Referee Report:
Relationships between environmental governance and water quality in growing metropolitan areas: a synthetic view through the coupled natural and human system lens

by:
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This paper that aims to identify socio-hyrological feedbacks pathways between water quality and governance (management practices) in growing urban metropolitan areas. Specifically, the authors compare two regions – Portland, OR and Vancouver, WA – with similar geophysical characteristics but different histories of water management policies. Dynamic feedbacks between water quality and land use change is an important area of research that is relevant to this special issue of HESS: Predictions Under Change: Water, Earth, and Biota in the Anthropocene. However, while the authors raise important questions and have developed a good dataset, the analysis in this paper is very preliminary and merely compares snapshots of characteristics in the two regions (t-tests) rather than identify causal feedbacks in the system.

I have read the comments by Reviewer 1, who greatly simplified my task by raising several concerns that I have with the paper as well. Here I will focus on concerns that were not discussed in detail in Reviewer 1's report.

Major Concerns:
1. **Governance structures:** Chang et al. are interested in the relationship between governance and stream monitoring efforts. However, there are no clear measurable indicators such as number of regulatory agencies, level of local involvement (to establish top-down vs participatory management), etc. to compare outcomes in the two regions. The paper describes number of litigations and size of budget allocations as governance indicators. However, both these factors are likely to be influenced by water quality itself and are not objective measures of environmental governance structures.

2. **Hedonic model**: Hedonic pricing models are commonly used to estimate the impact of changes in environmental quality. It is unclear what other variables are being controlled for in this analysis. At the very least, I would expect to see a table with summary statistics describing the data. How do you control for confounding and unobservable factors that influence housing value? Do you control for spatial and temporal trends (using spatial and time fixed effects) in the regression? How are percentage impacts derived? The presentation of results in Figure 8 is not very clear. A complete table of results will be better.

3. A larger concern, relevant to dynamic feedbacks in the system, relates to whether housing values influence the nature of management effort? Are riparian restoration efforts focused around regions that have higher (or lower) property values? Do budgets for riparian management depend on property taxes? If management efforts are influenced by property values (that reflect peoples' willingness to pay for improved water quality), the hedonic model must control for this endogenous feedback effect. Addressing this feedback in the

empirical estimation of the value of water quality and in predicting future management efforts or land use changes will be a step towards developing a coupled model.

4. Similarly, the paper compares snapshots of land cover between 1992 and 2006 but does not build a predictive model for land use change. I realize that a model of land use change is perhaps outside the scope of this analysis but to develop a CHANS or SES framework, these dynamic linkages need to be addressed.

5. Policy implications are not discussed for any of the questions that the paper addresses. A more detailed discussion of the policy relevance of the results and the implications of potential feedbacks that connects these findings is needed.

6. As Reviewer 1 pointed out, the first three broader research questions on page 7399 are not relevant for this analysis. If the authors want to tie the results of this preliminary analysis to the broader goals of the project, a discussion of how their findings fit in as building blocks to address the broader questions is essential.