Summary of comments and responses on the Task 4 - Final Report: Improved Biogenic Emission Inventories across the West project

#	Commenter	Section	Page	Draft Final Report Comment	Response for Final Report
Comments from Mike Barna, National Park Service, March 9, 2012					
1	Mike Barna	5.1	71	The large difference in NOx emissions between MEGAN 2.10 and BEIS (e.g., 1,000 tpd versus 2,200 tpd, respectively, as shown in Table 5.1.4) could potentially have a significant influence on ozone and PM nitrate concentration, as well as nitrogen deposition. Although beyond the scope of this study, this would be an interesting sensitivity test to evaluate within a regional model (along with, of course, evaluating the effects of different VOC emissions). Are there any flux measurements that would help constrain the difference of soil-emitted NOx between MEGAN 2.10 and BEIS?	Although a few measurements of soil NO emissions have been made, there is no publically available database that can be used for this and there are no data that we know of for 2008. Thus there are no observations that we could use to directly evaluate these emission estimates.
2	Mike Barna	4.2.1 - 4.2.3	49 - 52	Can MEGAN 2.10 create even finer-scale inventories (e.g., 1 km) than the 4 km inventory developed for this study? This might be useful for future air quality modeling in complex terrain which might employ nested grids beyond 4 km.	Yes, MEGAN can estimate emission inventories at 1 km resolution. This can be done with the publically available MEGAN inputs which are available at 1 km. Some of the base landcover data for MEGAN are available at even higher resolution and so it is possible to create inventories with even finer resolution. A discussion is added to the text.
3	Mike Barna		39 Table note	A small typo at the bottom of p. 39: change "depended" to "dependent"	The typo has been corrected.
Comments from Patrick Barickman, State of Utah, Division of Air Quality, March 2, 2012					
4	Patrick Barickman	4.0	47	All of the information in this paragraph is stated in the second paragraph of the executive summary. Is it necessary that the same information be repeated in this chapter?	It is a reminder and for complete work description. So text is unchanged.
5	Patrick Barickman	4.0	47	Same author's reference is given on page 44, 3.1.1 MEGAN model description	Shorten the list to "by the National Center for Atmospheric Research (NCAR) with contributions from other institutions."

6	Patrick Barickman	4.2.1	49	This paragraph confuses me in that it seems to be at odds with the conclusions in section 6. It is stated twice in the conclusions that the 8-day LAI is a benefit and enhancement to v2.10.	The paragraph has been revised to clarify these points.
7	Patrick Barickman	4.3.3	67	Is there a URL that could be referenced here?	The reference is added in Reference Section
8	Patrick Barickman	5.2 Isoprene Emission	78	Unclear	Text was edited to be more specific.
9	Patrick Barickman	6.0	102	During both?	Yes, MEGAN v2.10 estimates lower isoprene and CO emissions than MEGAN v2.04 for all domains and the two periods. See Table 5.2.1.
10	Patrick Barickman			Typos	Typos are corrected.
Comments from Tom Pierce, Atmospheric Modeling and Analysis Division NERL/ORD/USEPA, March 9, 2012					
11	Tom Pierce	2.0	7	Add USDA crop data to the BEIS3.14 box on "species composition"	Added to the text
12	Tom Pierce	2.1	8, 10	While attempts were made to adjust for sub-pixel scale variations in LAI due to variations in vegetation type, I am still concerned that LAI might be overestimated using the approach that is discussed. It would be interesting to see how the satellite-derived estimates compare to a grid of ground-sampled LAIs	There is a maximum LAI value which is now given in the text. In general, the satellite LAI is lower than the values specified by BEIS. Studies of MODIS LAI validation by comparison to ground observations are mentioned in the text and references are given. A comparison of MEGAN and BEIS values with ground-sampled LAI would be valuable but is beyond the scope of this project.
13	Tom Pierce	2.1.1	11	I am concerned about how LAI is treated in urban areas. The text indicates that it is "mapped" from surrounding areas.	This approach allows for lower LAI in arid western regions (e.g. Phoenix) than in eastern cities such as Atlanta which have much higher biomass density for vegetation covered landscapes
14	Tom Pierce	2.1.1	12	Is it reasonable that LAI goes as high as 17? This must be double-sided; are the double-sided values used in MEGANv2.10?	The figure title indicates that this is 17 m2 per 10 m2 (the unit used for the MEGAN LAI data in order to reduce file size by having integer data). This is equivalent to 1.7 m2/m2, which is a moderate value for LAI. This is now noted in the figure caption.

15	Tom Pierce	2.1.1	12, 14	The figures on these two pages seem inconsistent relative to the values of LAI. The figure on p. 14 implies a single-sided LAI. The figures should be made consistent and it should be verified that LAI is properly treated in the model.	The LAI values in the two figures are consistent. The units (m2 per 10 m2) are now noted in the figure caption.
16	Tom Pierce	2.2.2	22	Maybe I did not read carefully, but it is not clear to me how the FIA plot data were grouped to form a tree distribution for an area. How did the authors consider the "spatial randomness" assigned to the publicly available FIA data /or/ were they able to get the uncensored raw information?	Uncensored raw information was used.
17	Tom Pierce	2.2.3	22-23	Again, the importance of urban areas is noted.	We agree that urban areas are important.
18	Tom Pierce		32	Nice summary here!	We appreciate the comment.
19	Tom Pierce	Table 3.2.1	39	LAI in BEIS3.14 does vary temporally, although in a very crude manner. For "deciduous" vegetation types, there is a "frozen" (low) and "non-frozen" (high) LAI value in the BEIS emission factor table. Also, although I was unable to verify in the code, I believe that BEIS does vary MBO emissions as a function of light, as well as temperature.	The table has been revised to reflect BEIS LAI variations and BEIS light response for MBO and methanol (see comment 27).
20	Tom Pierce	3.2.2	40	The description of how BEIS treats LAI is somewhat misleading. Spatially, LAI varies by tree cover percentage (1 km) and by county-level tree species distribution.	The text has been revised to better describe BEIS LAI variations
21	Tom Pierce	3.2.3	45 (44?)	I was unable to check, but BEISv3.14 may do the "2 day" temperature adjustment. It's been a long time since I've been in the code, and I assume the authors actually went in and checked it.	This is not included in BEISv3.14- see comment 26
22	Tom Pierce		46	How does MEGAN deal with irrigated crops for soil NO? The precipitation algorithm should not be used for them.	Soil NO emissions from irrigated crops are not adjusted in response to precipitation. The explanation is added into the report.
23	Tom Pierce	4.2.2	50	"Figure 3.4a" should read "Fig. 4.2.2.1".	Typo is corrected.

24	Tom Pierce	4.2.3	51	The explanation on how spatial emission factors are calculated was a bit fuzzy. Perhaps it would be illustrative to show an example of how these factors were calculated for a small area. General: Along the lines of the above comment, it would be very helpful if an emission factor table mapping vegetation types to isoprene were given, so that the generation of the area varying emission factors was not so mysterious.	Emission factors of the dominant isoprene emitters and text describing the processes of developing the spatial emission factors has been added to section 4.2.3
25	Tom Pierce	4.2.1	55	It would be interesting to see an evaluation of the two surface PAR estimates (in umol/m2-sec) vs. surface observations.	The evaluation by Pinker et al. (2003) shows good agreement between satellite PAR and ground observations. The reference and discussion are added into the report.
Comments from George Pouliot, Emissions and Model Evaluation Branch, Atmospheric Modeling and Analysis Division/NERL/USEPA ORD, March 12, 2012					
26	George Pouliot			BEIS3.14 does not do a 2-day temperature adjustment as Tom suggested; it uses only the hourly temperatures to estimate the emissions.	Responding to Tom Pierce's comment #21.
27	George Pouliot			However, for Isoprene, MBO and Methanol, the emission algorithm is a function a light and temperature. All other species are a function of temperature (except NO).	Responding to Tom Pierce's comment #19.