Dear Editor,

We are pleased to submit for your consideration our manuscript, “Estimating bioenergy feedstock water footprints using a database and system dynamics approach”. In this proposed manuscript, we review the water footprint modeling literature and demonstrate a novel approach to water footprint modeling that fits an analytical need. Our model, BioSpatial H2O, uses a database framework and system dynamics modeling approach for assessing the water footprint for a wide variety of aggregate U.S. crops across the U.S. We present illustrative results from BioSpatial H2O for commonly studied biofuel crops, corn grain and soybeans.

Increased biofuel production has prompted concerns about the environmental trade-offs of biofuels compared to petroleum-based fuels. Biofuel production in general, and feedstock production in particular, is under increased scrutiny because of the impacts of large-scale agricultural production, such as on rural water supplies. Balancing the competing uses for a limited water supply is contentious and decisions have significant societal and environmental impacts. Water footprinting has been proposed as a possible clear and comprehensive measure of water use among potential uses.

Biofuel water footprinting for public and private decision making requires an understanding of the current state of scientific knowledge. A robust understanding of bioenergy water use is needed to better evaluate the trade-offs between bioenergy systems and to other sources of energy. Confidence in knowledge for making decisions will advance industry and the societal goals. Knowing water trade-offs for decision making is especially important because of the role public policy has as a driver of bioenergy production and use.

Based on our review of the water footprinting literature, many water footprinting approaches are limited in their capacity to assess the water footprint across multiple water stocks such as surface and ground water stocks). Several models are geographically aggregated, have limited representation of many agricultural feedstocks relevant to biofuels, and have minimal flexibility to perform scenario analysis.

Our manuscript describes and demonstrates the capabilities our novel water footprinting modeling approach to address these limits. BioSpatial H2O:

* Presents a complete water footprint and can assess a wide variety of aggregate U.S. crop categories.
* Could be modified to evaluate specific crops not typically evaluated such as cellulosic crops like switchgrass.
* Uses a rich spatial climate, soil, and plant physiological database for bottom-up water footprinting.
* Datasets could be modified to represent other conditions such as alternative countries or future climate scenarios.

The study is expected to be of interest to U.S. researchers of bioenergy and agricultural water footprinting as well as relevant crop-based biofuel industries. While BioSpatial H2O is currently designed for U.S. conditions its flexibility means there is relevance for researchers and industry in other countries. Our Research Section paper fits within *the Journal of Soil and Water Conservation’s* requirement to present research which is clearly relevant to soil and water conservation.

All materials to be presented in the manuscript represent original work by the authors, which have not been previously published, and this manuscript is not under consideration by any other journals.

We appreciate your consideration of this potential manuscript.

Best regards,

Daniel Inman

Ethan Warner

Dana Stright

Jordan Macknick

Corey Peck