

## ***Interactive comment on “Comparative analysis of hydrologic signatures in two agricultural watersheds in east-central Illinois: legacies of the past to inform the future” by M. A. Yaeger et al.***

**Anonymous Referee #2**

Received and published: 4 August 2013

Specific comments:

Page 6519, line 20: the author refers to “...grasses whose dense, deep root systems...” On the same page, lines 3-5, the author also refers to “...deep rooted vegetation such as trees.” Seems slightly conflicting.

Page 6519, line 26: should read “nitrate-nitrogen.”

Page 6520: should mention the invention of the “clod-busting” plough (ala John Deere) which played a significant part in allowing the Midwestern prairie to be farmed (in addition to tile drainage).

C3799

Page 6521, line 9: write out 2/3 as “two-thirds.”

Page 6523, line 26: should read, “...season; thus, in an effort. . .”

Page 6525, line 13: should read, “...in Kaskaskia, the more recent. . .”

Page 6528, line 12: should read, “...July 15 through November 15. . .” Also, please discuss why this time period was selected (versus, say July 1 through November 1).

Page 6528, line 14: streamflow drought periods?

Page 6529, line 6: please discuss why the threshold (tb) of 3 days was chosen. Did you try different thresholds? Was 3 days recommended in Zelenhasic and Salvai (1987)?

Page 6529, line 13: should read, “Lastly, to gain a quantitative. . .”

Page 6529, line 15: the author wrote that 3 east-west transects are obtained from the PRISM dataset, but in Fig. 5, there seem to be 9? Or Fig. 5 refers to each cell in the dataset? Why discuss transects when you could just say you chose 9 cells that cover the two study watersheds?

Page 6529, line 22: be consistent with the word “inter-annual” or “interannual.”

Page 6531, lines 1-2: note which ones are the “Kaskaskia tributary streams and main-stem reaches above Lake Shelbyville” for the ease of the reader.

Page 6531, line 6: should read, “from May to June and sharp decline from June to July” or something of similar.

Page 6531, line 7 should read, “Thus, three distinct. . .”

Page 6531, lines 8-9: should read, “row-cropped” and “tile-drained.”

Page 6531, lines 11-12: the phrase “with the time element removed” is confusing, as time is still a factor (“At the daily scale”). I understand you mean the “linear” time factor is removed when producing the exceedance plots, but it sounds odd when stated this way. I would recommend just removing “with the time element removed.”

C3800

Page 6531, line 16: should read, "...5% of the time, while upstream..."

Page 6531, line 23: should read, "Also as seen in the regimen curve, the reservoirs' influence..."

Page 6532, line 1: should read, "It is also interesting..."

Page 6532, lines 14-16: The lower than expected values for Decatur are because of Lake Decatur, correct? Similar to what was seen at Rochester? So why was this pattern not expected?

Page 6533, lines 6-8: should read, "Overall, average deficit volumes in the Kaskaskia watershed are fairly small (<0.2 mm), with an average time between deficits in most places of about a week, but varied average deficit durations. Some of the threshold flows..."

Page 6533: line 9: the phrase "as a consequence" is confusing. Please discuss how the very small threshold flows were a consequence of the previous sentence (and which part of the previous sentence?).

Page 6534, line 25: should read, "...this region, which can be seen..."

Page 6534, line 26: should read, "At smaller time scales, this spatio-temporal variability can increase..."

Page 6535, lines 4-5: remove "removing nutrients from."

Page 6535, lines 3-6: large reservoirs reduce flow variability on whichever stem they are located on, not just the main-stem (perhaps this is so in the Kaskaskia). Please clarify the language.

Page 6525, line 11: should read, "...it may be the combined..."

Page 6535, line 20: should read, "Thus, in the summer..."

Page 6536, line 23: should read, "...larger and/or longer..."

C3801

Page 6537, lines 8-9: the phrase, "some regions already had depleted water resources" is confusing. Please elaborate and describe how that influences the spatial variability of the results.

Page 6538, lines 12-15: please elaborate on the point that an increase in the fraction of *Miscanthus* will cause an increase in streamflow deficits and deficit durations and decrease in time between deficit periods. This is a very important point and should be well discussed (i.e., consequences of these increases/decreases).

Page 6538, line 16: should read, "...watersheds such as Sangamon..."

Page 6538, lines 26-29: the statement beginning with, "Furthermore, the empirical analysis..." seems contradictory to one of the main points of this paper, which is (as in the title), "legacies of the past to inform the future." I think this statement is too strong, perhaps you can soften it a bit so as not to seem contradictory.

Page 6539, line 1: should read, "...modeling process; thus, both empirical and physically-based modeling analyses..."

Page 6539, lines 6-7: by "integrated systems model framework" do you mean a system dynamics model? What sort of human actions will you include in the model? If you could elaborate slightly (without tipping your hand too much), that would be great.

Figure 2: I can barely see the difference between the Sangamon and Kaskaskia watershed boundaries (left plot) and river (right plot). Please organize the HUCs by watershed (subwatersheds to Sangamon in one group and Kaskaskia in the other).

Figure 4: the labels for  $t_b$  should be differentiated, as they represent two separate time periods.

Figure 5: the x-axis is cut-off at the right side.

Figure 8: please use months (like Figure 7) instead of numbers. Then you can remove the x-axis title.

C3802

Figure 10: add the following to the caption. Note: the circled area in (a) is the Sugar Creek catchment.

Figure 13: please remove the decimal places from the y-axis.

General comment: The scientific concept is valid and the analysis and is timely. However, I feel that for the amount of effort put into the work (which seems like quite a lot), the conclusions are too short and somewhat lacking. That is, more critical information can be extracted from the authors' work. Currently, a majority of the conclusions are drawn from previous peoples' work. Elaborating your conclusions would be a great way to solidify this paper. Otherwise, great job!

---

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 10, 6515, 2013.