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I have reviewed the sample project and other documents and recommend that the methodology NOT be adopted by ACR.

The case study provides too few details on analyses included and assumptions made. For example, in response to reviewer requests to include managed natural fires in the baseline, the authors replied that they updated the protocol to include them. However, managed fires are not mentioned anywhere in the spreadsheets, parameters or sample project document. I can only assume that they were not accounted for, even though managed natural fires reduce fuels and are being allowed to burn more and more in southwest forests on public land as a cost-effective alternative to thinning and prescribed burning. There is some probability that the baseline would be more resilient to carbon losses because of managed fires likely during moister cooler conditions, just as there is some probability that a crown fire would reduce carbon stocks (mainly in drier windier conditions). Both should be included. Especially in this example where prescribed fire only (no thinning) is the treatment of choice over a large portion (41%) of the area to be restored. I discuss two other issues with the case study below, however there are others. Please see reviewers' previous comments, such as, but not limited to the appropriate scale of use of LANDFIRE data. They were not designed for project level work, are not 100% accurate as assumed in this sample project, and ground conditions may have changed since any version was developed.

Most importantly, estimates of uncertainty are lacking in the sample project. The authors mention in the Limitations section that uncertainty equations were not applied, but in the same paragraph mention that they made "deductions for uncertainty" without describing their methods. It is unknown how they developed those. Also, what parameters and other assumptions go into the confidence intervals in Figure 3? There is no explanation.

I disagree that this case study shows clear evidence of carbon benefit. Not without at least estimating uncertainty and sufficiently justifying how each input to the models were selected. Might the chosen parameters (e.g. representative concentration pathway, RCP) overly magnify the difference between the baseline and model scenarios? It is impossible to say. They do not state which Climate-FVS assumptions they used and why in Table 3 or elsewhere. They mention that "uncertainty for USFS plot data was not available" despite extensive communications with the Forest Service personnel who provided the data to them. It is the author's job to estimate uncertainty based on how and when the input data were collected.

Also, parameter sensitivity runs are needed. That is, what are the ranges in model outputs of the most sensitive variables? Are the carbon storage estimates in Figure 3 conservative? It is impossible to tell. They perform no sensitivity analysis, even on the limited number of parameters such as fire return interval that they mention in their protocol should be included in a baseline sensitivity analysis. Demonstrating how uncertainty would be calculated was one of the most pressing reasons why we asked for the case study and the authors have failed to do this. In addition, improving parameters does not fix errors in the algorithms used in a model. Climate-FVS has been published, but not validated.

In the Study Area section of the case study the authors discuss criteria for additionality, however leave out important ongoing initiatives in the case study location, such as a Four Forest Restoration Initiative (4FRI) Rim Country request for proposal (RFP) process that is in the project review stage. With 4FRI input, the Forest Service plans to award 20-year Stewardship contracts for restoring these forests and spurring local forest products industry. The nearby White Mountains Stewardship contract was only 10 years long and the longer time period of 20 years is designed to make forest thinning more economically feasible. Forest Service representatives have explained that they have learned a lot from the White Mountains contracts and the first 4FRI project area RFP on how to select viable project developers.

The authors refer to forest biomass as being "non-unusable". This is untrue. Forest biomass is being used for multiple purposes including making wood pellets <http://forestenergy.com/> and generating electricity in eastern Arizona by Novo Power. The Arizona Corporation Commission is currently considering mandating that electric utilities that it oversees build additional biomass capacity. County supervisors in the state have sent letters to the Commission backing this plan. With increased interest in alternative energy expansion to mitigate climate change and 20-year Stewardship contracts facilitating a long-term flow of wood and biomass, businesses have more incentives to utilize both resource streams. Also, advancements in wood and biomass utilization technologies are continuously being made.

The recent devastating fires in California, such as the Camp Fire, have further increased interest by local and state governments and regulators to pay for forest thinning within their constituencies. Even before those fires, voters in the City of Flagstaff approved a bond initiative called the Flagstaff Watershed Protection Project that in part utilizes expensive helicopter thinning operations. This project includes restoring public lands in the Coconino National Forest.

Reviewers have provided a lot of detailed guidance to date, yet in too many instances the protocol authors have not sufficiently responded to or addressed our concerns. For the reasons above and others addressed in previous review comments and discussions among reviewers, I do not recommend adoption of this protocol.

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