Reviewer: The content is very relevant, as high temperatures in the stream may lead to severe impacts on the river's biota. This new approach seems to be a very efficient manner to estimate the stream temperature, although some uncertainty in this methodology may be still relevant. Additionally, the English of the manuscript seems to be very good, congratulations. Here below and attached are some recommendations.

Introduction

In the introduction section you started discussing the main impacts of the increase of stream temperature in the water chemistry (dissolved oxygen, salinity, and pH.), and how these changes may influence certain species, which is totally fair. However, you did not discuss how those changes may affect some hydrological and meteorological parameters, it is essential to put some attention in this discussion as well. See in Koh et al. (2010), Guenther et al. (2012), Dugdale et al. (2018), and Rodrigues et al. (2021). These references discuss some of the main impacts of riparian vegetation in hydrological and meteorological parameters. In addition, you should discuss more other benefits of riparian vegetation, for example, reduce/prevent of river siltation, decrease/alleviate the runoff from the rainfall, reduce of nutrients that go into the stream, etc.

Koh, I., Kim, S., & Lee, D. (2010). Effects of bibosoop plantation on wind speed, humidity, and evaporation in a traditional agricultural landscape of Korea: field measurements and modeling. Agriculture, ecosystems & environment, 135(4), 294-303.

Guenther, S. M., Moore, R. D., & Gomi, T. (2012). Riparian microclimate and evaporation from a coastal headwater stream, and their response to partial-retention forest harvesting. Agricultural and Forest Meteorology, 164, 1-9.

Dugdale, S. J., Malcolm, I. A., Kantola, K., & Hannah, D. M. (2018). Stream temperature under contrasting riparian forest cover: Understanding thermal dynamics and heat exchange processes. Science of the Total Environment, 610, 1375-1389.

Rodrigues, I. S., Costa, C. A. G., Raabe, A., Medeiros, P. H. A., & de Araújo, J. C. (2021). Evaporation in Brazilian dryland reservoirs: Spatial variability and impact of riparian vegetation. Science of The Total Environment, 797, 149059.

I noticed that you separated the objectives from the introduction, which most of the time they are together (Introduction and in the end the objectives). I do not know if it is a requirement of the journal, if so, that's fine you can leave with this separation, if it is not, I would suggest you

incorporate the objectives in the end of the introduction as it is easer for the reader to understand what will be done based in the problem/gap you just mentioned in the introduction.

In addition, I would suggest you reformulate your main objective, as in the end of the introduction you mentioned "…we fill that gap by incorporating the shade factor into the equilibrium temperature approach (Edinger et al., 1974), and couple it with the improved hydroclimatological SWAT model of (Ficklin et al., 2012) to improve the simulation of the heat transfer process at the water-air interface.", if I understood correctly you will include another parameter (shade factor) into the equilibrium temperature approach by Edinger et al. (1974), and then insert it in the hydroclimatological SWAT model. I think you named the "equilibrium temperature approach" to "Energy balance model" in the objective sections, am I right? Please, if it is not required merge the objectives with the introduction.

Why did you choose to improve the Edinger et al. (1974) equilibrium temperature approach? Just asking because there are others energy balance models in the literature…

Why did you just evaluate the reduction in the number of days above survival limits for salmon and trout? Rather than other animals or local flora…

I also do not think you should outline the whole work, like in Lines 109 to 113, it can be removed.

Methodology

In Figure 1, I would recommend having a zoom out with the whole map of the USA, before the Oregon map, in fact you could substitute the Oregon map and put both tighter (USA and Oregon). As you are submitting for an international journal, sometimes people do not know where all states from US are located.

In the Line 131 you mentioned that 40% of the area has agriculture, how far these zones are from the study rivers? I was just wondering how you separated the natural riparian vegetation and agriculture areas, which I suppose seems to be the same from above (green). And how the agricultural zones may affect the stream temperature?

Supposing you collected the riparian vegetation data from remote sensing sources (satellite image, for example Landsat time series), how did you differentiate the riparian vegetation from small shrubs as they look almost the same in a pixel of 900 m^2?

For the hydrological model, why did you choose SWAT? Please, you have to mention it in your section 2.1

I also noticed that Ficklin et al. (2012) model uses different types of data (snowmelt flow/melt temperature, groundwater temperature, surface runoff, and lateral flow) to compute the local stream temperature. It is fantastic that you have this kind of data in your study area, although I do not think that is so common in remote areas. Do you think it is possible to use the Reanalysis data from ERA 5 data base? I am asking because these types of data are not measured as yours, so it might be a problem. What do you think?

In section 2.4, you mentioned that the shade factor varied from 0 to 1, how and why did you put this range? Is there any reference that mentioned such this nomenclature "shade factor"?

In addition, you also said in Lines 240 and 241 "the shade factor was different for each stream, each day within the year, and each instant within the day." How and in which locations did you calculate the solar radiation for these streams?

Results

Section 3.1: It would be great if the NSE, and PBIAS were first explained in the Methodology section, in a subsection called "Statistical Analysis" or something similar.

In section 3.3 you evaluated (very shallow by the way) the effects of riparian vegetation in the stream temperature. Do you think it is necessary to introduce more riparian vegetation in this catchment? I am asking because, although the riparian vegetation can reduce the stream temperature, this may result in other consequences, such as the increase of the transpiration from this vegetation, did you think about that? In addition, I would recommend an additional paragraph for this section 3.3, to discuss more about these consequences.

The section 3.3.2 is very interesting, you should dig more in the literature and discuss more your results with other author, and not only say as you did in Lines 339 and 341 "This finding

is consistent with previous studies seeking strategic placement of riparian vegetation to achieve the greatest reduction in water temperature", please, rephrase this sentence and show the results of these authors and others. This is one of the main important parts of your work, go deeply and find more researches to compare, and discuss. In the end of this part, you should insert something regarding the impacts of the stream temperature in the salmon and trout rearing migration (which until now I do not know why only these two species, I hope I have a suitable justification for this), to make a link with the next section, as you will start to discuss more about soon.

The section 3.3.3, in my opinion, is your peace of gold result, you showed the positive impact of riparian vegetation in reducing the stream temperature, and the reduction in the number of days with exceeding 18 Celsius degree. This is fantastic, and you should discuss these results with other authors, the main benefits (reduction of evaporation, suitable areas for fauna reproduction, etc.) as well as other consequences (this reduction of stream temperature may be excellent for some species, but for others may generate badly effects, please discuss the disadvantages/downside as well). If you can not discuss/compare the number of the days (as I think this result is pretty new), show how this temperature mitigation/attenuation may impact in the local flora, fauna, hydrology, and the meteorology parameters (positive and negative effects).

Regarding section 3.3.4, if possible, do you think would be a good idea to insert the riparian vegetation through the whole river section? Why? Which impacts it would be expected? Please, discuss this situation as well in this section. It could start like "If possible to insert riparian vegetation through the entire river stretch, the main expected impacts would be …"

Conclusion

I suggest to change or exclude Lines 391 and 392 when you said "Therefore, the application of the improved stream temperature model can be easily scaled to other regions.", you calibrated this parameter for this specific area, with specific vegetation, as well as meteorological conditions, so be careful.

It is essential a section of "Sources of uncertainty" or "Uncertainty analysis", although the model was well calibrated some uncertainties remain, for example, you calibrated for a period lower than 30 years (for both points of calibration), which may present some bias if in this short

time happened a high or too low discharge; your calibration was specific for this area and for this type of vegetation, how could other researchers use your shade parameter in other areas? Is it really representative? The objective of this section is an auto critique of your own work, showing its limitations and it can be improved. No work is so perfect that can't show any limitations, please rethink about the main uncertainties and write this section.

Overall, the work is very good, it just needs more discussion and some explanations, as I included in the review. The writing is also fine and formal.