

## ***Interactive comment on “Working backwards from streambed thermal anomalies: hydrogeologic controls on preferential brook trout spawning habitat in a coastal stream” by Martin A. Briggs et al.***

**Anonymous Referee #1**

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### General comments

The manuscript by Briggs et al. is an impressive multidisciplinary tour de force on groundwater and surface water processes and patterns and trout spawning distribution. The value of this work is in the many different field-based approaches that were used to characterize the thermal, geologic, hydrologic, and ecological environment of the 2-km reach of interest. This strength, however, is also a weakness in that there is so much described in the manuscript that it is difficult to determine the degree to which the authors truly address the objectives set forth at the end of the introduc-

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tion. Certainly, the authors “develop a hydrogeological understanding” in relation to the spawning behavior of coldwater fish, but strictly speaking, the actual results presented do not evaluate associations between trout spawning locations and identify common characteristics of these areas. In this sense, to address objective 1 (line 156), the authors would need to statistically analyze the data (i.e., with consideration of sample size and probability) in order to test their hypotheses rather than simply presenting descriptive graphs. As mentioned above, however, the manuscript is interesting in its totality, so perhaps the best approach is to modify the objectives (mainly objective 1) so that they better match what is actually presented in the manuscript. Given the broad focus of this journal and the kinds of articles that it publishes, it seems that the paper is valuable as a “perspective” and “approach” rather than a traditional scientific paper that tests specific hypotheses. This kind of focus is apparent in the manuscript’s title, which is good in the images that it evokes, but it is rather vague and would benefit from more explicit wording as opposed to “working backwards”, which is rather difficult to understand unless one reads the whole manuscript. In conclusion, some general reframing of the manuscript would be helpful to highlight what it is actually about. This could be accomplished by revising the title and objectives and potentially merging the “conclusions” with the discussion because strictly speaking, this is not a paper that has conclusions in a traditional sense that are derived from statistical analyses.

### Specific comments

1. Line 47: Using the word “preferred” is problematic because this paper does not actually statistically analyze preference which would require an explicit comparison to what is available. I recommend removing the word “preferred” from the manuscript.
2. The manuscript refers to 10 years of observation that have gone into counting and mapping redds and spawning behavior, but these data (and sample sizes, etc.) are never presented. Perhaps the authors refer to a manuscript that published these data. In any case, it would be better to temper this kind of wording so that the readers won’t be expecting some kind of explicit analysis of these data.
3. Line 58: In many places,

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words and phrases are used that are colloquial and informal (e.g., short circuit, dropout, choked, etc.). Although I understand what the authors mean, many readers would not understand these phrases, so it would be best to go through the whole manuscript and eliminate all of this informal language. 4. These are minor issues, but we refer to “coldwater and warmwater fishes” not “cold-water fish. It’s just convention that this wording is recommended by the fisheries community (American Fisheries Society). In this sense, it is different from “cold-water seep”, for example, which is a hydrologic rather than ecological feature. Also, please be careful about referring to refugia, which is the plural form of refuge or refugium. Thus, we don’t write “refugias”. 5. Line 182: Shouldn’t this be in hectares? 6. Line 193: The word “niche” does not have a scale per se, so it isn’t appropriate to use it this way. Be more explicit about what scale you are writing about. 7. Line 236: No information is provided on the number of fish that were tagged. As outlined in my general comments, it would be better to keep the discussion of fish general. 8. Line 343: Can you cite the previous work on the distribution of brook trout spawning? Otherwise, this can’t really be presented as a result because we have no data to evaluate in relation to this statement. 9. Figure 1b: This is really too small to examine and appreciate. It’s really impressive, but honestly the dots are too busy and crowded. 10. Figure 7: The red and blue symbols are really hard to see on the graph because they overlay one another. Can you jitter them a little so that it is easier to see them?

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