May 11, 2009

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Re: Comments on the Final Draft CAR Forest Project Protocol Version 3.0

The Wilderness Society appreciates the opportunity to comment on the Final Draft of the Climate Action Reserve's Forest Project Protocol Version 3.0 of the Climate Action Reserve, released April 15, 2009. We applaud the Work Group for making progress toward meeting the objectives set out when revisions were initiated. We would like to reiterate two of our major points from previous comments:

- The Wilderness Society believes that federal lands should not participate in private carbon offset markets at this time, until a scientifically thorough and public national review can determine whether participation would be consistent with public lands mandates.
- Accounting for harvested wood carbon is very complex and uncertain and should be based on conservative assumptions.

Following are more detailed comments on elements of the protocol.

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p. 4, 2.1.2 Eligible Forest Project Types and Definitions, Improved Forest Management
We appreciate the removal of the reference to timber harvest as a necessary component of improved forest management projects.

The term "project life" is used in this paragraph and throughout the following pages. It would be helpful to refer to the glossary definition of the term when it is first used, to clarify that this represents the entire monitoring period, and not just the period during which a project actively earns credits.

p. 9, 3.5.1 Promotion and Maintenance of Native Species, Table 3.1
Criteria for natural forest management include maintaining starting stocks of *standing* dead wood, but exclude requirements to maintain *down* dead wood. This element of forest structure *was* incorporated in the natural forest management definition in the December draft. Large woody material plays an important role in maintaining forest biodiversity, and as for standing dead wood financial incentives under commercial

management may favor reduction or elimination of this material. We would like to see down dead wood or large woody debris returned to the definition of natural forest management.

p. 12-13, 5.1. Defining a Project's GHG Assessment Boundary, Accounting for Primary Effects, Table 5.1

Down dead wood should be a required carbon pool for forest management and reforestation projects. Intensive practices that reduce down dead wood should not be encouraged by ignoring the effects of project practices on pre-project carbon stored in coarse woody debris. The glossary defines this as a required pool.

The same is true of soil and litter carbon, although these are less likely to decrease under management that increases live tree stocking over time. These pools should be required, however, when practices planned under a project have a reasonable chance of depleting these carbon stores over time.

p. 13, Defining a Project's GHG Assessment Boundary, Accounting for Secondary Effects, Table 5.2

Mobile combustion emissions and other processing emissions associated with wood products processing and transport should be accounted for if wood products are credited as a carbon pool. Reporting of emissions from harvesting equipment should also be required for forest management projects, although the magnitude of these emissions is likely to be small. p. 12 Section 5 Defining a Forest Project's GHG Assessment Boundary states: "The GHG Assessment boundary include[sic] the carbon sources, sinks, and reservoirs that quantify the total GHGs produced or sequestered *directly and indirectly from the activities involved in a forest project*. Project-level reporting in this protocol addresses forest carbon stocks, biological CO2 emissions, and *mobile combustion emissions*." When a harvested wood carbon pool is associated with a forest management project, processing and transport emissions are a direct effect of wood products carbon storage, just as surely as emissions from site preparation are a direct effect of reforestation activities. Under an economy-wide cap, these activities will probably be covered by emissions allowances, but the impact of an offset project (by definition outside the cap) on activities within the cap should be reflected in some way through reductions in carbon credits.

p. 15, 6.1.1 Reforestation Projects, Primary Effect – Estimating On-Site Baseline Carbon Stocks

The last sentence in this section describes how to treat baseline when forest cover is less than 10%. Less than 10% cover may be very common for reforestation projects. How will a narrative description of future conditions without the project be translated into a quantitative baseline for these projects?

p. 17, 6.2.1.1 Improved Forest Management Baseline for Private Forestlands, Determining Common Practice on Similar Landscapes

The proposed baseline methodology relies heavily on FIA data to define 'common practice' for each assessment area. Standard errors computed based on variability of live tree biomass estimates reported for FIA plots will understate the true uncertainty. Merchantable tree volume and live tree biomass listed in FIA data are not the result of direct measurements. FIA Phase 2 core measurements generally include only diameter and length of each tree. For obviously practical reasons, FIA does not directly measure roots, branches or leaves. Rather, total live tree biomass is estimated using allometric equations (when no equations are available for a species, equations for other species are substituted). Even though FIA may record some factors which could cause trees of the same diameter and height to vary dramatically in volume (e.g. rotten/missing cull portion, crown class, and tree damage), these variables are rarely considered in allometric equations. Because FIA tree biomass is an estimated value, the standard error for mean live tree biomass for an assessment area calculated using FIA data will therefore understate total estimation error. Higher uncertainty may not be an obstacle to using the data in this way, but registry administrators should be aware of the full extent of uncertainty.

p. 23, Improved Forest Management Baseline for Private Forestlands, Determining the Baseline of Project Live Tree Carbon Relative to Common Practice, the Stocking Reference, and the Financial and Legal Reference, Step 4

It is not clear whether this average is weighted by year, but that would be most reasonable. An intersection of Step 2 and Step 3 baselines that occurs in project year 5 should produce a lower overall baseline than an intersection that does not occur until year 90.

p. 24, Improved Forest Management Baseline for Private Forestlands, Determining the Baseline of Project Live Tree Carbon Relative to Common Practice, the Stocking Reference, and the Financial and Legal Reference, Step 5

The text on p. 23 implies that the modeled baseline cannot go below the higher of High Stocking or Financial/Legal Reference, and the chart on p. 24 seems consistent with this approach. The wording in the box on p. 24, however, implies that the modeled baseline must *average* at least as high as the relevant reference, which would be a less stringent requirement that would allow periodic depletion of stocking below the reference lines.

p. 24, Improved Forest Management Baseline for Private Forestlands, Completing the Baseline by Adding Other Pools

It is unclear how pools other than live trees will be estimated for Common Practice or Financial/Legal or High Stocking references, as well as for baseline modeling. These pools vary considerably across forest properties, and some (particularly standing and down dead and harvested wood) are not directly correlated with live tree carbon. None are modeled particularly well by existing growth models. CAR should support additional regional research to improve baseline estimates for non-tree carbon pools.

p. 25, 6.2.1.2 Improved Forest Management Baseline for Public Lands

The baseline for public lands with increasing carbon stocks is a projected increase until land reaches its "productive capacity". How is productive capacity defined, particularly for land with a high frequency of natural disturbances? Are future disturbances assumed identical to past, or should the agency project likely future disturbances given climate shifts? If policies or funding levels have recently changed or are projected to change in the future, how does that change affect the quantified baseline?

The Wilderness Society believes that federal lands should not be included in the CAR protocol at this time (see comments on previous draft). Public mandates for federal lands are likely to change dramatically over a 100 year period. Projecting a baseline using past and current practices and administrative requirements is unlikely to define "business as usual" for these lands over time. Federal lands may be managed for ecologically appropriate carbon storage when that function is compatible with other public values, and may provide demonstration sites to improve measurement and monitoring of carbon stores. But they should not enter into binding contracts with outside parties that obligate them to maintain defined levels of carbon reserves until the federal land management agencies conduct a thorough scientific and public review of the impacts. These decisions should not be made piece-meal by local agency staff.

p. 26, 6.2.2 Secondary Effects, Leakage
If projects that reduce harvest rates reduce timber output by an estimated 2% compared to sustained yields, then only a portion of that amount should be assumed to "leak" to other properties. Leakage estimates have ranged from less than 10% to over 90% (Murray, Brian, Bruce McCarl, and Heng-Chi Lee. 2003. Estimating Leakage from Forest Carbon Sequestration Programs). If 2% is set as a default leakage discount, it should be permissible for projects to provide their own alternative leakage analysis based on unique characteristics of their project.

We question the assertion that culmination of mean annual increment always defines the optimum forest stocking for carbon management. This rule-of-thumb fails to reflect non-live-tree pools, the effects of post-harvest residual stand volumes or uneven-age vs. even-age management, or the direct and indirect emissions from wood that is removed from the forest. However, that statement does not materially affect the protocol requirements and could easily be removed from the protocol text.

p. 28, 6.3 Avoided Conversion Projects
Given the increasing credibility of appraisals in the valuation of conservation easements, it is a reasonable approach to accept the difference between use value and market value as evidence of conversion pressure. This approach will, however, restrict the ability of smaller properties to offer projects, as appraisal costs are significant and are subject to economies of scale. Property owners who donate conservation easements, as opposed to those selling easements or land to non-profits or government entities, may not require an appraisal as part of the process of long-term protection. Consideration should be given to the possibility of aggregating avoided conversion projects within a uniform real estate market that might be covered by a joint appraisal.

pp. 28-29, Suitability of Project Area for Conversion
Characteristics that affect likelihood of development might vary regionally – development on steep slopes and ridgelines, for instance, is common in mountain resort areas.

p. 30, Discount for Uncertainty of Conversion Probability
The jump from a 40% discount for a 40% price differential between current value and full market value to 100% discount for a 39% price differential is so large that it might influence appraisers of properties near the dividing line to tweak results.

p. 30, 6.3 Secondary Effects, Quantifying Net Changes at Other Affected GHG Sources
The 3.6% leakage risk would represent the likelihood that any forestland in the area would be developed in a given year. This leakage assumption, like the harvest leakage assumption, essentially assumes 100% leakage over time (in other words, the project does not succeed in lowering the forest conversion rate in its region). CAR should remain open to more precise leakage estimates in the future.

p. 34, Example of Annual Calculation Activities
Wood products stores should be subject to an uncertainty discount. Although the initial roundwood quantity is measured, estimation of the amount remaining in year 100 is highly speculative and uncertain. CAR response to TWS comments on the wood products draft asserts that this is a conservative assumption since underestimating the harvested wood baseline is more likely than overestimating the project harvested wood pool. What is the basis for drawing this conclusion?

p. 36, 7.2.2 Compensating for Reversals
In addition to treating reversals due to gross negligence differently from unintentional reversals, it is critical that reversals due to intentional harvest activity also be treated differently from unintentional reversals. This seems to be the intent of the revised protocol, but the wording in this section could be clearer. Permitting projects to cover intentional reversals by drawing on the reserve would encourage behavior that amounts to burning down an insured building to collect an insurance settlement. The text on p. 39, 9.1 states that the PIA will determine how intentional reversals are treated, but some general principles should be stated here. Requiring more than a 1:1 compensation for intentional reversals is appropriate to discourage projects that may seek to game the system by maintaining projects only as long as they support management that is already financially attractive.

The Reserve should set a minimum acceptable balance to be maintained at all times. Widespread reversals caused by a bad fire season or pest outbreak could easily deplete this pool. The Reserve should be authorized to purchase additional offsets or emissions allowances to replenish the pool, and assess projects for this cost as a normal cost of risk insurance (e.g. premiums for flood insurance may rise in the years after a major flood event). Authorizing emissions allowance purchases as a fall-back (assuming regulations are passed) will go a long way to improve confidence in forest offsets.

p. 27, 8.1 Crediting Period and Required Duration of Monitoring Activities
There seems to be some confusion over whether projects must monitor for 100 years from the time the *first* reduction achieved by the project is measured and reported, or from the time the *last* reduction is measured and reported. Suggested wording: "The

Reserve requires all forest projects to ensure the project's CRTs are sustained for 100 years from the year in which the *last project* reduction is measured and reported."

p. 38, 8.2.1 Annual Monitoring Report, Disturbances
In order to determine how reversals are treated, the annual report should state whether any disturbance was planned (requires compensation by the individual project) or unintended (may be eligible for compensation through the buffer pool). Reporting of unintended reversals should include documentation that the event was an act of nature outside the control of the project, just as an insurance claim would require an investigation to protect against insurance fraud.

p. 39, 9.1 Forest Carbon Inventory
This section distinguishes intentional from unintentional reversals, and we urge that distinction apply as well to Section 7.2.2. Text refers to a remedy for intentional reversals as defined in a PIA, but that aspect of a PIA is not clearly described.

p. 51, A.3 On Site Forest Inventories
The revised procedure allows projects to forego field sampling for as long as 18 years. Models used to estimate carbon pools should be carefully checked to ensure that they accurately account for changes in non-tree carbon pools (particularly below-ground tree carbon and standing and down dead wood). Most growth models were developed to track merchantable volume, so they do not fully reflect the effects of harvest practices on other carbon pools. Given these limitations, it is unlikely that models alone would produce overall inventory estimates within +/-20% of the mean at 90% confidence (the threshold for a 100% risk contribution, which essentially makes the project not creditable). Until models better reflect non-tree carbon pools, field sampling should be required for these pools whenever a significant disturbance, including harvest activity, takes place.

p. 56, On Site Forest Inventories, Step 4
Down dead biomass should be included in initial project inventory, because this pool is likely to be reduced under some common management practices, and its removal could in some cases result in creditable off-site harvested wood carbon.

p. 58, On Site Forest Inventories, Steps 5 and 6
Litter and soil carbon should also be required pools when the project design indicates that planned practices may deplete these carbon pools over time.

p. 59, A.4 Estimate Carbon in Wood Products
This section as a whole should make some reference to updating assumptions due to improved data or changes in technology or consumer behavior (just as forest growth models will be adjusted over time). One suggestion would be for the protocol to use wood products estimation methods consistent with the EPA's annual Inventory of U.S. Greenhouse Gas Emissions and Sinks. This report uses the same basic assumptions as the 1605(b) tables, but the methodology is updated regularly. New offset projects could utilize the estimation methods in place at the time their project is first registered.

The following statement seems to imply that only landowners who also operate their own mills may claim wood products credits. "A harvest that leads to the production of wood products within your entity must occur for the wood products pool to have value."

The text describes the harvested wood credited by the proposed CAR methodology as "average adjusted value for wood that is estimated to still be in-use after 100 years". The factors proposed are actually much higher than the amount of wood still in use after 100 years. A better description of the methodology would be "amount of wood that is estimated to still be in-use each year [see below for an accurate formula that would fit this description], averaged over a 100 year period".

p. 59, Estimate Carbon in Wood Products, Process 1

The text mentions BOE reports, which are specific to California. When applied outside California, other reliable means of determining wood volume delivered to the mill will need to be substituted.

p. 60, Accounting for Mill Inefficiencies, Process 2

The text implies that the 1605(b) mill conversion rate of 67.5% for Pacific Southwest softwoods will apply whenever CAR mill efficiencies specific to each assessment area are not available. The 1605(b) figure applies to softwood only and does not distinguish between sawlogs and smaller material. The 1605(b) table provides a mill conversion rate of 56.8% for all hardwood west-wide, and this would be a more appropriate default figure for hardwood. If CAR develops mill conversion rates for each assessment area, that will be an improvement over the regional 1605(b) estimates, but even a mean value for an assessment area will be extremely imprecise since areas are so large. Data for sawlogs and smaller logs, softwood and hardwood, from the specific mills served by a project, would greatly improve the accuracy of the estimates, and this information could be collected while surveying project mills for wood product types.

The conversion percentages in the 1605(b) table also *assume no bark*. Bark is generally used for very short-lived uses like fuelwood or mulch, so this portion will need to be deducted before computing product mass if the roundwood volume delivered to the mill includes bark. Pacific Coast softwood bark is about 15% of total roundwood volume including bark (US Forest Service, GTR NE-343 Table 5).

p. 61, Estimate Carbon in Wood Products, Process 3

The CAR response to TWS' comments on the wood products draft states that the 5-year-interval averaging procedure is simpler than averaging annual amounts and will result in similar results. Please reconsider our comments. Averaging all years in the 100-year modeling period for each product type would be no more complex than calculating the average of values at five-year intervals. Once an average is computed, participants merely multiply their initial wood product figure by the computed factor, just as they would under the CAR proposal. The alternative approaches can differ significantly for short-lived products like paper. The year-by-year in-use estimates by product type, from Table 8 of US Forest Service GTR NE-343, are copied below for your reference, along with averages starting in Year 0 and Year 1 and the factors from CAR draft Table A.5.2. Ken Skog, Supervisory Research Forester at the US Forest Products Laboratory, concurs that averaging the annual amounts would be preferable to averaging the values at five-year intervals.

USFS GTR NE-343, Table 6

Year after production	Softwood lumber	Hardwood lumber	Softwood plywood	Oriented strandboard	Non-structural panels	Misc. products	Paper
0	1	1	1	1	1	1	1
1	0.973	0.938	0.976	0.983	0.969	0.944	0.845
2	0.947	0.882	0.952	0.967	0.939	0.891	0.713
3	0.922	0.831	0.93	0.952	0.911	0.841	0.603
4	0.898	0.784	0.909	0.937	0.883	0.794	0.509
5	0.875	0.741	0.888	0.922	0.857	0.749	0.43
6	0.854	0.701	0.869	0.908	0.832	0.707	0.36
7	0.833	0.665	0.85	0.895	0.808	0.667	0.299
8	0.813	0.631	0.832	0.881	0.785	0.63	0.243
9	0.795	0.6	0.815	0.869	0.763	0.595	0.192
10	0.777	0.571	0.798	0.856	0.741	0.561	0.149
11	0.76	0.545	0.782	0.844	0.721	0.53	0.115
12	0.743	0.52	0.767	0.832	0.701	0.5	0.088
13	0.728	0.497	0.752	0.821	0.683	0.472	0.068
14	0.712	0.476	0.738	0.81	0.665	0.445	0.052
15	0.698	0.456	0.724	0.799	0.647	0.42	0.04
16	0.684	0.438	0.711	0.789	0.63	0.397	0.03
17	0.671	0.421	0.698	0.778	0.614	0.375	0.023
18	0.658	0.405	0.685	0.768	0.599	0.354	0.018
19	0.645	0.389	0.673	0.759	0.584	0.334	0.013
20	0.633	0.375	0.662	0.749	0.569	0.315	0.009
21	0.622	0.362	0.65	0.74	0.555	0.297	0.006
22	0.611	0.349	0.639	0.731	0.542	0.281	0.005
23	0.6	0.337	0.629	0.722	0.529	0.265	0.004
24	0.589	0.326	0.619	0.713	0.517	0.25	0.003
25	0.579	0.316	0.609	0.705	0.505	0.236	0.002
26	0.569	0.306	0.599	0.697	0.493	0.223	0.002
27	0.56	0.296	0.589	0.689	0.482	0.21	0.001
28	0.551	0.287	0.58	0.681	0.471	0.198	0.001
29	0.542	0.278	0.571	0.673	0.46	0.187	0.001
30	0.533	0.27	0.563	0.666	0.45	0.177	0.001
31	0.525	0.263	0.554	0.658	0.44	0.167	0
32	0.517	0.255	0.546	0.651	0.431	0.157	0
33	0.509	0.248	0.538	0.644	0.421	0.149	0
34	0.501	0.241	0.53	0.637	0.412	0.14	0
35	0.494	0.235	0.522	0.63	0.404	0.132	0
36	0.487	0.229	0.515	0.623	0.395	0.125	0
37	0.48	0.223	0.508	0.617	0.387	0.118	0
38	0.473	0.217	0.5	0.61	0.379	0.111	0

Year after production	Softwood lumber	Hardwood lumber	Softwood plywood	Oriented strandboard	Non-structural panels	Misc. products	Paper
39	0.466	0.211	0.493	0.604	0.372	0.105	0
40	0.459	0.206	0.487	0.598	0.364	0.099	0
41	0.453	0.201	0.48	0.592	0.357	0.094	0
42	0.447	0.196	0.474	0.586	0.35	0.088	0
43	0.441	0.191	0.467	0.58	0.343	0.083	0
44	0.435	0.187	0.461	0.574	0.337	0.079	0
45	0.429	0.183	0.455	0.568	0.33	0.074	0
46	0.423	0.178	0.449	0.563	0.324	0.07	0
47	0.418	0.174	0.443	0.557	0.318	0.066	0
48	0.413	0.17	0.437	0.552	0.312	0.063	0
49	0.407	0.166	0.432	0.546	0.306	0.059	0
50	0.402	0.163	0.426	0.541	0.301	0.056	0
51	0.397	0.159	0.421	0.536	0.295	0.053	0
52	0.392	0.156	0.416	0.531	0.29	0.05	0
53	0.387	0.152	0.411	0.526	0.285	0.047	0
54	0.383	0.149	0.405	0.521	0.28	0.044	0
55	0.378	0.146	0.401	0.516	0.275	0.042	0
56	0.373	0.143	0.396	0.511	0.27	0.039	0
57	0.369	0.14	0.391	0.506	0.265	0.037	0
58	0.364	0.137	0.386	0.502	0.261	0.035	0
59	0.36	0.134	0.382	0.497	0.256	0.033	0
60	0.356	0.131	0.377	0.493	0.252	0.031	0
61	0.352	0.129	0.373	0.488	0.248	0.029	0
62	0.348	0.126	0.368	0.484	0.244	0.028	0
63	0.344	0.124	0.364	0.479	0.239	0.026	0
64	0.34	0.121	0.36	0.475	0.236	0.025	0
65	0.336	0.119	0.356	0.471	0.232	0.023	0
66	0.332	0.117	0.352	0.466	0.228	0.022	0
67	0.329	0.114	0.348	0.462	0.224	0.021	0
68	0.325	0.112	0.344	0.458	0.221	0.02	0
69	0.321	0.11	0.34	0.454	0.217	0.019	0
70	0.318	0.108	0.336	0.45	0.214	0.018	0
71	0.314	0.106	0.332	0.446	0.21	0.017	0
72	0.311	0.104	0.329	0.442	0.207	0.016	0
73	0.308	0.102	0.325	0.438	0.204	0.015	0
74	0.304	0.1	0.321	0.435	0.201	0.014	0
75	0.301	0.098	0.318	0.431	0.198	0.013	0
76	0.298	0.096	0.314	0.427	0.195	0.012	0
77	0.295	0.095	0.311	0.423	0.192	0.012	0
78	0.292	0.093	0.308	0.42	0.189	0.011	0
79	0.289	0.091	0.304	0.416	0.186	0.01	0
80	0.286	0.09	0.301	0.413	0.183	0.01	0
81	0.283	0.088	0.298	0.409	0.181	0.009	0
82	0.28	0.086	0.295	0.406	0.178	0.009	0
83	0.277	0.085	0.292	0.402	0.175	0.008	0
84	0.274	0.083	0.289	0.399	0.173	0.008	0

Year after production	Softwood lumber	Hardwood lumber	Softwood plywood	Oriented strandboard	Non-structural panels	Misc. products	Paper
85	0.271	0.082	0.286	0.395	0.17	0.007	0
86	0.269	0.081	0.283	0.392	0.168	0.007	0
87	0.266	0.079	0.28	0.389	0.166	0.007	0
88	0.263	0.078	0.277	0.386	0.163	0.006	0
89	0.261	0.076	0.274	0.382	0.161	0.006	0
90	0.258	0.075	0.271	0.379	0.159	0.006	0
91	0.256	0.074	0.269	0.376	0.156	0.005	0
92	0.253	0.073	0.266	0.373	0.154	0.005	0
93	0.251	0.071	0.263	0.37	0.152	0.005	0
94	0.248	0.07	0.261	0.367	0.15	0.004	0
95	0.246	0.069	0.258	0.364	0.148	0.004	0
96	0.243	0.068	0.255	0.361	0.146	0.004	0
97	0.241	0.067	0.253	0.358	0.144	0.004	0
98	0.239	0.066	0.25	0.355	0.142	0.003	0
99	0.236	0.065	0.248	0.352	0.14	0.003	0
100	0.234	0.064	0.245	0.349	0.138	0.003	0
Average (starting Year 0)	0.463	0.250	0.484	0.582	0.380	0.176	0.058
Average (starting Year 1)	0.458	0.242	0.479	0.577	0.373	0.168	0.048
CAR factors	0.474	0.262	0.490	0.585	0.387	0.189	0.078

The Wilderness Society continues to believe that using the 1605(b) approach, which credits harvested wood carbon estimated to remain in year 100, would be much simpler and a better compromise position (see below).

The use formulas summarized by the CAR factors in Table A.5.2 are applicable *after products are placed in use*. Losses that occur *between mill and placing products in use* (secondary processing, construction), which may amount to 10% to 80% of wood material, are not accounted for.

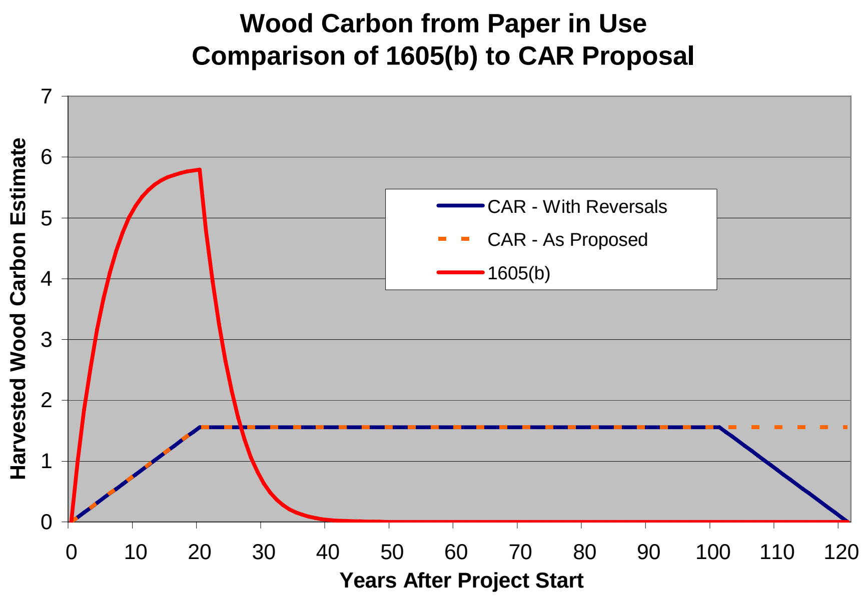
p. 61, Estimate Carbon in Wood Products, Process 3

The following statement needs clarification: "Since the values incorporate a 100-year in-use value there is no need to make further adjustments with time." Projects must be monitored for 100 years after the *last* credit is verified, so the entire monitoring period could theoretically extend to 150 or 200 years. Following the recommended CAR procedures, harvested wood carbon credited from the first year of a 20-year project is reported as part of the harvested carbon pool during the entire 100 year period after that wood is harvested. After that time, products continue to leave use each year, hence no longer contribute to long-term storage. Continuing to credit the average amount *after* 100 years will further overestimate harvested wood storage.

The chart below illustrates the treatment of one metric ton of carbon embodied in paper produced annually during a twenty year crediting period, followed by 100 years of monitoring, under three assumptions.

- The red line shows carbon in-use estimates using the 1605(b) parameters, which would allow no credit for carbon in-use for paper, due to its relatively short use life.
- The orange dotted line shows the CAR procedure as proposed, which apparently proposes to continue crediting harvested wood carbon beyond 100 years after harvest. This scenario implies that the five-year interval carbon average continues to be stored 100 years after manufacture, which is clearly not a conservative assumption when compared to the actual projections of carbon in-use.
- The blue line shows the situation if wood carbon is debited from the harvested wood pool after 100 years. No compensation would be required for reversals after year 100 for the carbon harvested in year 1, but the year 1 harvested carbon should not continue to be counted along with the pools attributed to years 2 and later.

Avoidance of such complex accounting was the reason the 1605(b) program chose to credit only wood product carbon remaining as of Year 100. This approach undercounts earlier storage but overcounts later storage, and is a reasonable compromise. We recommend returning to the simpler 1605(b) methodology.



Sample project that annually produces paper containing 1 ton of carbon, ceases claiming carbon credits at year 20, monitors for another 100 years.

p. 61, Estimate Carbon in Wood Products, Process 4

If landfilled wood is ever considered as a credited harvested wood pool in future protocol revisions, it will be critical to report methane emissions from wood decomposition. Approximately 50% of carbon from decomposing wood in landfills is released as methane, which is 25 times more potent than carbon dioxide as a greenhouse gas. Depending on the amount of wood that decomposes, rate of decomposition, and extent to which methane is flared or captured for energy, methane emissions can overwhelm any wood storage advantages of landfills.

p. 67, C.2 Management Risk II and III
Clarify that the remedy for conversion or over-harvesting requires full replacement of credits. Leaving standards entirely to the PIA leaves room open for unequal treatment.

p. 67, C.3. Social Risk
Text states that social risk totals 5% but table shows 2%.

pp. 69-70, Natural Disturbance Risk, C.4.1 and C.4.2
The assumption that risk of loss to insects, diseases and windthrow doubles when forests are not harvested at least every 30 years appears unfounded, particularly as a general rule to be used nation-wide. It is just as likely that harvest will increase these hazards as that it will reduce them. Harvest that simplifies stand structure, decreases species or age diversity, or damages soils or residual stand would likely make stands more vulnerable to insect and disease outbreaks. Many stands are more susceptible to windthrow after thinning. Rather than try to distinguish risk based on harvest activity, given the varied responses of specific ecosystems to different harvesting methods, a single risk factor for disturbances would be most appropriate.

Thanks again for the opportunity to comment. We look forward to seeing the final results.