leakage in version 5.0, particularly the sliding scale based on project-specific harvesting conditions, is an improvement over version 4.0, we believe it should be further improved with additional research. The study cited in the Protocol to support the proposed leakage factor is a broad literature review that includes studies outside the U.S. and covering non-forest activities such as agriculture, bringing their relevance to a U.S. based forest protocol into question. From the studies that did take place in the U.S. and covered forestry activities, the leakage factors vary dramatically, ranging in one study from 16-68% as described below in Galik (2018):

> *One seminal study, Murray et al. (2004), uses the Forest and Agricultural Sector Optimization Model (FASOM) to estimate leakage rates of forest set-aside, avoided agricultural conversion, afforestation, and joint afforestation-avoided conversion programs in the U.S. They find that leakage magnitude differs both by activity and across regions. For instance, forest set-aside programs in the Pacific Northwest were associated with less leakage (16.2%) than programs in the South Central region (68.3%) owing to the higher carbon density in the former. Allowing harvest from acres enrolled in avoided conversion programs reduced leakage but also necessarily reduced carbon storage on harvested areas.*

This literature review illustrates that leakage is a highly complex issue that is influenced by a host of economic factors and forest-specific characteristics. Many of the studies cited in the review are based on models; therefore, the assumptions used in the models need to be carefully reviewed for relevance and applicability. There is a marked difference, for instance, between a project that results in the conversion of forest to a non-forest use outside of the project area and one where project harvest shifts to another sustainably managed forest where growth exceeds harvest. It is also important to define the level at which leakage is a concern for a project-level Protocol—should an individual project be responsible for macroeconomic dynamics at a national or international scale, or should it be responsible for what might occur within its local watershed or assessment area? At a minimum, there appears to be a wide range of leakage factors in the available literature, and revising the Protocol to reflect this range by applying maximum default leakage factors ranging from the original 20% from version 3.3 to the 80% in version 4.0 would seem appropriate in the short term to better reflect the range of leakage factors presented in the literature. However, in the long term we believe this subject warrants additional research, especially because leakage factors can have a significant impact on small projects and forests with slow growth rates, where it is possible for the secondary effects calculation to result in a reversal merely due to the assumption of a high leakage factor. We would strongly support undertaking a new study with the aim to develop leakage rates that are tailored to project-level GHG accounting of IFM and avoided conversion activities across the U.S. and thus appropriate for the Reserve's Forest Project Protocol. **(New Forests)**

RESPONSE: The 40% leakage deduction in the draft Version 5.0 was intended to simplify the secondary effects accounting present in earlier versions for projects that, when combining activity-shifting leakage and market responses, average around 40%. The 40% value the Reserve promoted would have covered both forms of leakage. The Reserve will now be returning to an accounting methodology that separates these two aspects of secondary effects. The Reserve agrees that research and wider jurisdiction-based monitoring will improve the ability to detect leakage, which will better inform how leakage risk might be treated within a forest carbon protocol. Please refer to the response to comment #7 for further detail on our proposed quantification approach.

13. **COMMENT:** The version 5.0 forest protocol does not justify how the 40% - 80% leakage value range was determined. The 2018 study by Christopher Galik that is cited by the protocol shows that leakage value estimates vary widely. The study itself chooses 40% for forest projects but gives no justification as to why 40% was chosen and states that selecting a single value to reflect leakage risk is difficult. Furthermore, the study is focused on estimating leakage for a very specific location: Merced County, CA. The protocol does not justify why a locally established leakage value was used to establish a nationwide leakage value. It is also unclear why the protocol chooses a 40% to 80% leakage value range when the cited paper uses 40%. These values are overly conservative and only serve to increase the barriers to entry small forest landowners already face.

    Forest carbon credits are a critical forest management incentive that results in environmental benefits that go far beyond simply carbon sequestration. Managing forests for carbon sequestration inevitably results in water quality benefits through increased use of riparian buffers, habitat diversity through the establishment of older age structure stands and additional forest reserves, and supports forest conservation through the establishment of a revenue stream that is mission-aligned with many land trusts

working to protect critically important forestland. This type of management is particularly important as a climate change resiliency tool. Adopting overly conservative leakage values inhibits the ability of forest owners to support sustainable and restorative management with carbon credits and is detrimental to the environment.

Over the life of a project, many forests may not actually reduce harvested volume much because they are shifting to longer rotations that will yield the same amount of volume. Overtime, leakage could be close to 0. While the protocol allows for the recuperation of credits lost to leakage later in the project's life if harvest volumes increase, these revenues would be backloaded and discourage participation because the high cost of project finance requires earlier project cash flows for financial feasibility. We suggest using a static leakage value that does not push credit generation into the future when market risk is highest.

Assigning a higher (80%) leakage value to projects that have not harvested wood products in the last 20 years is arbitrary and discourages landowner participation in the program. Forest management and forest ownership take place on time periods that extend beyond 20 years. It is common that harvests may not take place for 20 years because the rotation length is 100 years (i.e. oak-hickory). Furthermore, the financial situation of a forest owner can change rapidly resulting in the liquidation of timber assets or property sale and conversion to non-forest use. Carbon revenue provides a much needed financial incentive to preserve forests and maintain high carbon stocking. The protocol should not discourage participation by presuming to know what a landowner may or may not do in the future when legal restrictions are not present.

We suggest using the simple 20% leakage value that has historically been used in previous CAR Forest Project Protocol versions and in other protocols. Overly conservative values increase barriers to market entry and inhibit wider adoption of carbon-focused management, which have clear environmental benefits beyond carbon sequestration. **(The Climate Trust)**

RESPONSE: The 40% leakage deduction in the draft Version 5.0 was intended to simplify the secondary effects accounting present in earlier versions for projects that, when combining activity-shifting leakage and market responses, average around 40%. The 40% value the Reserve promoted would have covered both forms of leakage. The Reserve will now be returning to an accounting methodology that separates these two aspects of secondary effects. The many important co-benefits of a carbon project mentioned in this comment are noted and appreciated. Please refer to the response to comment #7 for further detail on our proposed quantification approach.

14. COMMENT: [The following represents excerpts from the original comment – see the Forest Project Protocol webpage for the full comment letter.]

a. The amazingly low, and never justified 20% leakage value in versions 1-3.3 most probably led to a lot of projects being given too many offset credits. This leakage estimate that is far below well known published estimates for leakage estimates for North American forest and forest product systems that are summarized in the 2018 Galik appendix referenced in the proposal (e.g. Wear and Murray 2004), and will eventually diminish the global reputation of the quality of ARB's offset program to which CAR projects apply. It was good that v4.0 at least used the 80% global leakage for wood production that is in line with estimates from empirical research published in Murray et al (2004) and Wear and Murray (2004). However, there is

absolutely no empirical justification for allowing v5.0 projects to once again use much lower leakage rates. The exact wording of the proposed change for V5 is not that clear on how project proponents could use the much lower leakage number, but the proposed change would clearly allow project proponents to propose the lowest leakage estimate possible and essentially dare ARB to reject the proposal.

b. There is absolutely no evidence in any documentation mentioned by ARB in this proposal watering down on forest offset rigor to support the assertion that: "[IFM] Reductions [of emissions] are the result of increased productivity of managed forest systems. This can be yielded through either extended rotations for even-aged systems so as to sequester more carbon on the stump or in eventual wood products, and/or through increased productivity of the stand as a whole through appropriate silvicultural practices". (Galik in TNC 2018, appendix J. p 7)…
It appears that the rationale for the 40% leakage rate is that projects still involve some harvesting should get twice as much benefit from the harvest reduction (even though a ton of harvest reduction is a ton of harvest reduction, no matter what else happens from the project).
c. It is also very clear that the trends for wildfires in California's forests are increasing and that it is imperative that proactive steps be taken to invest in California's forest to reduce the level of forest losses to catastrophic wildfire. By reducing the leakage rate from 80% to 40%, CAR is making it more profitable for projects to claim global climate benefits by reducing harvest levels – and leaving more carbon at risk to an ever-increasing risk of catastrophic wildfire. We can only wonder whether the recent spate of wildfires would have been smaller if more fuels reduction projects had been undertaken (even if they are the opposite of the goal of CAR's IFM projects that are designed to pay for increased biomass (aka fuel) inventories per acre.
d. It is also clear that making it more remunerative to create CAR forest offset projects based on reducing harvests to increase inventories (aided in value by lower approved leakage estimates) also goes against the global consensus on the role of well managed forests. The most recent IPCC (2014) is very clear on pointing out the benefits of using wood building materials rather than GHG emission intensive cement and steel can have very large global climate benefits.
e. The only outcome of allowing a new loophole in V5 of dropping the leakage rate for some projects will unfortunately be a higher likelihood of giving out too many offset credits to forestry projects that will most probably experience the much higher mortality rates have been documented on USFS timberlands in the AB 1504 reports. While the projects can initially be given many more offsets than they probably deserve, the increased mortality will most probably only show up after the initial set of consultants and ARB verifiers have moved on to new jobs. California's overall offset program will be left holding the bag for projects that ended up delivering less than promised. **(William Stewart)**

RESPONSE: Fuels management and timber harvest are both compatible and rewarded activities under the Improved Forest Management Protocol. An ideal Improved Forest Management Project is a project that, through managing the forest stocking and harvest rotations at improved, if not optimal levels, maintain more onsite carbon and produce more wood products than would have happened in the baseline scenario within the project life timeframe of 100 years. Improved stocking means a management for a forest is thriving and growing, yet resilient to environmental perturbations. Improved harvest rotation means increasing the age of harvest closer to the culmination of mean annual increment. A carbon market can help in achieving these objectives. Obviously,

converting all forests to wood products to avoid mortality is not a strategic objective to developing healthy and resilient forests that are capable of long-term wood production.

The value of managing fuel loads, while it does result in removing biomass from the project accounting, is recognized and rewarded through a reduced contribution to the buffer pool established to address the risk of natural disturbances. The protocol does not and cannot provide benefits for substitution effects, such as the potential benefits of wood products compared to steel or cement, or any other indirect benefits that cannot be directly measured as a project activity.

On the subject of leakage, please refer to the response to comments 7, 10, and 11 above for more information on the quantification approach presented in the current public comment draft.

Lastly, we would caution readers from conflating the Climate Action Reserve's voluntary Forest Project Protocol with the California Air Resources Board's (CARB) compliance offset protocols (COP). The two programs are distinct, and any changes made to FPP v5.0 may not ultimately be reflected in future revisions to the COP. Should CARB choose to revise the COP, any changes they make would go through a rulemaking process as required by the California Code of Regulations. Our protocol revision and public comment process is solely pertinent to our voluntary offset program and is not part of CARB's rulemaking process.

8.3.2 Verification Cycle

15. **COMMENT:** Bluesource believes that several of the changes incorporated into version 5.0 of the protocol mark meaningful improvements over the previous iterations of the FPP. Of particular note, we feel the *Updated Site Visit and Desk Review Verification Schedule* (Section 8.3.2.1) will reduce barriers to entry for landowners, without sacrificing any of the program's integrity. **(Bluesource)**

    RESPONSE: We thank you for your comment and support of the new verification schedule options.

16. **COMMENT:** New Forests views the following revisions in version 5.0 to be significant improvements to the prior Forest Project Protocol version 4.0… Updating the verification schedule for projects with low or no credit issuances. This is an important change because many IFM projects receive the bulk of their carbon offset credits in the first reporting period yet have a long trail of monitoring and verification costs over 100+ years. A "site visit" verification including sequential sampling is expensive, especially for projects that have moved into a "monitoring" phase and are no longer generating additional carbon offset credits. For projects that must merely maintain the carbon they have committed to sequester in their forest, many lower-cost monitoring methods are available, such as the use of aerial imagery and remotely sensed data to demonstrate that the forest is being maintained and that no reversals have occurred. **(New Forests)**

    RESPONSE: We thank you for your comment and support of the new verification schedule options.

17. **COMMENT:** As stated above, we support the proposed changes to the verification schedule for projects with low or no credit issuances and agree that tracking a metric

such as canopy cover is a helpful way to monitor changes that could potentially indicate a reversal. However, we believe that additional guidance on how to quantify canopy cover should be provided to ensure consistency and reduce verification cost. We also recommend that the threshold of a 5% decline in canopy cover automatically triggering a site visit verification should be revisited, as it could unnecessarily lead to more costly verifications that do not provide greater assurance of forest maintenance. If a project is not actively seeking offset credits, then the focus of the verification should be on the risk of a reversal to previously issued offset credits. The amount of canopy cover decline resulting in a reversal will depend on how canopy cover is quantified as well as project-specific factors such as project size, carbon density and growth rate. If a reversal has occurred, then a site visit verification is already required within one year of an avoidable reversal and within two years of an unavoidable reversal. It may therefore be more appropriate for the desk review of a forest project that is not receiving additional credits to determine via the monitoring reports and canopy cover data whether or not a potential reversal has occurred, which would then trigger a site visit verification to confirm the nature and extent of the reversal if necessary. **(New Forests)**

RESPONSE: The intent behind the 5% decline in canopy cover was to identify unreported reversals. We have revised this section to indicate that a 5% decline in canopy cover requires further evaluation to determine whether a reversal has taken place, and, if so, the site visit requirements for a reversal would apply.

9.3.5 Verifying Carbon Inventories

18. **COMMENT:** Sequential Sampling, in which the verifier aims to confirm agreement with project operator measurements, is intended to be efficient. There is no fixed sample size, but instead has stopping rules that indicate either agreement or potential bias. The CFCC believes the verification method for "paired" and "unpaired" sequential sampling tests performed within the CAR Protocol is not consistent with leading references on sequential sampling methodology (see Sequential Methods and Their Applications (Nitis Mukhopadhyay and Basil M. DeSilva, CRC Press, 2008, pp. 63-66). Furthermore, it increases the burden of proof for a project that is subject to verification. CAR should consider a lower minimum number of sample plots to verify the accuracy of the inventory, which would result in significantly lower costs to landowners. **(CFCC)**

    RESPONSE: The use of sequential sampling for forest inventories was a novel application of a sampling technique originally developed for quality control purposes. In order to achieve the desired conservativeness of this new technique application, the Reserve implemented conservative stopping rules, as referenced in this comment. With FPP V4.0, in reference to the paired sequential sampling exercise, we created more uniformity in the minimum number of sample plots by requiring six consecutive passing plots, or the first plot that passes after the 12th measured plot, whichever comes first. In response to this comment, we are opting to bring back the variable minimum consecutive passing plots so that smaller projects will not be held to the six plot minimum. We did not intend to increase the sampling burden for smaller projects, and this was an error in our previous analysis of existing sequential sampling data. As with V4.0, the first plot that passes after the 12th measured plot will also satisfy the exercise, if that condition is achieved first.

19. **COMMENT:** We appreciate the spirit of previous changes to the sequential sampling test specifying that stopping rules are met when the first plot passes after a minimum of

12 plots are sampled per stratum (for a stratified inventory) or when the first plot passes after a minimum of 30 plots are sampled (for a non-stratified inventory). This is instead of requiring six or more passing plots in a row after the minimum number have been sampled and is therefore more consistent with the statistical references on sequential sampling, which do not require a minimum number of passing plots in a row after a single plot meeting the specified tests has "passed". However, we recommend that the minimum number of sample plots be further reviewed to ensure that there isn't an undue burden of proof that results in significant additional cost without additional benefit. The current version of the Protocol already requires additional sequential sampling tests for tree diameter and tree height in addition to CO2e/acre. We recommend that the Reserve consider a lower minimum number of sample plots to verify the accuracy of the inventory, which would result in significantly lower cost to landowners. **(New Forests)**

RESPONSE: Noted. Please see response to comment #18 above.

To further clarify, the passing of sequential sampling after a minimum of 12 or 30 plots are sampled is not instead of requiring six or more passing plots in a row, but is instead an alternative stopping rule. The protocol specifies both, and sampling may cease when the first of these conditions has been met. Additionally, the tests for tree diameter and height do not represent additional tests. Verifiers already measure tree diameter and height as part of the usual sequential sampling exercise. The tests for tree diameter and height allow for verifiers to *stop* measuring these two data before the overall CO_2e/acre sequential sampling test is passed. Once the verification effort reaches the stopping rules for height and diameter, the verifiers can focus their time on checking defect and in/out trees and will simply use the project developer's height and diameter measurements, running these through the appropriate biomass equations for the remaining plots. We have incorporated the height and diameter tests into our sequential sampling workbook to ensure that processing the data does not represent an additional burden on the verification team. We believe this change should reduce overall verifier time in the field. The separate height and diameter tests are also optional – the project does not pass sequential sampling until the overall CO_2e/acre test is passed. We appreciate this comment, as it has made it clear that we did not adequately explain this process in the current version of the protocol. We have incorporated language into the protocol to clarify the application of this policy.

Assessment Area Data File

20. **COMMENT:** The inclusion of the standing dead and standing live carbon stocks in the Common Practice statistic (Section 6.1.2) is useful as an apples-to-apples comparison once a project has been developed. However, because standing dead trees are not generally inventoried to the precision required – height, diameter, species, and decay class – in timber inventories typically available at the project evaluation stage, we are concerned that the requirement will hamper project evaluation and development. When the initial stocks are below the common practice statistics, a High Stocking Reference value, 80% of the highest value for aboveground standing live and standing dead carbon stocks per acre within a decade of the start date must be calculated. It is difficult to imagine that many forest inventories will have forest inventory data that include standing dead trees, let along [sic] inventories that have collected appropriate decay classifications per tree. We suggest that the Assessment Area Data file provide separate standing live and standing dead values in the Assessment Area Data file for reference, similar to the Basal Area Reference values. **(The Conservation Fund)**

RESPONSE: Thank you for your comment on this change made to the previous version of the Forest Project Protocol. We will consider adding the additional column to the Assessment Area Data File.

Standardized Inventory Methodology (SIM)

21. **COMMENT:** A pre-verified SIM that is publicly available reduces both inventory design and verification costs. One area where the SIM could be improved pertains to plot type. Currently, the SIM requires fixed radius plots. Allowing variable radius plots would increase inventory flexibility and reduce per plot costs while maintaining sampling integrity. **(The Climate Trust)**

    RESPONSE: We thank you for your comment and support of the SIM. At this time, we have chosen not to incorporate variable radius plots into the SIM, because we have observed projects using variable radius plots encountering challenges with this inventory design during verification. The observed effect has been an initial cost saving during plot installation, that later becomes an added cost during the inventory update process. However, we may consider this for a future update to the SIM if there is a lot of demand for this change.

Climate Action Reserve Inventory Tool (CARIT)

22. **COMMENT:** Similar to the SIM, this tool certainly reduces development and verification costs but would benefit from the flexibility of accepting data from more cost-effective variable radius plots. **(The Climate Trust)**

    RESPONSE: We thank you for your comment and support of CARIT. At this time, we have chosen not to incorporate variable radius plots into CARIT, because we have observed projects using variable radius plots encountering challenges with this inventory design during verification. The observed effect has been an initial cost saving during plot installation, that later becomes an added cost during the inventory update process. However, we may consider this for a future update to CARIT if there is a lot of demand for this change.