

Interactive comment on “Characterizing the Potential for Drought Action from Combined Hydrological and Societal Perspectives” by Erin Towler et al.

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General comments:

This is an interesting and important paper that shows an approach to bring together natural and social drought processes. The authors propose an index that is composed of groundwater drought probability and stakeholders ratings of the importance of a water use, with the aim of showing the potential for drought action. I think that this is a very important step in drought research. The literature review and framing of the research are excellent. The results are good, but I do find the work quite “thin”. The authors use groundwater levels from one well and interview results from a previous study, multiply

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these into an index, show only part of the results, and then draw conclusions, some of which are quite obvious. I do think that there is potential for the paper to be published and I give a few suggestions to improve the paper below.

Specific comments:

1) Only the results for drinking water and recreation are shown in Figures 5-7. I would encourage the authors to find a way to show all results. I would suggest combining the plots of the empirical cumulative density functions into one 6-panel figure. I think the different lines will still be visible if you make the figures slightly smaller. Alternatively, the figures of the four remaining water uses can be placed in the appendix / supplementary material and be referred to for more information. Similarly, I suggest to include all decades in Figure 6. It is unclear why some decades have been left out.

2) I think some form of validation is needed. Either by checking back with the stakeholders whether they agree that the index shows more willingness to take action for certain water uses at certain drought levels, or by using historic information. Are you completely sure that there is no information on drought measures being taken in this area (or a comparable area)? Even not for the most recent drought? Did you consider looking at government reports, (social) media or the US Drought Impact Reporter (which includes lots of information on responses as well)? If you do a bit of this, it gives more backing to the statements like on l. 385-386 that the potential for drought action is diverse because the water use values are diverse (this is obvious because that is what you have put in the equation).

3) The interviews were done just after a drought event, which might have influenced the outcomes. Especially since, according to the social memory concept, people might be very aware and willing to save water during and just after a drought, but this awareness and willingness might fade over time when conditions return to normal. I understand that it would take a lot of time to go back into the field and redo the interviews in wet and normal years, but this issue should at least be mentioned in the discussion.

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4) The test of the “new normal” is interesting, but not well developed. Why is it only done for recreation? It would be also interesting for the other water uses, and especially for drinking water. How is the value of 120 feet chosen? Is that a relevant level, because if springs and streams have dried up at 117 feet already, what would be the difference of a level of 120 feet to recreation uses? The paper would be much stronger if you would have a rationale why groundwater levels would go down that much in the future or why different water uses are adapting to lower water availability.

Textual comments:

- There is quite a lot of repetition in the paper. For example the sentence that this study combines hydrological and social perspectives of drought comes back a few times. Maybe you do not need to mention it again in the first paragraph of the Methods? Also, the calculation of the PDAI is mentioned in the Methods and the Results (l.326-328). And the results of the differences in PDAI range are mentioned on lines 342-343, 353-356, and 380-385. It would be good if this could be minimised.
- L.106: can't > cannot
- L.124: Climate Division 8 > please explain or give a reference for readers who do not know what Climate Divisions are
- L.180: is there a word missing here?
- There are a lot of references to Figures and Tables in the Conclusions. It would be better if the Conclusions could be read on a more standalone basis.
- More discussion is needed on the limitations of this study. There is a bit now in the last paragraph of the Conclusions, but this could be developed more.
- Figure 2 & 3: please make the axis labels and legend text a bit bigger (maybe also for Figures 5-7)

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