Review comments for:

Waning habitats due to climate change: the effects of changes in streamflow and temperature at the rear edge of the distribution of a cold-water fish

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The subject paper represents a considerable investment in time and resources to assess the impact of climate change on the thermal habitat of a cold-water fish, the brown trout (*Salmo trutta*), in central Spain. It is an ambitious effort in collecting and organizing meteorologic, hydrologic and stream temperature data. The downscaling and bias-correction methods of the simulations from general circulation models are of satisfactory quality.

Where the work disappoints is in the methods used to develop state estimates of stream flow and water temperature. The artificial intelligence-based method, M5, used to simulate stream flows, is from a 27-year old paper, not readily available for study by reviewers. The description of the method (Pages 7-8) is replete with jargon and very difficult to understand. However, there is little reason to doubt that the authors applied the method incorrectly. In addition, it may well be the case that the results are within the bands of uncertainty that might be expected by applying a more modern hydrologic model. So, while the paper does not make a compelling case for using this method rather than a more modern one, the results are probably adequate for the specific scientific question posed here.

The stream temperature modeling is even less compelling. The regression-based methodology (Eq. 1) is *ad hoc* and one that has been criticized for its lack of ability to project the effects of climate (Arismendi et al, 2014). The authors incorrectly cite the

work of Piccolroaz et al, 2016 in support of their method. Rather than supporting regression methods like Eq. 1 of this paper, Piccolroaz et al, 2016, conclude that "Conversely, performances of purely regression-based or stochastic models are lower" than their model. It is a well-documented finding, however, that stream temperature is highly correlated with air temperature and, as is the case for the hydrologic model, M5, the results are likely to be within the uncertainty bands that would result from the application of one of the myriad models based on the thermal energy budget.

The development and analysis of this data set is noteworthy and worth publishing because of its environmental relevance. The outcomes from analyzing good, large data sets of stream temperature, hydrology and climate are reasonably robust in terms of the type of model being used. Based on this notion, it would seem the conclusions are also reasonable and, hopefully, of use to water resource planners.

The document also has some shortcomings in terms of an editorial nature, however, and would be improved in the following way:

* Have someone proofread it carefully.

* There are too few statistical measures of outcomes, particularly for water temperature.

* Use a term other than "rear edge" to define the upper range of satisfactory temperatures for brown trout.

* Explain “future running flows” or use a different term

* Define “agglomerative coefficient”

* Try to use fewer acronyms.

*Table S1 is not referenced in the main document and needs a much better description of what’s in it.

* Check the references to make certain they are complete.

References

Arismendi, I., Safeeq, M., Dunham, J.B. and Johnson, S.L.: Can air temperature be used to project influences of climate change on stream temperature? Environ. Res. Lett., 9(8), 084015. doi: 10.1088/1748-9326/9/8/084015, 2014.

Piccolroaz, S., Calamita, E., Majone, B., Gallice, A., Siviglia, A. and Toffolon, M.: Prediction of river water temperature: a comparison between a new family of hybrid models and statistical approaches: Prediction of River Water Temperature. Hydrol. Process., 30(21), 3901–3917. https://doi.org/10.1002/hyp.10913, 2016