Peer review report
Peer review report 1 on “Soil sealing and flood risks in the plains of Emilia-Romagna, Italy”

1. Original Submission

1.1. Recommendation

Minor Revision

2. Comments to Author

Manuscript ID: EJRH-D-14-00153
Title: Land take, soil sealing and flood risks in rural catchment of the plains of Emilia-Romagna, Italy.
Authors: Alberto Pistocchi, Costanza Calzolari, Francesco Malucelli, Fabrizio Ungaro (alberto.pistocchi@jrc.ec.europa.eu)
Overall Evaluation

The paper investigates the effect of soil sealing on the secondary drainage network in a rural area of the Northern-Central part of Italy (i.e. Emilia-Romagna). Authors propose a simple kinematic model to evaluate the effect of land take (from 1976 to 2008) in terms of flood peak and inundation volume, without the use of detailed hydrological models. The approach is based on several not neglectable assumptions, however, due to its simplicity and the possibility to adjust some of these assumptions to different context, it may represent a useful tool for practical applications. The analysis is interesting and the practical slant of the procedure may be of interest for the hydrologic community. The manuscript is well organized and written, even though, in my opinion some parts could be simplified and shortened. Previously to the publication I have some general comments that the Authors should consider. Finally, minor specific comments are provided.

3. General comments

- Due to the scope of the proposed approach, the methodology is intentionally simplified and based on many assumptions. Among those, the hypothesis of no hydraulic and hydrologic alterations on the study area from 1976 to 2008, the adoption of a specific and uniform capacity for the drainage network (i.e. 20 years return period in the study), as well as the fact of neglecting the effect of upstream outflows, affect the real possibility to evaluate the consequences of soil sealing on the flood inundation risk. Wider the extent of the contributing basin at a specific site, greater the influence of the previous simplifications. In my opinion the methodologies should be mainly proposed within the scope of the hydraulic invariance (i.e. a tool to define the retention volume necessary to guarantee the conservation of the conservation peak for small catchments and without the implementation of detailed hydrological models), while the evaluation of the flooding volume, even though evaluated in terms of comparison between two different periods, is not realistic. The paper should reflect this approach focusing on the hydraulic invariance.

- Even though the Authors clearly describe the assumptions and simplifications I would suggest to better highlight them, may be introducing ad additional section (e.g. sub-section in the Discussion) that lists the assumptions and the variables that one should define in order to apply the proposed methodology to its case study.

DOI of the original article: http://dx.doi.org/10.1016/j.ejrh.2015.06.021.
4. Specific comments

- P4-L24: please remove “last accessed January 2014” in the overall manuscript;
- P8-L23: Since there are different Authorities cited in the paper I would suggest to adopt specific acronyms. “Autorità di Bacino del Po” may become AdB-Po. At the same way, “Autorità di Bacino del Reno” become AdB-Reno (see Annex 2 for AdBRR).
- P10-=numered list: please adopt a different numeration style for the sub-list.
- P10-L24: Pistocchi et al., 2014 does not exist in the references.
- P12-L16: I think here the Authors refer to Figure 5. Please change the figure order.
- eq. 6: if I am not wrong σ should have the same exponent of W.
- P17-L7: Figure 6A and 6B are not specified.
- P19-L10: please check the sentence.
- P17-L9: the Authors refer to areas in which the urban expansion has been most intense but there is not the possibility to see this aspect in none of the reported Figures.
- P17-L22: nested brackets, please consider the opportunity to reword the sentence.
- Reference: Rossi & Villani are not in alphabetically ordered.
- Table 2: Is it ok that the sum of % is 89.1%? If yes, I suppose that the remaining part (9.9%) is the network portion not affected by different flood conditions and it should be added to the table.
- Table 5: “Percentage of the stream”.

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