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Interactive comment on "Contrasting watershed-scale trends in runoff and sediment yield complicate rangeland water resources planning" *by* M. D. Berg et al.

Anonymous Referee #1

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Review of Berg et al. – submitted to Hydrology and Earth System Sciences Berg et al. presents reservoir sedimentation data from a series of watersheds in Central Texas and integrates it with long-term precipitation and streamflow data to evaluate the impact of landscape scale changes on water resources. Long-term hydrologic studies that span multiple scales are of high interest to readers of HESS. However, the study has some significant shortcomings that counteract its main message of relatively stable precipitation-runoff relationships despite landscape scale changes. In particular, some of the data presented are less effective in addressing the central questions while other important data are missing. These are outlined in the main comments below. 1. Evaluation of type of vegetation change or changes in potential ET on rainfall-runoff

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Discussion paper

relationships. Given that long-term runoff (Q) is considered as the difference between precipitation and evapotranspiration (Q=P-ET), the authors spend little time evaluating the potential impacts of temperature changes or plant rooting depth on changing ET and Q. If the actual vegetation changes did not result in a change in rooting depth or the length of the plant growing season, then we would logically not expect any change in Q. However if rooting depth and/or growing season length decreased while potential ET increased, then these changes would offset and ET would stay the same. The relationship between these parameters is the most important for predicting rainfall-runoff relationships in the future, yet no data are presented on these variables. Potential ET can be relatively easily calculated from the PRISM data (Oregon State), and the rooting depth and season length could be assigned to each cover type (woody cover, grassland, and crop land). 2. There is no discussion of the impact of slope on sedimentation. I know you focus more on relative changes across time, but I think including the discussion of slope impacts is particularly important, especially with respect to internal sediment storage from on farm ponds. 3. With respect to the baseflow analysis, it would be extremely helpful to know the average pond size across time (Fig. 3). Is it 0.1 hectares, 1 hectare, larger? Moreso than just the pond density, knowing the average size is critical for assessing potential baseflow contributions from pond recharge and reduction in overland runoff. Specific comments: Section 2.1. Would be good to report mean air T, RH, and factors that affect PET. Page 4, line 11: Would be good to included characteristic rooting depths and growing periods for each of these types of vegetation. Page 4, line 16: Would be good to include potential ET in this section. Table 1: Would be extremely useful to have a pond density/average pond size and average upstream slope data for this table. Figure 4: Not sure this figure is needed. Figure 7: This graph seems to duplicate Table 2. I would recommend adding rows to Table 2 with the data from this figure presented there.

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