Author responses to the RC2 comments on Manuscript: ESSD-2016-42, entitled " Weather, snow, and streamflow data from four western juniper-dominated experimental catchments in southwestern Idaho, USA" – Earth System Science Data

- **Reviewer comments are in bold font and author responses are in normal font.**
- **Line number references are to the original manuscript unless otherwise noted.**
- **Quotes from the text are italicized and proposed revisions are underlined.**

RC2 General Comments:

The authors present a six-year hydrometeorologic dataset from four neighboring juniper-dominated experimental catchments. Data are presented from six meteorological stations and four streamflow weirs. Also included are lidar-derived DEM and vegetation height models. The datasets are of excellent quality and provide the necessary input and verification data for hydrologic simulations. The paper is well-written and data are well-described. I find no major flaws and have only limited minor comments. In my opinion, the paper and dataset are publishable with adequate attention to these points.

We thank the reviewer for a thorough review and have addressed the comments below.

RC2 Specific Comments:

1. **Page 1, Line 1: The authors should be more clear in the description of the data being published. "Weather, snow, stream, topographic, and vegetation data …" should be clarified as "Meteorological, snow, streamflow, topographic, and vegetation height data . . .". For example, 'stream data' is vague and could be interpreted differently by a hydrologist, geomorphologist, or biogeochemist. The vegetation data is limited to height data. Best to be as clear as possible in this first sentence.**

   We have made the change as suggested here and in the title. Thank you.

2. **Page 1, Line 13: The logical order of the first paragraph could be improved.**

   We have reordered the first few paragraphs to try to improve the logical flow of information as follows:

"*Across the interior western US, native Western Juniper (Juniperus occidentalis Hook.) is encroaching into sagebrush-dominated (Artemisia spp.) landscapes. These fire-sensitive native conifers in the western U.S. have greatly expanded in response to changing fire regimes following European settlement (Miller and Wigand, 1994; Miller and Rose, 1995; Weisberg et al., 2007; Miller et al., 2000). Western Juniper now dominates over 3.6 million ha of rangeland in the Intermountain Western US. Juniper (Juniperus spp.) expansion into sagebrush ecosystems influences the vegetation community (Bates et al., 2000; Miller et al., 2005; Miller and Tausch, 2001) and the hydrology and soil resources of an area (Pierson et al., 2007, 2010; Williams et al., 2014), which in turn also affects the wildlife habitat. For example, research in similar study sites demonstrate that juniper encroachment diminishes understory biomass (Bates et al., 2000, 2014; Pierson et al., 2013), which serves as a soil stabilization mechanism, forage for livestock, and habitat diversity. At mid to high elevations, expansion of native conifer species is viewed as a major threat to sagebrush obligates such as the greater sage grouse (Centrocercus urophasianus) (Braun, 1998; Connelly and Braun, 1997). Because of the associated impacts on the ecosystem quality and local economy (Aldrich et al., 2005), juniper encroachment has become a critical issue to the region's resource managers and ranchers.*

Although the deleterious impact of juniper encroachment is widely reported through field studies, there are limited datasets available to quantify that impact on larger scales through modeling. To address the need for monitoring data, the South Mountain Experimental Catchments were established in 2007 in a juniper-dominated region of southwestern Idaho, USA (Kormos et al., in press). A period of background data collection has spanning the 2008-2015 water years. The catchments are now being treated to remove juniper so comparative studies can be conducted. Catchment M was burned in the fall of 2015 and catchment G is scheduled to burn in the spring of 2017. The long term treatment plan includes burning catchments F and then E."

3. **Page 1, Line 13: The sentence starting with 'Because' doesn't adequately describe the issues facing managers and ranchers w.r.t. juniper encroachment, in my opinion. Please provide a succinct example of a specific challenge that encroachment presents to each group, rather than a general statement (ecological and economic impacts) that isn't elaborated upon. E.g., how juniper encroachment economically impacts ranchers is not explained.**

We have included the following sentence in the first paragraph to provide an example of the juniper encroachment challenges. Please see our response to the previous comment to see this sentence in the context of the paragraph.

"For example, research in similar study sites demonstrate that juniper encroachment diminishes understory biomass (Bates et al., 2000, 2014; Pierson

et al., 2013), which serves as a soil stabilization mechanism, forage for livestock, and habitat diversity."

And included the following citation in the sentence on economic impacts:

Because of the associated impacts on the ecosystem quality and local economy (Aldrich et al., 2005), juniper encroachment has become a critical issue to the region's resource managers and ranchers.

4. **Page 1, Line 15: If the 'changing fire regimes' term describes 'fire suppression efforts', please state that.**

   We have made the change as suggested as follows:

   "*These fire-sensitive native conifers in the western U.S. have greatly expanded in response to changing fire regimes (increased woody fuels in response to fire suppression efforts) following European settlement (Miller and Wigand, 1994; Miller and Rose, 1995; Weisberg et al., 2007; Miller et al., 2000)*."

5. **Page 1, Line 17: Move the Juniperus spp. definition to the first use of the word 'juniper' on Line 13.**

   This has been addressed in the reordering of the first paragraph as suggested. Please see the response to comment 2 above.

6. **Page 2 'Site Description': I think the fact that the catchments are neighboring (many share borders) is a unique characteristic that should be described. For example, some distributed hydrological models may benefit from this information in the treatment of lateral connectivity.**

   We have included the following sentence as suggested.

   "*Four west-draining catchments are defined by the locations of drop box weirs (Bonta and Pierson, 2003). The catchments share one or two borders with each other, which may be beneficial to hydrologic modeling efforts to describe lateral connectivity of basins or woodland treatment impacts beyond watershed divides. Contributing areas 25 range in size from 20.0 to 70.2 ha for a total of 204.5 ha (Table 2).*"

7. **Page 2 'Site Description': Please consider providing a size metric for each lidar product (e.g., the # of grid cells in the east and west directions).**

   We have added the size as suggested as follows on page 3, line 6:

"*These data provide an accurate 1 m snapshot (3276 rows and 1754 columns, 5,746,104 pixels with data) of bare earth elevation and mean and maximum vegetation height for each of the study catchments (Sankey et al., 2013).*"

And on page 3, line 9 as follows:

"*These data provide an accurate 10 m snapshot (329 rows and 176 columns, 37,310 pixels with data) of bare earth elevation and maximum vegetation height for each of the study catchments that can be utilized in modeling projects (Kormos et al., in press).*"

8. **Page 2 'Site Description': Please describe the buffer distance around the catchment boundaries (i.e., that the lidar products are not tightly 'cropped' to the catchment extent).**

   We have added the description as suggested on page 3, line 4 as follows:

   "*The lidar dataset extends beyond the catchment boundaries by approximately 200 m in most cases, although improved catchment boundaries extend to the end of the dataset in the northwest of the study area.*"

9. **Page 2, Line 13: I am accustomed to the order (latitude, longitude) rather than the reverse.**

   We have switched the order as suggested.

10. **Page 2, Line 23: I prefer spelling out 'six-year' rather than '6 year'. Here and elsewhere.**

    We have made these changes throughout the manuscript.

11. **Page 3, Line 1: " . . . a snow-free airborne lidar survey . . ."?**

    We have added "*snow-free*" as suggested.

12. **Page 3, Line 5: typo.: 'described'**

    We have fixed this typo. Thank you.

13. **Page 3, Line 30: Change 'zero' to 'the freezing point' or to 0°C.**

    We have made this change as suggested

14. **Page 4, Lines 7-9: The second sentence is largely redundant with the first paragraph of this section. I suggest: "Dew point temperature was calculated**

from measured values of air temperature and relative humidity (Marks et al., 2013).”

We have made this change as suggested. Thank you.

15. **Page 4, Line 22: Typo: change “... of the dataset of 14.3 ...” to “... of the dataset was 14.3 ...”**

    We have corrected this typo as suggested.

16. **Page 6, Line 1: ‘Catchment M’ should have a capital ‘C’**

    We have made this correction.

17. **Page 6, Line 15: change ‘at a 1 m resolution’ to ‘at 1 m resolution’.**

    We have make this change as suggested.

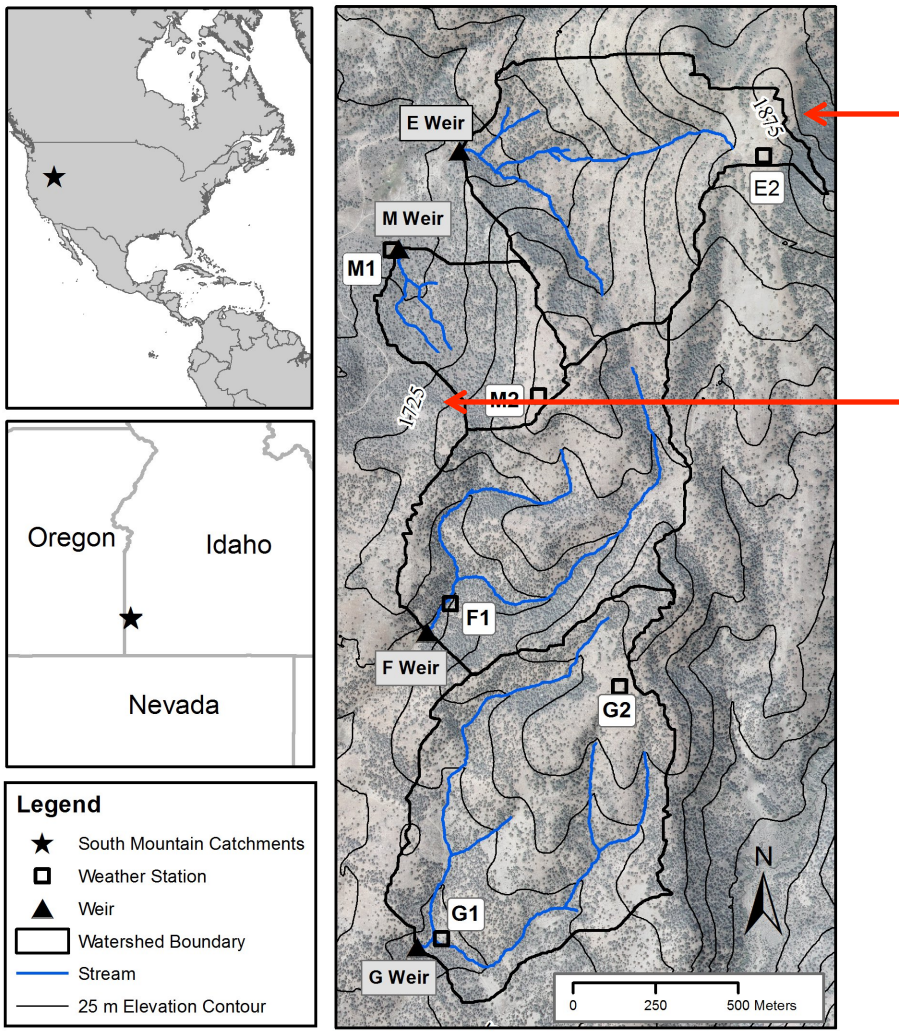
18. **Page 6, Lines 16-17: Suggest changing ‘represent’ to ‘adequately capture’.**

    We have made this change as suggested

19. **Figure 1: Label one upper and one lower contour line to give the reader a better sense of the elevation distribution. Please state the contour interval in the figure caption.**

    We have added one upper and one lower contour label as suggested and have added the following text to the figure caption:

    “*The contour interval is 25 m, with the 1875 m and the 1725 m contours labeled for reference.*”



20. **Figure 6: I think this should be a February storm event (typo. in caption that says 'January').**

We have made this correction.