

#	Section	Reviewer #1: 1 st Round Reviewer Comment	Author Response	2 nd Round Reviewer Response	Author Response	3 rd Round Reviewer Response
11	1.1	<p>General Concerns: Title: the title is a bit problematic. Whether it means to or not, it sounds like the authors are implying that a shift from infrequent high severity fire to frequent low severity fire will result in less pyrogenic emissions, when in fact the opposite much more likely. It's important to remember that the most plausible way by which more frequent forest burning leads to greater carbon storage is by preventing fire-induced shifts to an alternate lower-biomass steady state (i.e. forest to shrubland). A better, and more appropriate title would be: "Southwestern Forest Restoration: a protection from permanent forest loss due to high-severity wildfire and drought"</p> <p>The phrase "...calculates emissions reductions..." and "...calculates avoided CO2 emissions..." seems to leave no room for the real possibility that the proposed restoration, would, over time result in greater emissions</p>	<p>We have altered the text to match Reviewer 1's suggestions. We do account for carbon removed in restoration/fuels treatments within the project scenario, and the potential (not 100%) that forests burn and potentially succeed into alternate low-carbon ecosystems in the baseline scenario. The difference (subtraction) between these two occurs in section G, CALCULATION OF EMISSIONS REDUCTION TONS.</p> <p>We agree with your title revision and feel that your text better captures the heart of the carbon benefits derived from this methodology. We further concur that CO2 emissions from wildfires should not be the focus of this methodology, and have altered the framework within this section and throughout to better focus on avoided mortality due to climatic stress and re-direction to low-carbon ecosystems. We greatly appreciate your focus on the key point of this type of project and have added your suggested text.</p> <p>ACR: Please add to this response (or in the methodology if appropriate) a few sentences stating exactly how/when/why pyrogenic emissions are captured or excluded and how the need for conservatism is addressed. Note de</p>			

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		<p>and lower storage compared to a BAU baseline. For this methodology to be credible is should at least acknowledge uncertainty not just in the magnitude of change, but the directionality.</p> <p>I like the terminology “transition of high-to-low carbon dense ecosystems” and think this would be a great opportunity to clarify that what is really being proposed is the deliberate transition from artificially-high carbon dense ecosystems into sustainably-medium carbon dense ecosystems, so as to avoid new-low carbon dense ecosystems.</p> <p>The paragraph on leakage is a good point but could be strengthen, after all, it’s not that leakage is “not expected” it is, in fact, expected to be negative (per market supply and demand)</p> <p><u>And from Rev 7:</u> I support this reviewer’s second to last comment about terminology, and would add:</p> <p>To calculate the carbon credit, the carbon in biomass removed to reduce carbon</p>	<p>minimis sources/sinks are considered on a cumulative basis.</p> <p>ACR: Please add in this section limited to ponderosa pine dominated; please clarify term “natural disturbance fire regime” as this term is relative; in paragraph 3, please delete term “medium carbon storage forest” as this term does not have a quantitative definition; in paragraph 3, please replace “continued” with “long-term”; paragraph 7 delete sentence 2.</p>			

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		density to a lower fire risk level must be subtracted from the carbon that would be lost in moving from the high carbon density to a non-forest condition. Unfortunately, this assumes a 100% probability that the treated area would burn during the crediting period, and that transition to nonforest would be permanent.				
12	1.3	<p>3.B.iii: think about removing this one, as this describes the stem distribution of many “healthy” forests around the world including some fire-prone conifer forests of SW USA</p> <p>9: I’m not sure what this means. Consider clarifying.</p> <p>12: Here in lies the problem. No matter how well one parametrizes the models, one will never know if shrub-land conversion went avoided, until one can point to such events occurring regularly in untreated stands after the crediting period. Is there any mechanism to pay back the “proponents” if the credits they purchased turned out, years later to be debits?</p>	<p>Regarding 12: Please See Section 2.5, Comment 21 regarding the same issue.</p> <p>9: Text was simplified</p> <p>3Biii We understand your concern, text removed</p> <p>ACR: see response to 21 and 52 regarding ACR Buffer Pool Terms and Conditions.</p>			
13		Sounds expensive	Thank you for the comments. While the costs of the project are outside the scope			

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		<p>“Project proponents are required to monitor...” I hope these carbon credits sell for a lot, since it will cost a bundle to measure each of the pools in Table A3.1.</p> <p>And Rev. 7: If the project area is large enough, the monitoring cost per unit of C credit is manageable. But still a major consideration if the size of the credit per unit area is small as is probably the case in these forests.</p>	<p>of the methodology, we have designed the methodology to be applied to landscape scale which should help lower costs on a per C credit basis.</p> <p>ACR: Pending data availability. Authors to provide a test project showing likely volumes, timing and project developer costs.</p>			
14	1.5	See attached	See attached			
15	2.1	<p>Suggestions 1st paragraph following 5-pionts: it would be nice to have “stocking” quantified in this sentence.</p> <p>“must assess community and environmental impacts” ex-post? Who is going to pay for that?</p> <p>Demonstrating an “[E]levated risk of high severity fire” is squishy and difficult. There are temporal frequency and grain-size issues what would allow someone to prevent any project based on it failing to meet this criterion. Probably safer to use a narrower definition of fuel structure and crowning index.</p>	<p>Community and environmental impacts are assessed are central requirements of the NEPA process. NEPA process is typically paid for by the Federal agency that is planning the treatments.</p>			

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16	2.2	Wording “ecologically functional fire regime” find a better phrase. All fire regimes function. Its ok to advocate for one regime over another, but don’t distinguish one’s preferred regime as being functional.	Updated wording to read “frequent, low-severity wildfire regimes”.			
17	2.4	food for thought Regarding additionality. I understand why proof of additionality is being evoked here (i.e. if the restoration was going to occur anyway for social and ecological reasons, then one could not attribute gains, or losses, of carbon to the crediting procedure). However, this requirement is hypocritical with respect to many other efforts to manage carbon through energy offsets. For instance, to most effectively credit carbon offsets to energy produced from forest biomass, one must first make the case that the biomass is an inevitable byproduct of forest management that would have occurred regardless (not as argued in this methodology). In the methodology proposed here, baselines begin before treatment (insuring additionality can be attributed to treatment); in renewable energy accounting	Thank you for the perspectives on additionality. We agree, this methodology is motivated by the need to generate and sell offsets in order to perform restoration, rather than the other way around. We leave open the possibility that a renewable energy biomass module could be developed to capture the carbon savings generated as a byproduct of forest restoration. This would require a different kind of proof of additionality and generate a conceptually different kind of credit. It seems that both types of credits could be generated from the same project (restoration and biomass/renewable energy). The biomass utilization module has not been developed with this methodology because the biomass utilization infrastructure in the Southwestern U.S. does not exist at sufficient scale that would justify the additional work. The publication of this methodology should establish the foundation for the biomass module.			

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		<p>schemes, baselines begin after treatment (insuring additionality can be attributed to the byproduct of treatment). Both approaches are reasonable but we can't have it both ways, and it strikes me that the latter is more favorable than the former. Why? From the perspective of the carbon trader, I would prefer to know that my carbon was a "free" byproduct of an independently-desirable action (i.e. restoration) such that any of it I managed to protect in the form product storage, burial, or fossil energy offset went in my plus-column without having to subtract the portion of my byproduct that inevitably decayed or combusted in the process, or the reduction in forest biomass that the restoration resulted in. Moreover, from the perspective of the conservationist, I would not want healthy, resilient forests to be contractually-tied to their ability to hold more carbon over time than fire suppressed ones, which they very well may not. This a rant you can take or leave, I appreciate that this methodology is built around</p>				

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		restoration being dependent on the credits, and you can't very well turn back from that at this point.				
18	2.4.1	See general comments for section 2.2	We will address this comment in section 2.2			
19	2.4.2	See general comments for section 2.2	Comment addressed in section 2.2			
20	2.4.3	See general comments for section 2.2	comment addressed in section 2.2			
21	2.5	<p>OK... here is the funny thing about describing the potential carbon benefits of removing trees using the same language more often used to describe the carbon benefits of not removing trees: Concerns regarding permanence (and for that matter additionality and verification) lie not so much events that could later rob carbon from your projects, but the lack of such events you insist will befall the untreated areas.</p> <p>Betting on restoration (as this methodology proposes) is really a carbon short-sell, which depends just as much (if not more) on the failure of untreated forests to hang on to their carbon, than it does the success of treated forests to hang on to theirs. After all, if the untreated stands continue to escape fire and grow as they have up to now,</p>	<p>This methodology relies on the same counterfactual logic employed in REDD methodologies where credits are generate if emissions in the project scenario are reduced below what would have occurred in the baseline (absence of the project). REDD projects use the best available information to estimate current and projected rates of deforestation and forest degradation to establish the baseline. Projects are then implemented to reduce those rates of deforestation or degradation and can be financially rewarded relative to the extent of their achieved emissions reductions measured against a realistic future baseline.</p> <p>In the case of this methodology we create a baseline for expected forest conversion due to unintended high-severity fire, a type of unplanned deforestation/degradation. If project restoration activities, such as thinning and prescribed burning, can reduce the number of acres converted by high-severity fire to alternate ecosystems then carbon credits can be generated to pay for restoration.</p>			

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		<p>they will always have more carbon than those subject to thinning.</p> <p>For this reason, further discussion of reversals (2.5.1-3) should spend as much time considering the contingency of untreated stands not burning (or successfully and promptly regenerating after fire) as it does considering the contingency of carbon loss in the project area.</p>	<p>The baseline is set at the initiation of project and is used for the entirety of the crediting period. Baselines are calculated with best available science, 3rd party verified, and are designed to be conservative. Baseline model projections must be updated at the beginning of each crediting period with most current wildfire severity data, tree mortality data and regional forest health trends to ensure that baselines are realistic. Due to climatic changes we expect the risk of high-severity fires and subsequent ecosystem shift to increase over time. In the event that empirical evidence of fires and forest succession trends suggest fewer acres are being converted due to fire, the baseline can be recalculated at the initiation of a new crediting period.</p> <p>ACR:</p> <ul style="list-style-type: none"> (1) Please change text “biomass upon which ERTs have been issued” to “carbon stocks representing sequestered CO₂-e for which offset credits were previously issued”. (2) Please remove language that departure from NEPA plan is a reversal. This does not constitute a reversal; potentially non-compliance. (3) Third paragraph in 2.5.1 must specify both types of reversal, intentional and unintentional. (4) Prescribed burns and fuels treatments must be defined as intentional reversals once ERTs have been issued. 			

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			(5) Please reference the specific language in the ACR Buffer Pool Terms and Conditions regarding Early Project Termination due to a Reversal. "Sequestration projects will terminate automatically if a Reversal, Intentional or Unintentional, causes project stocks to decrease below baseline levels prior to the end of the Minimum Project Term. In cases where this decrease is caused by intentional reductions to stocks (e.g., forest conversion or over-harvesting), which is considered an Intentional Reversal, the Project Proponent shall compensate for all issued offsets to that project following the process in (c) above". Please remove any language contrary to these terms.			
22	2.5.2	See comments on Section 2.5	Comment addressed in section 2.5 ACR: Please see edits in Collaborase 2.5.2.			
23	2.5.3	See comments on Section 2.5	Comment addressed in section 2.5			
24	3.1	Not enough info Given the entire premise of this project rests on assumptions regarding how untreated forests are likely to behave in the future, the reader really needs to know exactly how this will be modeled (including parameters defining burn probability, severity	Thank you for bringing this to our attention. Appendix H has been revised and the methods revamped, as well as integrated into the main methodology. Regarding model assumptions, we have revised the methodology to make clear that we utilize USDA Forest Service parameters and model output used to evaluate and justify restoration prescriptions.			

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		<p>distributions, combustion factors, regeneration delay factors, and factors defining the likelihood of permanent forest conversion). All of these factors need to be defensible, or you will get an un-defensible answer. I was pleased to see that vague reference to “a large repository relevant material” in the first version of this document was replaced with an Appendix (H), however this Appendix H offers little more.</p> <p>It might be worth assuring people in this section that these models are being used only to forecast baselines at the beginning of a project, and that the real carbon consequences of the management action will eventually be assessed empirically against some sort of control plots (or better yet control landscape). This is the case right? Certainly you are not evaluating the carbon in present managed landscapes forever against some modeled hypothetical baseline.</p> <p>Also regarding Appendix H: You can’t simply take the mean parameter value among mutable sources. The average</p>	<p>We do have methods to evaluate changes in burn severity outside of the project through MTBS data, and the baseline is revised upon every crediting period to reflect changes. ERTs are continually re-examined to ensure that we aren't crediting based off of an initial run for 100 years.</p>			

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		of a bad value and a good value is a bad value.				
25	3.2	Information This section works.	No resolution needed.			
26	3.3.1	so far so good	No resolution needed			
27		<p>time lines and modeled uncertainty</p> <p>who is the “verifier”?</p> <p>Regarding baseline in general: at the 20-yr measurement intervals, are the prior baseline projections (modeled according sections 3.3 and Appendix H) reset to match observed conditions of untreated/unburned and untreated/burned sites? After all, if the projections were wrong, there needs to be a mechanism by which to fess up to the mistake. By this I don’t necessarily mean a paired plot, but rather the same probabilistic landscape model, re-run from time zero, but reparametrized with observed values for regeneration delay and conversion likelihood.</p> <p>Bullet 2, sub-bullet 2 and 3: It all comes down to this. And given the uncertainty in these parameters, one should establish a range, and base model output on this range. I’m not entirely sure how</p>	<p>The verifier is a third party who verifies ERT calculations.</p> <p>Yes, at the next crediting period the baseline is re-run and compared with MTBS data, regeneration delay and conversion likelihood for correction (see section 3.4 below). Are you suggesting a back-cast and an integration in difference between modeled and observed 'baseline'?</p> <p>We agree that this is the hinge upon which carbon benefits are realized. We have expanded the section to explicitly cover how to assess the probability of these two items, which was previously in the appendix.</p>			

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		RANSEED and FVSPi handle stochastic variation, but I'm inclined to think these tools take into account only the event probabilities distributed over time (fire starts) and space (establishment probabilities), not the actual uncertainty in our ability to estimate establishment probabilities and conversion probabilities.				
28	3.3.1.2	There is a lot packed in this section, but it is all fairly defensible and documentable	No resolution needed			
29	3.3.1.3	Be careful I guess the bullets under "Models must be:" covers you, but be careful as abuse and exaggeration of PE is common and could easily find its way into the models.	Thank you for this warning, given that we require PDs to model in concert with the USFS or similar we think this will avoid exaggeration. If you have some specific recommendations we are open to them.			
30	3.3.2	Sure, why not.	No resolution needed			
31	3.4	20 years probably not long enough I notice that defining the crediting period as 20 years has been removed from this latest version of the methodology. If this was deliberate, I approve; if not, consider these earlier thoughts of mine regarding a 20-year crediting period: Even if this whole plan works to save carbon, it's not going to happen until well after 20 years. Think about it: even if	Thank you for the recommendation. We have revised the methodology by setting the minimum crediting period at 20 years, accommodating projects that may generate net positive carbon offsets in less than 20 years. We also maintain flexibility for crediting periods to be longer than 20 years by allowing crediting project developers to set longer crediting periods, as some project may take longer to generate net positive carbon offsets. ACR: See response to 88.			

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		<p>the project-wide burn probability is as high as 0.5% per year (2/3rds of which burn at high severity, only half of which ever grow back to forest), 20 years of this baseline will remove less carbon from the project area than would the prescribed removal of 25% basal area and the elimination of all high-severity fire (numbers exceedingly generous to your argument, by the way). Sure, restored forests could re-grow the lion's share of the carbon removed in thinning within a couple of decades, however these facts remain: 1) some significant portion of post-thinning regrowth will take the form of understory and small trees, which will have to be regularly burned-off to maintain the desired forest structure, 2) un-thinned "base line" forests, the overwhelming majority of which never see a fire in the next 20 years, will also grow over this period; probably by the same amount, 3) for claims of additionality to be legitimate, the carbon contained in the treated forests at the end of the crediting period must not only be higher than the baseline condition at that</p>	<p>We have update section 7.1 to address concerns about maintaining credits enough credits for long enough to compensate for the period when net offsets were negative.</p> <p>ACR: See response to 21 and 52 and ACR Buffer Pool Terms and Conditions.</p> <p>The point you make in the second to last paragraph is unclear to us. Improved Forest Management and REDD methodologies both use renewable crediting periods, where credits continue to accrue when a new crediting period is initiated. We would expect similar outcomes under this methodology.</p> <p>A figure demonstrating the time frames of crediting periods and carbon accounting will be provided in a forthcoming case study. The development of such a figure is outside the scope of this methodology.</p> <p>ACR: Pending data availability. Authors to provide a test project showing likely volumes, timing and project developer costs.</p>			

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		<p>same point in time, but higher enough for long enough, to compensate for the initial period over which the baseline condition contained more carbon.</p> <p>If the credits are valued to reflect the long-term benefits (i.e. >100 years) that's OK (over this period, benefits of avoided forest conversion could well accumulate) but no credit could ever be issued again for simply continuing the promise beyond year 20, AND any future efforts to suppress fire within the project area would have to first buy back the credits, since fire suppression would function to reverse the effects of the restoration for which credits have already been issued, even though such actions would ironically result in short-term carbon accumulation.</p> <p>In short, the plan to save carbon by removing it is not as straightforward as other plans to save carbon through forest management. As such there needs to be more clarity in this document regarding the time-frames over which carbon will</p>				

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		actually be assessed. How about figure?				
32	3.5	General comment Easier said than done, but good-on-ya for articulating a plan.	No resolution needed			
33	3.5.1	<p>Are these the uncertainties we should be most concerned with?</p> <p>Weighted by size?: this concerns me since if uncertainty propagation is done correctly, such weighting is the natural result of the calculations, no extra consideration needed. Perhaps this confusion is just a matter of wording.</p> <p>Regarding the uncertainty in fire probability and interaction with weather: the 10,000 iterations proposed earlier should handle all this seamlessly. Why are you proposing to manually model fires at alternate times. This concerns me. Uncertainty in baseline is the most important part of this whole methodology, and it reads to me like you are just grasping at straws, rather than articulating an integrated approach that, through model iteration propagates BOTH the stochasticity of fire, weather, and regeneration,</p>	<p>General: A large portion of this text was from a previous iteration with a separate group of developers and no longer reflects the components and goals of this specific methodology. We currently are consulting ACR regarding their Forest Carbon Standard, as we are interested in using a monte carlo distribution of uncertainty to improve these sections.</p> <p>Re size: You are correct, if uncertainty propagation is completed correctly this would already be integrated. Text has been deleted.</p> <p>Re: wildfire timing, this was old text and no longer applies, text has been altered.</p> <p>Re: regeneration. A new section regarding regeneration has been added and will be included in the next iteration of this methodology.</p> <p>We agree that quantifying the risk of forest conversion is absolutely front and center and are working to make this a more central tenant of the methodology. Thank you for bringing this to our attention.</p>			

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		<p>AND uncertainly in our ability to estimate it.</p> <p>Missing from this section is any mention of the uncertainty and stochasticity of regeneration. Remember, this is the most important part of your argument. Restored forests are likely to be healthier by several ecological and social metrics than current fire-suppressed ones, but they are not certain to contain more carbon unless they effectively avoid fire-catalyzed conversion to non-forest. Quantifying this risk, and its uncertainty should be front-and-center in this document (especially throughout section 3).</p>	<p>ACR: Please specify locations of latest edits addressing the above.</p>			
34	4.1	<p>Confused I don't really understand what this section is about exactly. What does this text mean: "...must present in the GHG Plan an ex-ante stratification..."</p>	<p>They must show how they stratified the analysis area</p>			
35	4.2	<p>Expensive Good plan. I do hope these efforts are explicitly budgeted for.</p>	<p>Thank you for your concern regarding cost, we anticipate that by working at landscape scales these costs can be distributed across a large number of credits.</p> <p>ACR: Pending data availability. Authors to provide a test project showing likely volumes, timing and project developer costs.</p>			

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36		Why would you use climateFVS to measure standing carbon stocks in sample plots? You don't need a dynamic growth model to convert field measurements into c-stocks per unit area. Do you mean that you would simply use the allometric and stem sample scaling tools built into FVS to compute standing stocks? That would be fine.	Yes, the allometric and stem tools from FVS would be used, we are simply requiring climate fvs elsewhere to account for climate induced changes in growth and mortality.			
37	4.3.1.1	Recent edits (seven steps down to five) are an improvement.	no resolution required			
38	4.3.1.2	Why exclude belowground dead wood (it seems like you were considering it in an earlier version)? For what it is worth, I would include it as a fixed fraction of bole mass. That imposes no more error than excluding it, but makes the calculations more complete.	Below ground dead woods is now included			
39	4.3.1.2.1	Less detail about field measurements more about baseline modeling For what is worth, all this detail is not that necessary. Measuring live and dead forest biomass is not rocket science. One could easily refer to any number of published mythologies and equations. By comparison, accurately predicting how	Thank you for this recommendation. We have moved a large part of this material to the appendix and/or are just having it output from FVS. We have added additional sections on forest conversion, etc. We hope that this shifts the methodology focus effectively and are open to additional structure comments. ACR: Please provide citation as decomposition classes differ from Harmon/Domke. Last sentence references 7 steps vs. 5.			

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		often and to what condition forests might transition to when exposed to wildfire and future climate is rocket science, and simply saying that this will be performed using ClimateFVS or other FLS parametrized with Farsite and some down-scaled GCM data does not even come close to insuring it will be done right. So basically the methodology needs include more detail on how forest dynamics will be simulated and less on how carbon will be measured on the ground.				
40	4.3.1.2.2	See comment for section 4.3.1.2.1	comment addressed in section 4.3.1.2.1			
41	4.3.2	See comment for section 4.3.1.2.1	comment addressed in section 4.3.1.2.1			
42	4.3.4	More detail needed, or else simply leave out It is said that to determine the amount of harvested carbon that may persist in wood products for greater than 100 years, one must report the fraction of removed wood that ends up in seven different product categories. It might be worth noting the estimated fraction retained after 100 years for each category, so that any reader can better appreciate how small this number actually is.	This is pulled from the ARB forest carbon protocol and users are directed to the full methods in the last sentence of this section.			

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		By the way, I approve of wood product calculations being optional. This scheme is complicated and uncertain enough as it is. Staying clear of wood products and potential energy offsets is a good idea. See also my rant in section 2.2.				
43	4.4.1	<p>Too much is left to guess</p> <p>Sounds good, but I don't recall scale parameters being "laid out" anywhere (certainly not that I can find in sections 3.3.1.2 or 3.3.1.3). I would like to know what they are. Particularly, the fraction and absolute amount of carbon combusted in wildfire (by severity class) and prescribed fire. Given the history of abuse of these numbers, it would be nice to know that one is using reasonable values.</p> <p>Regarding Equation 4.4: What exactly is a "project developer derived constant"?</p>	This section has been altered such that these parameters no longer exist. Prescribed burn emissions are modeled in the same fashion as all other emissions, simply based on real shapefiles.			
44	4.5.1	<p>Shadow effect</p> <p>This shadow effect is real, and somewhat calculable. However, the consequence of this phenomena for these projects is slippery. First off, it seems clear from earlier text,</p>	Treatment shadow effect has been removed			

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		<p>that impacts of treatment on adjacent lands outside the project area do not count as creditable (after all, adjacent lands may become projects themselves). Secondly, the explicit purpose of treating a project area is to encourage frequent fire on all sites (i.e. once restored, shadow is a detriment not an advantage). Finally, if you are trying to link structural restoration to carbon storage, one best not remind folks of the shadow effect since a dense network of strategic fire breaks combined with effective suppression is likely the highest carbon option, now and in the future, but at the expense of natural structure and function.</p>				
45	4.5.2	<p>This equation solves for stocks not emissions, a re-occurring problem in this document</p> <p>Is inclusion of the wood products pool optional or not?</p> <p>Regarding Equation 4.6: Why is this equation titled carbon emissions reduction, when it seems to be calculating carbon stocks at time t? That's not a reduction, it's just an amount? To calculate</p>	<p>Thank you for pointing this out. We agree that the focus of this project should be in terrestrial carbon storage, not emissions reductions. Please see additional comments in section 1.5. We have simplified this section to solely calculate carbon stocks in the project scenario, and have moved emissions (such as fire and thinning treatments) to the net project carbon in section 5.1 below.</p>			

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		emissions reduction, one would have to do so relative to a baseline scenario. Moreover, why would you even calculate an “emissions reduction” when the directionality of changes in emissions in no way reflect directionality of changes in stocks. I think this whole section is unnecessary clouds your basic narrative that over time a treated landscape under a future climate will hold more carbon than an untreated one. See also my first comment on section 1.5.				
46	4.6	Leakage will be negative not minimal. Flooding the market with wood that nobody would pay to harvest without subsidies cannot increase harvest in other areas, it can only slow it down (negative leakage)	Text has been revised to acknowledge negative leakage. ACR: Consider removing the word “Likely” instead.			
47	4.7	negative leakage See comment for section 4.6	See response above in section 4.6			
48	4.8	A better approach I like this much more than the earlier attempts to calculate uncertainty. Given that this project is hugely burdened by uncertainty in the modeled baselines, not its ability to	No resolution required			

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		monitor carbon in treated landscapes.				
49	4.8.1	<p>not a fan of E 4.7 but it could work</p> <p>You don't really know the uncertainty in the components, but if you did this equation would sort of work. Problem: 1) sample variation is not uncertainty, 2) this equation does not account for covariance, of which there is a lot, 3) most of the real uncertainty, stemming from allometry applies equally to the treatment and baseline scenarios so has NO effect on the final delta calculation—the only one that counts. But given what you got, I guess this is OK.</p>	<p>We agree with your comments are open to altering this method and equation 6.1 below (see comment there). We will defer to ACR regarding the forest carbon standard and anticipate feedback following the review of this round of comments.</p> <p>ACR: Please see 51.</p>			
50	5.1	<p>Confused</p> <p>I don't really understand what the point of this section is. It was already stated that carbon content of the project area would be evaluate before restoration activities (right?) and every 5 years afterward for 20 years along with estimates of uncertainty (for what it's worth). So, what is the point of this activity? Simply not clear.</p>	<p>We apologize for the lack of clarity. Your stated timeline is correct We have removed this content as it was redundant, and moved the emissions from the project into this section to make the net-calculation clearer.</p>			

#	Section	Reviewer #1: 1 st Round Reviewer Comment	Author Response	2 nd Round Reviewer Response	Author Response	3 rd Round Reviewer Response
51	6.3	<p>There are better ways</p> <p>A few things come to mind here. This equation only works if one assumes symmetry and independence in the uncertainty distributions of UNC_sub_BSL and UNC_sub_WP, which is highly unlikely. Why not just use some sort of Monte Carlo approach. I understand that it would be harder to describe in a single equation, but provided you are already performing model iterations to arrive upon baseline stocks (and their uncertainty) why not just pump out the full distribution of differences between the simulated baseline carbon stocks and ground-verified project carbon stocks. This would be simpler and more robust than what is proposed here.</p> <p>By the way, what exactly are you going to do if the lower 90% confidence interval of carbon stocks in the treated landscape overlaps with the upper 90% confidence interval of carbon stocks in the untreated landscape?</p>	<p>We agree with this that this method treats uncertainty between the two scenarios as equal, when they in fact are likely different. We are open to using distributions from both scenarios in place of this equation and equation 4.7. This equation is however a part of the ACR forest carbon standard, so we will defer to ACR before altering it.</p> <p>ACR: If proposed uncertainty approach is that currently used in the IFM methodology and can be shown to result in a conservative estimate of ERTs, then this is OK. If an alternate approach is proposed, please provide a description (or link to USFS description) of how the models were validated and the associated uncertainty in outputs at various scales determined. For carbon credits, the lower bound of the uncertainty estimate for ERTs accounting for all parameters and structural uncertainty of the model must be used to be fungible with other emissions/offsets. If there is no difference between the conservative estimates of BL and Project scenarios then no credits can be issued.</p> <p>ACR: note de-minimis is considered on a cumulative basis</p>			
52	7.1	<p>Figure 7.1 is an exceptionally poor Figure but could be great.</p>	<p>We have altered the calculations to reflect net ERTs in place of linearizing a trend. We completely agree that linearizing trends detracts from the multitude of</p>			

#	Section	Reviewer #1: 1 st Round Reviewer Comment	Author Response	2 nd Round Reviewer Response	Author Response	3 rd Round Reviewer Response
		<p>Why on god's earth would you linearize the trend! Sure, I understand why valuing a 20-year project based on the delta at any single point in time would be inappropriate, but given that project scenario carbon is evaluated every 5 years and the baseline scenario is modeled continuously, there is no reason not to base credits on the cumulative difference between them. Linearizing what is in fact a non-linear trend is both silly and entirely unnecessary. You have the data that describes the real dynamic differences between treatment and no-treatment with uncertainty, use it for crying out loud! If all you do is draw straight lines through the data, then don't bother doing half the complicated stuff you proposed to in earlier sections.</p> <p>Figure 7.1 is an exceptionally poor Figure. Notwithstanding its lack of units, lack of key, and apparent half-hearted commitment to linearization (what's up with that inflection point; is this supposed to reflect a reversal?), it is a missed opportunity to encapsulate the entirety of this methodology and add</p>	<p>ways in which we attempt to capture inter-annual variation in carbon stocks.</p> <p>The figure currently in the methodology is not the final figure(s) sent to ACR for the methodology, they can be found here:</p> <p>https://docs.google.com/drawings/d/1fZC4c3Cfyuwztbm6OmBR1a6Wsmkz2CGEDtwvsG4xnUQ/edit</p> <p>https://docs.google.com/drawings/d/12fnDbFu0r0IS1Ud9TT2BsMteWckej6cur4ucfkCE_Ks/edit</p> <p>but given that we have now moved to net-ERT issuance, we plan to revamp figures throughout. We appreciate your figure ideas and plan on integrating the next iteration of the methodology. We especially like the idea of a figure illustrating the range of possible outcomes, thank you for this suggestion.</p> <p>DISREGARD – Figures removed</p> <p>ACR: Please update the second paragraph in Section 7.1 to reflect the ACR definition of Reversal: Negative project stock change ($C_{ACR,t}$) before the first offset credit issuance is a negative balance of greenhouse gas emissions ($C_{NEG,t}$). After the first offset issuance, negative project stock change is a reversal. The full magnitude of inter-annual variability must be captured and reversals assessed through annual monitoring following first ERT issuance.</p>			

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		<p>continuity to what is now a disjoint narrative. This figure could, and should, be carefully redrawn to illustrate a range of possible outcomes for the treated and untreated landscapes along with a line showing the running difference in carbon stocks between them (after all, this difference is the dependent variable that you are putting up for sale- show it in the context of the dynamic you are proposing to measure! And show it well!). A well-drawn figure of this form should appear at the beginning of this document illustrating an idealized outcome and some less ideal ones. It should then re-appear in slightly different forms throughout the document sequentially illustrating, uncertainty in baseline prediction, uncertainty in project assessment, additionality, and reversals. Each and every one of these ideas, is easily illustrated on a figure like this one.</p>	<p>AFOLU reversals must be reported and compensated following requirements detailed in the Reversal Risk Mitigation Agreement and the Buffer Pool Terms and Conditions, Exhibit 1 of the ACR Standard v.5. As outlined in Exhibit 1, sequestration projects will terminate automatically if a Reversal causes project stocks to decrease below baseline levels prior to the end of the Minimum Project Term.</p> <p>As a side note, ACR methodology <i>Improved Forest Management Methodology for Quantifying for GHG Removals and Emissions Reductions through Increased Forest Carbon Sequestration on Non-Federal Forestlands v1.2</i> will also reflect the ACR characterization of Reversals as emissions into the atmosphere of stored or sequestered CO₂-e for which offset credits were issued.</p>			
53	Gen	See attached	See attached			

#	Section	Reviewer #3: 1 st Round Reviewer Comment	Author Response	2 nd Round Reviewer Response	Author Response	3 rd Round Reviewer Response
54	4.3.1.2.1	Where is Table D.1?	Text removed			
55	3.3.1.1	See attached	See attached			
56	1.1	clarify why standard is cited	Text has been corrected.			
57	1.1	<p>What is the rationale for not including private lands in this protocol, especially given that fire crosses land ownership boundaries and doing so could reduce fire threats on adjacent public and tribal land?</p> <p>And Rev. 7 technically, tribal lands are considered private, so some but not all private lands are already included. This make the exclusion of private lands even odder.</p>	<p>The issue is that lands would have to be included in the same NEPA analysis. We have modified the conditions to reflect that private lands could be included if they were included in a NEPA analysis and/or treatments were planned and implemented by federal or tribal land managers.</p> <p>ACR: It is unlikely that adjacent public and private lands will have identical baseline scenarios in terms of fire probability, additionality and eligibility. If private lands are to be included they must: have same baseline as public (or weight different probabilities by fireshed); be under USFS administration; be included in the NEPA document; have clear documentation of GHG ownership; and use ACR's aggregated project approach. The methodology needs to be consistent throughout for inclusion of public lands and how they are to be treated (it currently is not). ACR is not aware of any forest carbon projects to date that have aggregated public and private lands.</p>			
58	1.2	<p>Definition of forests</p> <p>The term stocked is too general. For consistency with text later in the protocol use the following definition for Forests, forestland:</p>	Text has been corrected			

#	Section	Reviewer #3: 1 st Round Reviewer Comment	Author Response	2 nd Round Reviewer Response	Author Response	3 rd Round Reviewer Response
		Forestland is defined as land with at least 10 percent tree canopy cover, and not currently developed for non-forest uses.				
59	1.2	<p>Tree definition Keep significant figures of breast height consistent: A perennial woody plant with a diameter at breast height (1.37 m) > 5 cm and a height of greater than 1.37 m.</p> <p>Update definition so that shrubs with the above dimensions are not included in this protocol's definition of trees unless that is intentional, and if so, state that this definition includes both.</p>	Definition updated with USFS definition			
60	1.2	<p>Add small diameter tree definition Small diameter trees are referred to multiple times. Define in quantitative terms what it meant by small diameter trees and provide a rationale for the definition.</p>	Definition now included			
61	2.1	<p>timber rights timber rights</p>	In our view the project proponent would not need to hold timber rights. These projects would be developed in order to generate enough revenue to make the sale of timber rights from the USFS (or other landowner) financially viable and attractive to a potential buyer. The party that buys timber rights and cuts trees may or may not be the same party acting as the project proponent.			

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62	1.3	Arizona and New Mexico Wording change: "Project activities are implemented on public and tribal forestlands within Arizona and New Mexico". The location should not be defined by the land divisions of one type of public agency (e.g., Region 3 Forest Service) since this protocol applies to tribes and other public agencies.	We agree, the definition has been updated to include all Southwestern ponderosa pine forestlands. ACR: See 57.			
63	1.3	Re: 3a and 3b 3: Scope section 1.1 specifies that "While this methodology was specifically designed to address landscape-scale restoration treatments in ponderosa pine forests of the southwestern United States, it may eventually be expanded upon to include additional forest types and regions." Add to applicability conditions that the area must be a ponderosa pine forest. Include a specific definition of what constitutes a ponderosa pine forest in terms of amounts of other tree species that can be present (e.g., basal area ranges over some minimum number of contiguous acres). The definition could include areas where sufficient evidence exists that tree species composition has changed due to fire-exclusion, such as	We have added the ponderosa pine forest condition and have an updated definition for ponderosa pine forest in the definitions table 1.2 Re: 3b We have included a link to a publication that defines "high' ladder fuels			

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		<p>expansion of fire-sensitive species like white fir into formerly ponderosa pine ecosystems.</p> <p>3a: Stocking is a general term. More specific forest structure metrics should be specified and/or examples and side boards provided. If this info is provided later in the document, reference that section here.</p> <p>3b: The protocol should provide specific guidance on applicability instead of using relative terms, such as “high” ladder fuels. Higher than what? What if the canopy is “overstocked”, but ladder fuels are not “high”? If this info is provided later in the document, please reference that section here.</p> <p><u>And Rev 7:</u> Regarding 3a, there are a lot of ways to determine stocking so I agree that it is important to identify a standard. USFS FIA has a standard based on number and sizes of trees, but it is not so easy to apply, and is not easily compared with a stocking estimate from remote sensing based on percent canopy cover. This</p>				

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		issue is really important in low density forests.				
64	1.3	<p>forest management plans should be up to date</p> <p>The protocol should specify that management plans for public and tribal lands must be up to date. For example, the effective date range of tribal forest management plans should include the project start date. And revised forests plans should be developed under the 2012 Planning Rule for National Forests (see https://www.fs.usda.gov/detail/planningrule/home/?cid=stelprd3828310). As described on the Forest Service Region 3 web site “revised plans will set the framework for the fire treatment and ecological restoration work being conducted across the southwestern region.” For example, “the Carson National Forest is currently in the process of revising its existing 1986 Forest Plan under the 2012 Planning Rule” (https://www.fs.usda.gov/detail/carson/landmanagement/planning/?cid=stelprdb5443166, accessed on 3/2/17) with a proposed date of fall 2018. Much has been learned since</p>	<p>Thank you for the recommendation. The text has been updated to accommodate the recommended change.</p>			

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		the early to mid-80s to inform restoration planning and these much newer publicly-vetted plans should be in place.				
65	1.3	Basic Smoke Management Practices documentation BSMP #3 states that record-keeping of the Basic Smoke Management Practices "should be retained by the fire manager long enough to meet regulatory time frames." Specify what this time frame is, in terms of a project. What type of smoke records do agencies need to keep regarding Basic Smoke Management Practices?	The specifics requirements for record keeping of Basic Smoke Management Practices are beyond the scope of this methodology. The Clean Air Act establishes state-level responsibilities for smoke management and therefore will vary by project location.			
66	1.4	Table 4 Replace "and/or maintain forest cover with at least 10% tree stocking" with "and 10% tree canopy cover".	Text corrected			
67	1.5	propagate risk and area burned over time “(At project registration) Cite the risk of high-severity fire given current fuel loads within project’s NEPA planning documents EA or EIS and propagate risk and area burned over time.” Please rewrite this so that the meaning of “and propagate risk and area burned over time” is clear in the context of the sentence.	Thank you for the edit, the sentence has been corrected.			

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68	4.5.1	<p>shadow benefits are too uncertain</p> <p>The benefits of shadow effects are likely small and are highly uncertain given possible changes in forest conditions on adjacent lands over the crediting period. Shadow effects from thinning carried out via an existing stewardship contract or by a private landowner may negate any benefit to those lands from the offset project or even provide indirect emissions benefits (shadow effects) to the adjacent offset project.</p>	Treatment shadow effect has been removed			
69	2.1	<p>Number 4 in this section states: "have documented evidence that the project area qualifies for fuels treatment; evidence must include at a minimum a USFS or BIA prepared restoration plan and associated EA or EIS (or tribal government equivalent) that includes the project area." Are city, county, and state lands required to have a USFS or BIA prepared restoration plan? If not, please update this statement.</p>	Texted has been revised to incorporate environmental planning documentation for city, county and state lands.			
70	2.3	<p>timeline and project design document</p> <p>For "Timeline showing when project activities will be implemented", specify which</p>	We have clarified the language and inserted a hyperlink to the GHG plan template to clarify.			

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		activities need at a minimum to be on the timeline. By "project design document" are you referring to the Offset Project Listing form? the GHG Project Plan? Please add an explanation to the protocol as to what this document is.				
71	2.4	types of evidence Adding a discussion on broad types of acceptable evidence is unnecessary and possibly misleading that they are sufficient proof. The project developer may provide any form of evidence to support their assertions. It is the content, relevance, rigor of methods, solid reasoning, lack of errors or omissions, applicability beyond study sites, whether information is outdated, author expertise and other considerations, in combination with other supporting evidence, that makes any one piece of evidence useful. For example, listing in the protocol that a letter or document prepared by the project developer or one of its contractors is an acceptable type of evidence is unnecessary and misleading as to the weight carried by these forms of evidence. All bullet points should be removed from this section.	We agree with the reviewers comment All acceptable types of evidence have been removed.			

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72	2.4.1	<p>refer readers to sec 2.3 for start date info</p> <p>Regarding “the Project developers will show that the project has a start date after January 1st, 2000 and that as of the start date the projects demonstrates regulatory surplus.” Remove the January 1st, 2000 start date from this sentence. The start date is covered under sec 2.3 and without representing the details about when projects could start this early, stating it is in this way is misleading and unnecessary. Instead the reader should be directed to that section, such as in “the Project developers will show that as of the project start date (described in sec 3.2), the project demonstrates regulatory surplus.”</p>	text corrected			
73	2.3	<p>start date</p> <p>Move these two sections next to each other in any order to avoid confusion and remove striked throughed text:</p> <p>“Projects with a start date of January 1st, 2000 or later are eligible [28]. The start date marks when the project developer began implementation of land management activities to reduce long-term emissions through forest restoration</p>	<p>This is required language for ACR protocols as specified by the ACR Project Standards document.</p> <p>American Carbon Registry (2010), American Carbon Registry Forest Carbon Project Standard, version 2.1. Winrock International, Little Rock, Arkansas</p> <p>Revised as per Reviewer 3 suggestions.</p>			

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		<p>and fuel reduction treatment activities.” “If the project start date is more than one year before submission of the GHG plan the project developer shall provide evidence that generating forest carbon offsets was seriously considered in the decision to proceed with the project activity. Evidence shall be based on official AND/OR legal and/or other agency documentation.”</p> <p><u>And Rev 7:</u> Regarding start date -- why is it possible to have a retroactive start date before these protocols are even established? It seems like somehow, by enrolling project that started 17 years ago, some "cherry picking" could occur and credit given for past accomplishments that should more appropriately be part of the baseline going forward from now.</p>				
74	3.2	Wildfire Hazard Potential grid The 2014 Wildfire Hazard Potential (WHP) dataset is based on 2010 fuels and vegetation data. In addition, the intended scale for use of this map is national to sub-regional (pixels are 270 m; 886 ft.). It is recommended	We agree that WHP does not have the spatial resolution to model emissions. We merely intend it to be a requisite classification for a project to qualify and have therefore moved it to the eligibility section. We intend projects to use the FIRESEV dataset which has a 30 m resolution, which is much more appropriate for this scale of project. We			

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		<p>for use locally only with additional knowledge of an area. As stated in reference provided "it is the sole responsibility of the local user, using product metadata and local knowledge, to determine if and/or how the WHP map can be used for particular areas of interest." The WHP could be offered as an option for stratification if it can capture fuel and terrain variations to sufficiently model emissions, however a quick inspection makes this doubtful. For example, within Figure 2 of this protocol the Wildland Fire Potential classifies large grasslands and contiguous forested areas as "high" wildland fire potential in orange with a nearby smaller grassland classified as very high (red). These data do not appear to be appropriate for use in this protocol. Click on the Wildland Fire Potential overlay layer at http://wwetac.us/wwre/map.aspx to look it over.</p>	<p>have updated the stratification section and methods to reflect this clarification. Metadata on FIRESEV can be found here: https://www.frames.gov/documents/firesev/sfp_fw90_full_metadata.pdf</p>			
75	3.3.1.1	<p>stem dbh</p> <p>The definition of tree in Table 1 is in metric units: "A perennial woody plant with a diameter at breast height (1.37 m) >5 cm ...", however this section "requires an</p>	<p>Table 1 updated</p>			

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		initial inventory of all stems >5 inches in diameter". Is this supposed to be "> 5 cm"? To avoid confusion, keep units for the same forest structure metric in the same system of units throughout the protocol.				
76	3.5	Deleted	no resolution required			
77	2.2	See attached	See attached			
78	3.1	<p>Fires managed for resource benefits</p> <p>Tribes and public agencies currently let some naturally ignited fires burn on a case-by-case basis (aka Managed wildfires or Fires managed for resource benefits or Fire Use) to restore forests. These reduce wildfire risk and may increase carbon pools over the long-term. Could offset contracts prevent tribes and public agencies from letting naturally-ignited fires burn through or near project areas at any point in time, such as after the project is conceived and/or listed on a registry? If tribes and agencies are required to suppress these fires, low cost common-practice fire-reduction benefits will be lost and suppression costs will</p>	<p>Managed natural fires are explicitly included in both the baseline and project scenarios (see section 4.4.1). We have expanded the baseline section to make this more explicit.</p>			

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		increase. Fires managed for resource benefits should be considered in baseline carbon pools and emissions, and explicitly discussed in the protocol.				
79	3.5	<p>more detail needed on baseline uncertainty</p> <p>Adding a diagram of the uncertainty analysis would be helpful, for example that shows how sampling error from the inventory is accounted for in carbon stock projections, and carried through to baseline wildfire projections, emission projections and the final total accounting of uncertainty.</p> <p>Sensitivity analysis helps uncover input parameters which affect outputs more greatly and is useful to do as part of an uncertainty analysis, however as stated previously, an imprecise variable such as fire behavior fuel models may not affect models results much because each model represents a broad range of fuels, even though they have been found to be a large source of significant uncertainty in modeling fire behavior, given high spatial variability of fuels across multiple scales. Add</p>	<p>We like the idea of a diagram. We have a proposal into ACR about an alternate method for uncertainty calculation (sensitivity analysis), and given that approval of that, will generate the above figure.</p> <p>All of the models that we suggest here are USFS validated models which are the standard upon which land management is completed.</p> <p>ACR: See 51.</p>			

#	Section	Reviewer #3: 1 st Round Reviewer Comment	Author Response	2 nd Round Reviewer Response	Author Response	3 rd Round Reviewer Response
		<p>methods to address fire behavior fuel model error specifically (e.g., are local fuel models necessary).</p> <p>An uncertainty analysis is needed for the project developer to quantify the uncertainty in FVS-Climate, fire, emission and other model outputs brought about by uncertainty in inputs, which stem from random error, sampling error, natural variation, etc. However, carrying out an uncertainty analysis on inputs, assumes that the model being used has been validated and that model uncertainty is within an acceptable range for the purpose the model is being used for. As stated in the “model uncertainty” comment in sec 3.3.1.1, the authors should demonstrate that the models they recommend in this protocol have been validated, in studies that compare predictions to field data, and when used in combination in the protocol work flow meet the accuracy requirements needed to estimate carbon pools and GHG emissions in ponderosa pine ecosystems.</p>				
80	4.4.1	gathered shapefiles	We have removed the classes. We intended the emissions to be continuous			

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		<p>What is the accuracy of this method of estimating prescribed and natural burn emissions in quantitative terms? What are the results from validation studies for this method of estimating CO₂e emissions from prescribed fires? Are burn classes and severity classes the same thing? Why use mean severity classes instead of a continuous range of burn severity? Using three classes will not likely provide accurate GHG estimates. Would every Rx fire fall in burn class 1? What scale (e.g., stand level) and for what purposes was FIRESEV designed for? All of the FIRESEV study titles mention mapping of the potential for severe fires, not the actual severity of any one fire: https://www.frames.gov/partner-sites/firesev/firesev-documentation/ Describe and demonstrate with visuals the following: "real-time fire severity maps on its own or along with current satellite imagery products to enhance data analysis of fire effects". Please provide a figure showing FIRESEV model outputs and output from one or more of the previously listed fire models (3.3.1.2 and</p>	<p>and were attempting to acknowledge that forests in different states of treatment would burn differently, but this was misleading and confusing.</p> <p>We had referenced the wrong dataset and intended to cite MTBS if there was a lack of spatial data, though we don't foresee this being a common occurrence. This is merely to make sure that we don't miss any prescribe burn emissions in the case that a shapefile is missing.</p>			

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		3.3.1.3) for one restoration unit. Is equation D-5 now 4.4? Please correct. Developing a method to estimate burn emissions that incorporates inventory data would be more appropriate. Products like FIRESEV based on satellite data that cannot remotely-sense below the tree canopy are not likely to be able to provide credible emission data for prescribed fires.				
81	4.4.2	"delineated as" what?	E OPS, thank you for catching the missing information			
82	1	See Attached	See attached			
83	3.3.1.2	burn probability spatial data More clearly describe how the model generates the burn probability spatial data so it can be determined if the dataset is appropriate for use at the sub-restoration unit scale and in combination with other models. The burn probability dataset is fairly coarse-scaled or is that just how the data were binned for the figure? What are the major sources of uncertainty in burn probability model predictions? The six fire intensity layers by flame length class also appear too coarse for how they are used in this draft protocol.	We have clarified the text to make it evident that burn probability data comes from landfire.gov (https://landfire.cr.usgs.gov/distmeta/ser/vlet/gov.usgs.edc.MetaBuilder?TYPE=HTML&DATASET=FB6) The resolution of FRI is 30 m2, it was simply binned for a visualization, but we feel that might be misleading so have removed it.			
84	3.1	tree seedlings	Tree seedlings have been planted following wildfires in the Southwest on tribal and public lands. Planting			

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			<p>ponderosa pine seedlings following severe fires in AZ and NM has been found to be successful about half the time. The baseline carbon pools should include some level of post-fire planting of seedlings to aid in regeneration.</p> <p>ACR: Our understanding is that seedling planting is not widespread enough to be considered a baseline condition. Please provide statistics for occurrence of post-fire planting and include as an eligibility criterion if all projects will assume planting in the baseline.</p>			
85	4.3.1	add rigor to the sampling plan The sampling plan requirements are not rigorous enough. Something like the following should be added: "The sampling plan must contain sample selection and parameter estimation procedures that comply with the conditions of probability sampling and are well-designed to estimate required inventory data."	Text has been added, thank you for the recommendation.			
86	2.5.1	graph with and without fitting It is unclear why fitting is necessary. Add a graph to the protocol showing an example of a reversal when "project carbon is calculated and ERTs issued based on a fit of all observations with a minimum of 5 years of carbon stock data...". Include the fitted and original unfitted data and show how a reversal would	<p>Project no longer uses fitting and now reflects net ERTs at verification</p> <p>ACR: See above comment 21 and 52.</p>			

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		occur when data is fitted and not.				
87	4.3.1	deleted comment	no resolution required			
88	3.4	crediting period length Explain in what ways the crediting period is project specific versus a constant 20 years for any project under this protocol.	<p>Thank you for the recommendation. We have revised the methodology, setting the minimum crediting period at 20 years. We maintain flexibility for crediting periods to be longer than 20 years because as another reviewer notes it may take significantly long than 20 years to accrue credits depending on factors like restoration treatments, prescribed burn intervals, and other site-specific conditions.</p> <p>ACR: Per the ACR Standard v 5.0, IFM projects have a Crediting Period of 20 years and cannot be changed on a per project basis. Projects can renew their crediting period for another 20 years with a re-assessment of baseline.</p>			
89	8	location of attached calculations and citations Where are the attached calculations and citations referred to twice in this section?	It seems that when ACR imported this into Collaborase our calculations did not copy over. We will ask them to update this to reflect the material that we sent them.			
90	1.5	lack of information on delayed regeneration and reduced C in succeeding ecosystems There appears to be very little information in the protocol on baseline delayed regeneration or reduced C in succeeding ecosystems, which are depicted as project carbon benefits in Figure 1.	New sections have been added throughout the methodology to specify methods for regeneration and C in succeeding ecosystems. The appendix has been re-vamped such that repetitive measurements and methods (e.g. c stocks) reside there, and scenario specific methods are in the body of the text.			

#	Section	Reviewer #3: 1 st Round Reviewer Comment	Author Response	2 nd Round Reviewer Response	Author Response	3 rd Round Reviewer Response
		<p>The section that this figure refers to for information on these topics (3.1.1) is missing from the protocol. Section 3.1 mentions these topics briefly, but provides no details. Please add a methodology with supporting evidence including an estimate of its accuracy in determining real carbon benefits. Include how often and over what period delayed regeneration and reduced C in succeeding ecosystems have occurred following severe fires and under what conditions they have they not and/or could be mitigated (e.g., seedlings planted, post-fire wet weather conditions). If they vary across the Southwest, what parameters do project developers need to adjust for local conditions? Be specific. Section 8 Appendix, which does not appear to be referenced in the protocol, contains a few sentences with methodological guidance that is broad and insufficient.</p>				
91	2.4.3	<p>barriers due to prevailing practice Please provide some examples of what is meant by "barriers due to prevailing practice" in the context of southwestern forest restoration.</p>	<p>Prevailing practices for the southwest may include reliance on prescriptions that use hand-piling and burning of slash materials onsite as opposed to the using slash as a fuel source for biomass energy production. This is a common practice due to a lack of infrastructure and the</p>			

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			additional cost of creating and burning piles after thinning operations.			
92	3.3.1.2	<p>cumulative density function Text should be added to this section describing additional inputs besides inventory data required by FSim and the other models listed and the major assumptions the project developer needs to make to generate the burn probability maps. For the cumulative density function, is the choice of "shape" and "time" parameters in eq. 3.2 well-defined in the literature other than >1 for shape? Explain what the time variable means. Is it a coincidence that the function approaches 100% burn probability at the end of the 40-year Minimum Project Term or was this intentional? Also, a common language interpretation of the cumulative density function in Figure 5 should be added to the protocol with suggested prediction limits, such as, we used FSim or ___ to predict that a fireshed in unrestored ponderosa pine has a 50% chance ($\pm 10\%$) of burning within 15 years.</p>	<p>Text and captions have been added to this section. Fire modeling will occur in concert with the land management agency who is completing the project (e.g. 4FRI, Coconino Forest, etc.).</p> <p>Cumulative probability reaching near unity at the end of the project term was a coincidence, this is just a sample calculation based on the mean FRI for the 4FRI (15 years). This is part of why we have confidence that portions of the project area will burn within the project period with or without restoration.</p>			
93	1.3	Timber harvesting "Timber harvest in the baseline must not exceed that of the project scenario." In	Timber harvest for the baseline and project scenario are expected to be similar in tree selections as specified by NEPA planning documents. The			

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		<p>terms of what harvesting metric? It may exceed in terms of one, but not of others. Does the timber harvest apply to only small diameter trees? Or are these offset projects designed to gain higher economic benefits by harvesting more trees of all sizes than baseline contracts?</p>	<p>treatments for the baseline are planned but not implementable because the treatments cost more than the value they generate in timber products. In the project scenario the timber harvest is increased because more acres are being cut because a project is helping to pay the cost of removing non-commercial timber. This means that more small trees are being cut but it does not preclude cutting of larger, commercially valuable timber if this is part of the plans created and approved by the Forest Service.</p>			
94	1.1	<p>why must the project scenario increase wood extraction? ACR's forestry standard explains that eligible IFM project activities include "increasing carbon stocks in harvested wood products". Leakage issues aside, is the intent of the following paragraph to state that this option was chosen to be included in this IFM protocol or is it truly meant to encourage more wood to be harvested/extracted? "Improved forest management in the project scenario must increase wood extraction through fuels treatments over the baseline scenario, thus leakage of timber activities is not expected. As per the ACR Forest Carbon Project Standard, if the project</p>	<p>We agree, the criteria were too explicit, the true goal is to reduce fire severity. As such we have altered the text to address only wood products, and made it a possible, not required event (ladder fuels likely would not represent anything other than slash piles or material for biomass energy).</p>			

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		<p>scenario increases the yield of wood products or does not reduce the supply produced leakage for IFM projects, the project developers may assign leakage to be de minimis [8].”</p> <p>In other words, should the term “wood extraction” be replaced by “wood products”? If so, update the language as these have different carbon emission implications. If not, explain why “the project scenario must increase wood extraction” if the goal of these projects is to reduce the risk of high severity wildfires? Why not let that goal dictate whatever level of wood is extracted? Perhaps project developers will choose to reduce greater levels of low-volume ladder fuels or implement novel and/or more intensive prescribed burning or other techniques to reduce fire-severity. Otherwise, the perverse incentive to increase revenues by extracting larger trees (that still meet diameter cap restrictions) may play out while discouraging creative solutions to reduce fire-severity.</p>				
95	4.1	Sampling strata	Thank you for this recommendation, the text has been altered.			

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		<p>Project developers should be allowed to optimize stratification in a way that minimizes sampling error, modeling uncertainty and inventory costs. Stratifying within or without regard to restoration unit boundaries may improve precision over using restoration units. Change “project developers shall utilize restoration unit boundaries outlined in current Environmental Impact Statement (EIS) documents to improve the precision of carbon stock estimates” to something like: “Project developers may utilize restoration unit boundaries, outlined in current Environmental Impact Statement (EIS) documents, however to improve the accuracy of carbon stock estimates they may choose other stratification boundaries.”</p>				
96	4.1	<p>monitor regeneration Add regeneration measurements to inventory and monitoring requirements because they are an important component in estimating net GHG emissions, especially in this protocol.</p>	<p>Thank you for this recommendation, they have been added.</p>			

#	Section	Reviewer #3: 1 st Round Reviewer Comment	Author Response	2 nd Round Reviewer Response	Author Response	3 rd Round Reviewer Response
97	4.1	<p>Inventory Having different sections describing inventory methodologies for the initial and subsequent reporting periods is confusing and unnecessary. For example, section 4 WITH PROJECT STRATIFICATION list initial inventory items and well as the baseline (e.g., 4.3.1 TREE CARBON STOCK CALCULATION). This is confusing! Move all inventory information to one section or an Appendix that can be referred to from the baseline and with-project scenario sections. As commented on elsewhere, the baseline and project scenarios may experience similar ranges in fire severity and treatments, although at different levels. The same measurements should be collected or modeled for each reporting period, according to the time interval for each stated in the protocol. The only difference in inventory for the initial and subsequent reporting periods is that subsequent inventories must be updated for restoration treatment activities, such as thinning and burning, and disturbances that have</p>	<p>We appreciate this recommendation and will move all of this material to streamline the methodology.</p>			

#	Section	Reviewer #3: 1 st Round Reviewer Comment	Author Response	2 nd Round Reviewer Response	Author Response	3 rd Round Reviewer Response
		<p>occurred during the reporting period.</p> <p><u>And Rev 7:</u> These are good points, helpful to ensure consistency in baseline and scenario calculations.</p>				
98	5.1	<p>Net GHG emissions Consider changing this section title to something like “NET GHG REMOVALS AND EMISSION REDUCTIONS DUE TO PROJECT IMPLEMENTATION” (meaning net release of GHG gases to the atmosphere due to increased sequestration or reduced emissions between the baseline and project scenarios) to avoid confusion about the term ex-ante, especially given previous section names are “baseline scenario” (versus counterfactual scenario) and “with-project scenario”.</p> <p>Add a figure of the “ex ante calculation of all net anthropogenic GHG removals and emissions for all included sinks and sources for the entire project period” together with the projected baseline scenario (net CO₂e over 40 years).</p>	<p>Thank you for that recommended title change, we agree that the new text is clearer. We are working on a pilot study based on the Cragin Watershed Protection Plan in the second EIS area of the 4FRI. Our intention is to include example calculations and graphs based on this pilot, but are currently delayed due to time constraints on the part of the forest service. These graphs and example calculations (to be included in the appendix) will be added as soon as possible.</p>			
99	8	Referrals	We agree. ACR had asked us to link to relevant material for ease of use for			

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		<p>General referrals to the body of work of specific researchers are unnecessary given the ease of access to citation databases and of questionable value given the existence of current and future contributions by other researchers. They should be omitted from the protocol. Current and future contributions by others may be just as valuable on regeneration or other topics.</p>	<p>project developers, but those links will be out of date the minute the methodology is published. We have removed the referral text.</p>			
100	8	<p>Move regeneration discussion to elsewhere in protocol Survival of ponderosa pine seedlings have been found to vary significantly depending on distance to seed trees, canopy cover, soil type, soil moisture, precipitation, temperature, and competing vegetation. Using a mean regeneration rate across an area as large and diverse as a National Forest would likely be highly inaccurate. This appendix should be removed. Instead, regeneration should be added to in the project inventory requirements and sections on “Delayed regeneration following severe wildfire” and “carbon storage and sequestration of alternate ecosystems”, also referred to as “Reduced C in succeeding ecosystems</p>	<p>Thank you for this recommendation, all of these components have been moved to and/or expanded upon in the main body of the methodology.</p>			

#	Section	Reviewer #3: 1 st Round Reviewer Comment	Author Response	2 nd Round Reviewer Response	Author Response	3 rd Round Reviewer Response
		following fire”, which are described as major benefits of the baseline (see Fig. 1) be added to the body of the protocol.				
101	3.5	sensitive parameters from the literature Add a list of known sensitive parameters for each recommended model based on relevant publications. Provide reviewers with an example of a "documented sensitivity analysis demonstrating which elements within the baseline scenario (e.g. Fire return interval, initial carbon stocks etc.) contributed to the greatest amount of uncertainty within baseline stock projections, along with documented evidence of incorporating this uncertainty".	See response to comment 79 below. We feel that a literature review is outside the scope of this methodology and feel that it is best practice to conduct a full sensitivity analysis, but intend to attach an example project with a full sensitivity analysis with the next iteration.			
102	3.1	fire suppression Large amounts of time and money are spent each year fighting fires. The probability of success of fire suppression efforts should be added to baseline scenario.	The efficacy of wildfire suppression, especially in relation to dollars spent has dramatically decreased over the past few decades. Restoration has been proposed by the USFS because of the difficulty of fighting active crown fire given current stand conditions. In addition, stands are projected to burn with increased severity and size given trends toward a hotter and drier climate. How do you propose accounting for the success of wildfire suppression? And do			

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			we actually think that it will be effective over time?			
103	1.5	storage of small diameter wood long-term in harvested wood products The bullet point "Potential storage of small diameter wood long-term in harvested wood products" should be updated to convey that the project will increase storage given current fuel treatments in the Southwest already store small diameter wood in harvested wood products to some extent.	Thank you for the recommendation. We have updated the text read "Potential increase in storage." to acknowledge the pre-existing small diameter wood products industry in the southwest.			
104	7.1	Keep a running balance Curve fitting is not necessary and may result in forward-issuing offsets, which is not permitted by the ACR Carbon Standard. The protocol should explain that a running balance of net greenhouse gas emission reductions will be kept, and ERTs will only be issued in years when the balance is positive. For more details on this method see pp. 36-37 of Improved Forest Management Methodology for Quantifying GHG Removals and Emission Reductions through Increased Forest Carbon Sequestration on Non-Federal U.S. Forestlands v1.2.	Thank you for this recommendation. We have revised ERTs to be based on a running balance based off of Improved Forest Management Methodology for Quantifying GHG Removals and Emission Reductions through Increased Forest Carbon Sequestration on Non-Federal U.S. Forestlands v1.2, and appreciate that this method both avoids forward-issuing credits, and has already been approved by ACR. ACR: See 52.			
105	1.3	Project Area size and shape	We selected 10,000 acres as a minimum project size because it represents the			

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		<p>What evidence supports that restoration units need to be greater than 10,000 acres to achieve landscape-scale effects capable of reducing fire severity? If project lands do not have to be contiguous, how can landscape-scale effects be achieved? Contingencies for project shape (non-contiguous sections, long and narrow sections, islands of non-project lands within the outer boundaries of the project area, etc.) should be addressed in the protocol.</p>	<p>smaller end of the spectrum of fuels reduction and forest restoration plans created by USFS in the Southwest but is large enough to achieve landscape scale benefits.</p> <p>Landscape scale definition provide on p.2 : https://cfri.colostate.edu/wp-content/uploads/2016/05/2014_FrontRangeDesiredConditions_CFRI-TB-1402.pdf</p>			
106	4.1	<p>Add methods for forest conversion Regarding “The project scenario also includes an estimation of the proportion of the high severity sites that are expected to be redirected from high carbon forests to less carbon-dense vegetation types (e.g., grasslands and shrublands).” As stated in comment “lack of information on delayed regeneration and reduced C in succeeding ecosystems” in section 1.5, this protocol should include methods to estimate this. It is mentioned in the protocol title, but insufficient information is provided on how should be estimated.</p>	<p>Methods have been moved from the appendix into section 3.3.1.2.</p>			

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107	4.3.3	<p>Where is the confidence deduction used? This section seems to be the only place in the protocol where a confidence deduction is mentioned. How is used in concert with the other uncertainty methods proposed? Which equation(s) is it used in?</p> <p>9 APPENDIX - DATA AND PARAMETERS (I) 9 APPENDIX - DATA AND PARAMETERS (I)</p>	<p>It is used as an input to Climate FVS and therefore all downstream calculations.</p> <p>ACR: Please confirm that confidence deduction is input to FVS. For the test project that is forthcoming, please assume a scenario where the deductions are large and the last statement in section 4.3.3 is applied such that a project developer would be responsible for the reversal.</p>			
108	5	<p>40 years till net carbon benefits Within how many years do the models you recommend in this protocol show net carbon benefits of restoration treatments over baseline levels in southwestern ponderosa pine? Hurteau et al (2016) https://www.treesearch.fs.fed.us/pubs/52476 (see Fig. 6) estimate that total ecosystem carbon (TEC) following thinning and burning treatments in a ponderosa pine forest in north-central Arizona will take over 40 years to exceed that of no action. If this period is significantly longer than what your methods estimate, explain and demonstrate quantitatively why the</p>	<p>Throughout the development of this methodology we have coordinated with Dr. Hurteau and Dr. Fulé, both of which have published net-carbon estimates of ponderosa pine restoration. Our analysis differs from the above referenced study in two main realms:</p> <p>Succession of low-carbon ecosystems following severe fire, which alters total ecosystem carbon storage.</p> <p>Drought and heat induced mortality of live trees</p> <p>Without treatment the literature suggests major losses of living trees and carbon sequestration in SW ponderosa pine ecosystems (http://www.sciencedirect.com/science/article/pii/S0378112715003801, http://www.sciencedirect.com/science/article/pii/S0921800916315890). In our initial model we generated a carbon</p>			

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		models and assumptions you propose are more accurate.	benefit ~12 years into project implementation, but this varies as a function of original structure among many other variables.			
109	3.3.2	<p>Use the same methods to develop baseline and with-project scenarios The same set of methods should be used for estimating both baseline and with-project carbon over time. Separate methods and equations are not necessary because both the baseline and project scenarios have live and dead biomass, fuel treatments and associated fossil fuel emissions, wildland and prescribed fire emissions, and carbon stored in wood products. The only difference is that each scenario has less of some things (e.g., wildland fire emissions in the project scenario) and more of others. The same equation should be used to represent net annual baseline (or project) carbon.</p> <p><u>And Rev 7:</u> An important point -- I just want to endorse these statements by reviewer 3. Models, input data, assumptions, carbon calculations, etc. should be as consistent as possible for both baseline and scenario.</p>	<p>The same methods are used across both scenarios. We have attempted to make this clearer.</p> <p>ACR: Should equation 3.1 be "per fireshed"? Please confirm the definitions of the terms fireshed and sub-unit and consistent use in Section 2.1, 2.2, Section 3 equations and Appendix 8.</p>			

#	Section N	Reviewer #5: 1 st Round Reviewer Comment	Author Response	2 nd Round Reviewer Response	Author Response	3 rd Round Reviewer Response
1	1.1 Scope	"or does not reduce the supply produced leakage for IFM project" non-sensical text	text has been corrected			
2	2.2 Project Geographic Boundary	<p>If areas are not contiguous does that not undermine the landscape effect? I assume the FULL landscape HAS to be modeled including areas outside the project?</p> <p><u>(And from Reviewer 7):</u> I'm not sure that contiguous is necessary, but certainly, the landscape should be in a reasonably consistent condition such that the analysis parameters can be uniformly applied, or, the landscape can be subdivided into analysis domains each of which would be 10,000 acres or larger. Generally, in my opinion, the size of the area is more important than whether it is contiguous or not. The large area helps with projecting wildfire occurrence which is very stochastic.</p>	The text has been revised to address Reviewer 7's comment to specify that total project area must be 10,000 acres or larger and provide additional reference to how stratification of the total project area is performed.			
3	2.3	I don't think it is a baseline "valuation", I think it is evaluation so the baseline is re-evaluated	We agree. Changed revaluation to re-evaluation			
4	2.5.1	comma	suggested comma added			
5	2.5.1	extraneous space	extraneous space addressed			
6	3.3.1.1	models	corrected			

#	Section N	Reviewer #5: 1 st Round Reviewer Comment	Author Response	2 nd Round Reviewer Response	Author Response	3 rd Round Reviewer Response
7	3.3.2	AWfired. Listed under the wrong equation and inadequately defined	Equations corrected			
8	4.1	typo area not are	text corrected			
9	4.5.1	How shadow effect is defined. Are you saying to model the landscape with and without the fuels treatment incorporating fire probability and a massive set of potential ignition locations? Can you model where only part of the landscape is treated? How are ignitions modeled? There is to me nowhere near enough description here for something that could be a very significant project benefit.... I think there also has to be direct discussion on the calculation of uncertainty for this component	Treatment shadow effect has been removed			
10	General	<p>Central problem with the methodology: On the whole the methodology is much stronger. HOWEVER it has a central flaw.</p> <p>The method compares apples with oranges and in the majority of cases will create emission reductions just as a result of the fact that fires are relatively low probability events. In the rarer case of a with project fire the project will just fail and therefore what we are doing is crediting</p>	<p>Thank you for bringing this to our attention, we realized that we were less than clear in the fire methods.</p> <p>Both baseline and project fire is modeled with the same fire frequency, however, it is important to note that as soon as restoration efforts begin the nature of fire behavior is altered. Upon crediting period renewal ignition rates across both scenarios are re-evaluated. We feel that this is an apples to apples calculation but welcome other approaches if you see them.</p>			

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		<p>hot air and never debiting where a loss occurs.</p> <p>The solution has to be compare EITHER apples with apples OR oranges with oranges.</p> <p>So, either fires have to be modeled in the baseline AND the project case.</p> <p>-So, the same hypothetical fires at the same frequency would be modeled with and without fuel treatment. OR</p> <p>-The same ACTUAL fire ignitions across the whole landscape that occur in the with project case modeled across the landscape with and without fuel treatments.</p>				

#	Section	Reviewer #7: 1 st Round Reviewer Comment	Author Response	2 nd Round Reviewer Response	Author Response	3 rd Round Reviewer Response
110	1.2	<p>Recommend consulting with USFS FIA for definitions of forest and trees</p> <p>Almost all publications from FIA about the nation's forest resources contain standard definitions of forest, tree, shrub, etc. For the future if this protocol is expanded to other regions, it would be useful to be consistent with these national standard definitions.</p>	<p>Thank you for this recommendation. We now use a USFS FIA definition for 'forest' and trees</p>			
111	1.3	<p>NEPA Guidelines Consider adding a definition of recently updated NEPA requirements (established by the Obama administration, but CEQ was ordered by Trump to rescind these new requirements) for addressing climate change on federal lands, which specify that project activities must address impacts on climate by assessing emissions, and impacts of climate on the project outcomes (this is paraphrased from the actual language). https://obamawhitehouse.archives.gov/administration/eop/ceq/initiatives/nepa/ghg-guidance</p>	<p>Thank you for the recommendation. We now include a definition of NEPA but decided not to include the CEQ requirements for considering project related GHG emissions due to the recent changes in policy that you mention.</p>			

#	Section	Reviewer #7: 1 st Round Reviewer Comment	Author Response	2 nd Round Reviewer Response	Author Response	3 rd Round Reviewer Response
112	1.3	Re. 12 Please clarify what is meant by an "increase in carbon storage". Does this mean that the C stocks must always be above the baseline, or that the rate of increase of C stocks must be above the baseline?	Text has been clarified, total carbon stocks must be above the baseline following ERT issuance			
113	1.4	standing dead trees What is rationale for excluding standing dead trees less than 15 feet tall? There is no such restriction on size of down dead wood, though there probably should be a lower diameter limit on down dead	We had borrowed exclusions from ARB's forest protocol but are willing to include standing dead >5". Text is updated.			
114	1.5	fuel treatments will not increase carbon storage This sentence represents a continuing problem in describing the project benefits: "Implementation and maintenance of forest fuels treatments is expected to increase above-ground carbon storage by reducing high severity fire over the long term." The fuel treatments will decrease above-ground carbon storage and if continued, the decreased storage will be permanent. It would be more accurate to specify that the treatments will result in above-ground carbon storage that is higher than if the	Thank you for the clarification. The text has been updated with the recommended language.			

#	Section	Reviewer #7: 1 st Round Reviewer Comment	Author Response	2 nd Round Reviewer Response	Author Response	3 rd Round Reviewer Response
		project were subject to a high-severity fire, but lower than current storage (or some such language).				
115	2.4.2	Is this test necessary in all cases? What about the case where a federal agency has a forest plan that specifies "common practice" fuel reduction treatments, but lacks the resources to carry out such treatments? If someone comes along with funding to then support "common practice" that is applied well beyond what the agency is capable of, then this seems like it should be considered additional even though it is still common practice.	This test is not necessary in all cases. This is one of several tests that can be used to demonstrate additionality. Fuels reductions treatments are already common practice, thus projects using fuels reductions treatments would not use this test as a demonstration of additionality. Implementation barriers would be a more like test to use to demonstrate additionality. However, if new types of fuels reduction treatments are developed a project proponent may want to use this additionality test.			
116	2.5	examples needed	Risk mitigation measures are described in section 2.5.2. They include the option for project proponents to create a buffer pool or purchase insurance approved by ACR.			
117	2.5.1	1 year vs 5 year, measurement and reporting It is not clear here, but may be in later sections, why reporting has to be annual yet measurements on a 5-year basis, and how this should be accomplished (with models I suppose, calibrated every 5 years). Probably this section is summarizing a much more complex discussion in a few words.	Thank you for bringing this to our attention. ACR requires annual reporting, which is why we mentioned annual reporting. Models often output 5 or 10 year sums, so annual totals would have to be calculated, though this is common in nearly all forest carbon projects.			

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118	3.3.1.1	<p>Some general comments on this section Be clear about which sources of uncertainty must be included in the projections, and which may be excluded. For example, is it necessary to assess uncertainty in the baseline because of projected impacts of climate change, or may this be excluded?</p> <p>The opening paragraph states that FVS must be used, then states that other models may be used if approved. Statements seems contradictory.</p> <p>The fire and fuels extension of FVS includes conversion of FVS output variables to the different carbon pools. Why not use this instead of the equations in D-3? The FVS calculations of carbon variables are (mostly) consistent with the standards used by FIA to calculate forest carbon stocks for U.S. GHG inventory reporting. Except, FIA has updated some standards (like biomass equations) that have not yet been updated in FVS.</p>	<p>We have strengthened the uncertainty section and have a question in to ACR regarding an approach which would be a departure from the current forest carbon protocol. We are unclear about what you are asking about regarding climate change in the baseline scenario.</p> <p>We want project developers to use Climate FVS, but ACR asked us to leave room for alternate models in the future should they be developed. That text is a request from them.</p> <p>We agree that this streamlines the methodology and have updated it to remove those sections and just have them output from FVS. Thank you for this recommendation.</p>			
119	3.2	<p>Fire regime and fire history The following list has recommended sources for 2</p>	<p>Thank you for catching that, links have been updated and expanded</p>			

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		<p>of 4 inputs. What about the other 2?</p> <p>Species cover and types (FIA/Landfire dataset) Condition class (FIA/Landfire dataset) Fire regime Fire history</p>				
120	3.3.1.3	<p>Climate change included? As in the last section, please specify if projected weather in the baseline must include expected changes because of climate change.</p> <p>While I think of it, there should be some consistency on what is included in the baseline and in the project scenario. For example, if climate change is included in the baseline, it should also be included in the project scenario. It may be tempting to assume that such inputs may cancel each other out if included in both, but because of interactions with other variables, this is probably not a very good assumption.</p>	<p>Climate change should be included, thank you for pointing out that we had failed to mention this. We agree that climate must be assessed in both scenarios, because current stands will respond differently to restored stands due to structure. We have tried to make this more explicit and the recommended text has been added.</p>			
121	4.1	<p>How often to collect data? It may be stated somewhere already, but this section talks about using models to make estimates of different carbon pools for annual reporting,</p>	<p>On the ground measurements are made at the initiation of the project, and then every 5 years during full verification. Interim 'measurements' are modeled. This is the same between the project and baseline scenarios for all variables.</p>			

#	Section	Reviewer #7: 1 st Round Reviewer Comment	Author Response	2 nd Round Reviewer Response	Author Response	3 rd Round Reviewer Response
		and implies that there should be some actual measurement made during the project period. How often should measurements be made, and is the remeasurement period the same for all variables?				
122	4.3.1.2.1	why exclude dead trees less than 15 ft. height? Suggest including all standing dead trees regardless of height, but subject to same diameter limits for live trees.	Standing dead less than 15 feet now included, but above 5" in diameter (in line with entire protocol)			
123	4.5.1	This is trouble I'm not convinced that the shadow effect can be quantified, though I understand the purpose of not allowing credits for reduced fire risk because of treatments outside the boundaries of the project area. At the very least, put "optional" prominently in the title of this section. Also, wouldn't (or couldn't) any negative shadow effect (because of lack of treatment on adjacent land) be covered by assessing risk of reversal?	Treatment shadow effect has been removed			
124	4.7	Recommend treating the shadow effects like leakage Rather than making assessment of shadow effects optional, their existence these effects could be reviewed periodically to determine if there are any significant changes within the	Shadow effect removed			

#	Section	Reviewer #7: 1 st Round Reviewer Comment	Author Response	2 nd Round Reviewer Response	Author Response	3 rd Round Reviewer Response
		project area that are induced by activities outside the project area. Just like leakage, only the reverse.				
125	7.1	figure 6 I could not find labels for the different lines.	<p>The figure currently in the methodology is not the final figure(s) sent to ACR for the methodology, they can be found here:</p> <p>https://docs.google.com/drawings/d/1fZC4c3Cfyuwztbm6OmBR1a6Wsmkz2CGEDtwvsG4xnUQ/edit</p> <p>https://docs.google.com/drawings/d/12fndbFu0r0IS1Ud9TT2BsMteWckej6cur4ucfkcE_Ks/edit</p> <p>but given that we have now moved to net-ERT issuance, we plan to revamp figures throughout.</p> <p>ACR: Please confirm locations of new figures.</p>			
126	1	See attached	See attached			
127	4.5.2	shadow effect will be removed To the reviewers: shadow effect will be removed from this equation. Due to technical issues with Collaborase we are currently unable to.				