

Interactive comment on “A Spatially Detailed and Economically Complete Blue Water Footprint of the United States” by Richard R. Rushforth and Benjamin L. Ruddell

Anonymous Referee #1

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General Comments: This article introduces a useful model to hydrologic sciences by attempting to capture the complex influence of economic activity on disparate water resources. The model contributes to the field of water footprinting and its public access is crucial to its policy relevance. With moderate revisions, I recommend this article be published in HESS.

Specific Comments (by line number in manuscript):

Title: I don't think you can call this model "economically complete" if you don't include the service sectors. Maybe something related to the "physical economy"?

10: in the abstract, it's unclear what "median" is the median of.

C1

42: you haven't mentioned energy yet, so perhaps a sentence tying it into your hazards framing would be helpful.

57: what do you mean by "optimal" here? efficient? something more specific?

59: it seems appropriate to acknowledge here that non-managed green water still supports most of the world's food supply and virtual water trade. It's fine to focus your model only on blue water but this choice needs to be stated, justified, and situated within the larger picture of water-for-food. Somewhere in this paragraph could be a good place to do this.

66: before this paragraph it would be helpful to have a little primer and literature review on water footprinting. Referring to the water footprint method (i.e. Hoekstra et al), you are using both the "water footprint of production" and the "water footprint of consumption," so it would be good to mention these concepts. Also what is your/NWED's contribution to the literature? What's been done and how does your project fit in or push the boundaries of water footprinting?

71: this meta-statement could also mention some other aspects of the database, e.g. where it's housed, that it's publicly available, any other features.

81: the qualification after the comma seems unnecessary.

88: the inclusion of saline water is curious and could be clarified here so it's not conflated conceptually with your framing of freshwater hydro-economic vulnerability.

89: sentence missing "we leave"?

94: it should be mentioned that FAF is modeled data not surveyed data.

103: from what scale are FAZ linkages disaggregated?

112: please state that this attraction factor method assumes that all residents consume equally.

C2

117: how are international water use factors derived?

121: seeing "water withdrawal" and "water footprint" in the same sentence raises questions, since WF is technically based on consumptive use. Please clarify here or state where you will clarify.

135: if you mention post-recession, you might also mention hydrological conditions, i.e. pre/post any notable droughts that could affect USGS withdrawal data.

156: number "of"

169: water footprints are not mentioned in this section, suggest deleting from section title.

172: it's unclear at this point why all of the attributes of FAF flows are important and how they're used. e.g. if you have tons, why do you need mode, \$, and ton-miles?

190: outflows would not be summed, unless they're negative.

207: double "ofs".

247: I understand from earlier that commodity production can be simply, e.g. the number of livestock operations in a county, so how do you get from this to tons as the denominator of the intensity?

259: "tons of a c produced within a county according to disaggregated FAF data" is also (with comment at 249) confusing since FAF doesn't report production data.

306: I think you don't mean the "the" after the ";". Also, not sure what you mean here since EIA does report electricity consumption data.

369: this statistic could use a citation.

515: "circularly multiplied" could be "positive feedback loop"

542: "significant," not "signification"

C3

588: specify that this is groundwater management in the US.

592: "to have"

654: after reading this section, and thinking about the magnitude of uncertainty in this model, I think you might want to revisit some of your claims in the results sections and conclusion. I realize this is very general, but just make sure you feel comfortable that what you say can be backed up by your model's findings.

733: "For example..." is not a complete sentence.

740: this is an interesting proposition, can you elaborate on what such governance systems might look like?

743: the mention of consumption coefficients seems to reference an earlier paragraph. Please clarify.

751: delete "and grey."

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C4