Peer Review Comments and Responses: FLM 1
July 2009

In general, I noticed that much of the data is referenced to a database labeled "Dane County and Community Data, 1970-2000." However, nowhere is there a description of the sources, accuracy and limitations of the data elements which comprise this database. I would suggest that you include an appendix for this, particularly in reference to measurement of agricultural and other open or undeveloped lands.

- *See Appendix A revision. "It should be noted that the findings of this paper are based on historic land use data which were collected to evaluate changes in the use of land, not the present purpose and level of analysis, which poses limitations on the accuracy of the analysis. This data is presented in the Dane County and Community Data 1970-2000 report. The numbers published in the report are based on data collected and assembled for the Land Use Inventory every ten years. The data from this report presents various complications, especially when comparing figures across decades, due to changes in methodology in measuring acreages and categorizing land uses. These limitations have been adjusted for to the greatest extent possible and include:.." All of the limitations listed in Appendix A are based on the data from this report. I clarified that this report is the source of the data and continued with what was already written about the limitations of the data.*

On p.2-3, you indicate that information on small and medium-sized family farms is limited. What are the available sources of information on these operations, and how might they be supplemented by Dane County?

- *See page 18 for added text on this data area. "Land use and operation characteristic data on small and medium-sized family farms. The next issue paper will attempt to gather and assemble or create data on these operations. Informational resources include Dane County, UW Extension, and the 2007 Agricultural Census."*

On p.3, you say that "By comparing these jurisdiction types we can determine where the majority of crop and pasture lands are being lost, and can further investigate why and to what uses they are being lost." Could you elaborate on exactly what method you use to make such determinations? Is the land use conversion being examined at the parcel level, or are you inferring conclusions from use of aggregate data at the minor civil division level? If you are inferring things from aggregated data, please explain what assumptions went into the decision procedure you used.

- *I added text to clarify as follows: "Table 1 illustrates the acreage changes in land uses for the county as a whole, all cities, all villages, and all towns, each of which is a compilation of changes made at the parcel level within that jurisdiction. Parcel level changes are illustrated in the maps accompanying this document. By comparing these jurisdiction types we can determine where the majority of crop and pasture lands are being lost, and can further investigate why and to what uses they are being lost through a decadal analysis of the land use inventory data.*

At the top of p.5, you note that "significant agricultural acreage is being transferred to land uses such as vacant/unused, environmental corridors, wetland restoration, or open space." Could you offer some guidance as to why such conversion is likely to occur in these cases?

- *See footnotes 4-11.*

On p.5, you state that “in 2000 all agricultural land within USAs were categorized as vacant”. Could you explain why this was the case?

- *See footnote 4: In 2000, the City of Madison land use was created by using a conversion table from their existing parcel dataset. Those lands that were annexed and not yet platted were coded as being vacant rather than agricultural in nature. The assumption is that at the time the City of Madison did not have a land use code for agricultural uses. The City of Madison is the only community in Dane County (2000 and 2005) that maintains their own parcel coverage and land use coverage. A conversion is necessary for all comprehensive land use datasets. The 2005 land use dataset corrected for this “vacant” error as detailed analysis identified these areas and errors in the conversion.*

On p.5, you also mention the “recategorization of large areas of pasture into the other open lands category, which increased by just over 42,000 acres in the twenty year period. Determining exactly how much of this land use changed as a result of re-categorization is beyond the scope of this report.” Even though a quantitative estimate is beyond the report’s scope, it would be helpful if you could at least lay out some of the major qualitative reasons why pasture might have been placed in the open lands category, and some of the difficulties posed in trying to identify the ag lands there.

- *See Footnote 7: For the purposes of land use categorization, lands were categorized as being agricultural in nature if they were cultivated, had fenced animals on them or agricultural buildings on them. Fallow farm fields were categorized as open land because they were not being cultivated. Fields used for grazing were coded as open land since they were also not being cultivated.*

On p.6, you indicate at the top that 37,000 acres of developed acreage were added in Dane Co. from 1980 to 2000. Yet in paragraph 2 on that page, the sum of acreages converted to development that are cited there only add up to 32,700 acres. Could you explain the source of the discrepancy? Also, could you explain for each category of land converted to developed use, how these figures were specifically derived? What method was used?

- *Numbers for outdoor recreation, institutional, and communications/utilities uses were not included in this paragraph. I have added them*.

- *There were derived differently for each year using a combination of aerial photos, site visits, surveys, and questionnaires for 1970, 1980, and 1990. The details of this will not be incorporated into the report, as it is quite complicated. The 2000 and 2005 land use totals were measured using a comprehensive GIS dataset of land use categories based on detailed site by site analysis of every parcel in Dane County. These parcels were often split into multiple categories. For example a 40 acre farm field might have a small (2 acre) grove of trees in one corner, a pond in another and a cell tower in another corner. This one parcel would be split three times creating four polygons each with a different land use code. The woodland, water and farm field would be considered undeveloped while the cell tower would be considered developed.*

In Appendix A, you indicate that in most cases, the adjustments to the land use inventory methodology from one decade to the next decade resulted "in lower numbers for crop and pasture acreages, revealing that crop and pasture acreage numbers prior to 2000 were higher than what actually existed on the land." It would be useful if you summarize for each decadal change, the total amount of the nominal farmland acreage change, or net decline, in crop and pasture acreage, that was due to reclassification/redefinition, rather than **actual** decline in such land use/cover. This would include all of the various individual adjustments you point out were made to crop and pasture lands based on re-definitions of the categories for open space, vacant and undeveloped land, farm residences, woodlands, and farm pools in Appendix A. I didn't see this included anywhere in the report.

- *At this point it is not possible to do this. Accurate data does not exist. Efforts are underway to work backwards and recreate these land use years. This is identified in the 'data needed' section of the report and will potentially be worked on by an intern hired to complete the coding for the 2010 Land Use Inventory.*

In Appendix A, you point out that farm dwellings were counted as residential uses in 1980 and 1990, but counted as agricultural land in 2000. To make the figures commensurable between decades, you say farm dwelling acreage was removed from the residential category in 1980 and 1990, and inserted into the ag land category for those years. However, since it would be more exact and involve less error to make adjustments to the year 2000 digitized data, wouldn't it make more sense to subtract the farm dwelling acreage from the year 2000 agricultural land acreage instead? Arguably, in terms of actual use, the farm dwellings should be included in the residential land category anyhow, and not in the farmland categories. Also, which farmland category did you add the farm dwelling acreage to – cropland or pastureland? And what rationale did you use for distributing farm dwelling acres to either cropland or pasture?

- *In 2000, farm dwellings were not measured separately from agriculture, therefore it is not possible to subtract farm dwelling acreages from this number.*
- *In terms of actual use, the farm dwellings are being used by the farmer who farms the land therefore his home is used to directly support the farm. This is not true for the second, third or more homes associated with the farm which likely could be sold off to someone not related to the farm owner. Considering some of the farm homes are embedded deep within numerous barns and buildings it would be rather difficult to tease out the acreage of the land used for farm dwellings and not for agricultural use. Sheds or detached garages were considered to be associated with their single family homes despite being separate. Farm dwellings (primary) are considered in the agricultural land use category. In 1990 and prior farm dwellings were identified by a simple point and it is assumed that a standard multiplier was used to calculate the size of each rather than digitizing the boundary of farm dwellings.*
- *"Crop" and "pasture" are one category, therefore it does not matter whether the number went to either one. They were not added to "other open space," which contains large swaths of pasture.*

You indicate in Appendix A that farm dwelling acreage was typically one or two acres per farm in the 1980 and 1990 data. Since the data was not digitized for those years,

and hence not measurable directly, what assumptions were used to make such an estimate?

- *In 1990 and prior farm dwellings were identified by a simple point and it is assumed that a standard multiplier was used to calculate the size of each rather than digitizing the boundary of farm dwellings. This assumption is supported by zoning rules for on-site septic systems that typically require a minimum of 1 to 2 acre lots. Also in digitizing and coding every single acre of land in Dane County for 2005, it was found that the majority of the farm dwellings are near the road with agricultural buildings behind and a 50-100 foot driveway, typically amounting to 1-2 acres.*

In Appendix A, you indicate that some woodlands were counted as agricultural land prior to 2000. Please give an estimate of this acreage.

- *See page 19: I estimate 5-10,000 acres, but state no more than 13,400 acres in the report and no less than 4,000 acres. Land uses prior to 2000 did not have rural lands digitized into the GIS and therefore blanket categories were applied. Work will completed to deal with this limitation in the work for completing the 2010 Land Use Inventory.*

In Appendix A, you indicate that "large areas of pasture were categorized as other open land in 2000." Could you provide some background on why this was the case, and estimate the amount of such acreage? I would think this acreage should be added back into the Crop/Pasture category, especially since you have digitized data to work with for year 2000.

- *See page 20: An estimate is not available since the cows were not in the pasture fields at the time of aerial flight nor did the farmers indicate which of their lands were pasture and which were for cultivation. For the purposes of land use categorization lands were categorized as being agricultural in nature if they were cultivated, had fenced animals on them or agricultural buildings on them. Fallow farm fields were categorized as open land because they were not being cultivated. Fields used for grazing were coded as open land since they were also not being cultivated.*

In Appendix A, you indicate that certain lands within the CUSA previously categorized as agricultural were reclassified as "vacant/unused" in year 2000. You state that this was done "to reflect the intent of urban service areas as areas that are planned to be developed". You indicate that no adjustment was made for this since you didn't know the acres so affected. I would argue that it is highly flawed to classify lands in current agricultural use based on assumptions about their future use. A survey of existing land use should be consistent at only describing lands based on such existing uses. I would strongly advise that you make a concerted effort to identify all vacant/unused lands in the CUSA that were classified as ag in 1990 and shift them back to the agricultural category if they are still in agricultural cover/use in year 2000.

- *One purpose of the Land Use Inventory is to measure vacant developable land area in Urban Service Areas, which are by definition planned for urban development within the planning period. Therefore, this assumption make sense under this purpose of the Inventory.*
- *In 2000 the City of Madison's land use was created by using a conversion table from their existing parcel dataset. Those lands that were annexed and not yet platted (mostly on the*

periphery) were coded as being vacant rather than agricultural in nature. The assumption is that at the time the City of Madison did not have a land use code for agricultural uses. The City of Madison is the only community in Dane County (2000 and 2005) that maintains their own parcel coverage and land use coverage. A conversion is necessary for all comprehensive land use datasets. The 2005 land use dataset corrected for this "vacant" error as detailed analysis identified these areas and errors in the conversion. However, the 2005 methodology of coding lands based on their use not the City of Madison use is being employed for all previous land use datasets. A corrected 2000 land use could be issued if time can be allocated into redoing this project.

You indicate that farm ponds were counted as agricultural land uses in 1990, but reclassified as water in year 2000. Explain why farm ponds were shifted out of ag use in year 2000. I would argue that the decisive criterion for classifying ponds on farm parcels should be whether the use of the water was an integral part of the farm operation, or not. For example, farm ponds used for aquaculture, for irrigation, or for farm animals in a dedicated way should be included within the agricultural use category.

- *The GIS boundaries did not exist in 1990 and prior. The redo of these datasets will incorporate farm ponds. Water on the surface of the land was coded as water for land use regardless of what the water was used for. Perhaps future land use inventories can identify whether the water body is for agricultural or not, and maintain this as a sub-set of water that could be easily added to agriculture, although this information maybe difficult to gather. Simply adding it to agriculture maybe misleading and the data would be compromised yet again.*

On page 3, paragraph 4.: "It also discusses the roles of annexation and residential development and how they impact farmland consumption." , and the subsequent discussion of annexation on page 5, paints urban density development as the enemy, rather than the friend of farmland preservation. This approach perpetrates the myth that annexation is necessarily bad, when it generally is really helpful. To be specific, Table 1 identifies 63,197 acres of developed acres in the Towns in the year 2000 – compared to an aggregate Town population of 74,740 (and these numbers include urban towns – which should be broken out separately). This is a density of 1.18 persons per developed acre. Compare this to a density of 4.59 in the Villages and 5.74 in the Cities. (Note also, that the "developed acres" measurement includes employment and institutional uses, enjoyed by all County citizens, which are much more predominant in urban areas. Although annexation certainly results in farm land loss, it is loss to development that is at least between 4 and 5 times more efficient than farm land lost to development in lands that are not annexed. Please consider providing a more appropriate emphasis on where we are being most wasteful with converted farmland; and consider differentiating between predominantly urban and rural towns and between Madison and the smaller cities. I think this is a very important issue, and if left unaddressed, will severely undermine the traction these efforts attain at the city and village level, and ultimately at the county board.

- *See changes made to pages 6-7*

In terms of metrics, please clarify how the measurement of "developed acres" is done for rural residential lots. Specifically, is there an assumed area of development – say one acre?

- *In 1990 and prior farm dwellings were identified by a simple point and it is assumed that a standard multiplier was used to calculate the size of each rather than digitizing the boundary of farm dwellings. This assumption is supported by zoning rules for on-site septic systems that typically require a minimum of 1 to 2 acre lots. Also in digitizing and coding every single acre of land in Dane County for 2005, it was found that the majority of the farm dwellings are near the road with agricultural buildings behind and a 50-100 foot driveway, typically amounting to 1-2 acres.*
- *Rural residential lots are digitized based on the portion of land that being mowed or used with playgrounds etc. If the property is dense woods then it was coded as such. If a 10 acre lot had a house on the corner and the rest was not mowed, not forest, not cultivated, not water, then it was likely coded as open land. No assumed area of development. Some residential lots in heavily wooded areas might be only one acre in size despite the land owner having 10 acres.*

If so, does the assumption account for the tendency for "undeveloped" portions of lots between 1 and 20 acres to gradually be taken out of agricultural use over time? Has the County, RPC or anyone else ever tackled the math on this issue?

The open lands re-categorization issue looks like a gaping loophole in the analysis. The following paragraph (p. 5) makes it sound like 94,000 acres was lost to agriculture but almost half (42,000) is some kind of statistical typo. This needs to be polished a little so it's not so glaring. One radical option would be to combine crop, pasture and open land throughout.

- *Not almost half. That would assume that all of the growth was due to the re-categorization, where land use did not actually change, when in some cases it did. This would also combine crop/pasture with open lands that are not agriculturally related, such as environmental corridors.*
- *I changed the text as such so that this limitation is not so glaring and is more indicative of what may have actually taken place on pg. 5 "Towns have seen the largest decline in crop and pasture lands, about 94,500 acres[1] in the county between 1980 and 2000. This loss in crop and pasture is greatly affected by the re-categorization of large areas of pasture into the other open lands category in 2000[2]. Determining exactly how much of this land use changed as a result of re-categorization is beyond the scope of this report, however an estimate is that no more than 32,900 acres (the total gain in open lands from 1990 to 2000) were transferred from crop/pasture to the open land category in 2000. It is likely that this number is considerably smaller if previous conversion trends continue, as about 15,200 acres of open land were converted from another land use between 1980 and 1990 before the re-categorization took place."*

A very minor point. On page 14, I think you want the word "tract" to refer to expanses of ag land.

- *Fixed. Thanks.*

[1] Number was reduced to account for changes in water re-categorization. See appendix A for more details.
[2] See footnote 7.

Be consistent with your numerical notations in the text, round to the nearest 100 or 500 or 1000. With the actual numbers listed in nearby tables you can round more readily. Example: p5. 2nd paragraph under annexation.

24,000 acres, 16,000 acres, 8,050 acres- there appears to be something odd about the 8,050...like there some an implied precision that didn't exist with the other 2 numbers.

- *All number were rounded to the nearest hundred, unless exact or previously published (this is the case with the land demand projection, which was previously published as 42,450 in the Regional Transportation Plan 2030.*

The numbers of prime agricultural land converted between 2000 and 2005 seems really high compared to the other time intervals in the analysis. Can you please explain why this might be?

- *The main reason for such high numbers is the Highway 12 expansion, which converted significant portions of prime agricultural land into transportation. In fact, only about 13,000 total acres were developed in that time period across the county and most was that project. A similar impact occurred with the expansion of Hwy 151 in the T. of York, which is discussed in the Town section of the report. A few large parks that were also created, and quite a few subdivisions in towns were built-out.*