

## Final Author Comments.

**The manuscript HESSD-228-2014 “Quantification of anthropogenic impact on groundwater dependent terrestrial ecosystem using geochemical and isotope tools combined with 3D flow and transport modeling” by A.J. Zurek et al.**

We appreciate the comments of Referee #2. They helped us to improve the manuscript. Detailed responses addressing all points raised by the reviewer are listed below.

### **Anonymous Referee #2**

#### **1. General comments**

*1.1. Description and pertinence of the tools should be stated in the introduction – authors should make a link with the context of the study area. Some of these aspects are included – but not in the introduction*

We agree. The Introduction has been thoroughly modified accordingly.

*1.2. In most parts of the ms, authors used qualitative estimate instead giving number. I believe that quantitative estimate will be more appropriate to estimate impact.*

We accept this criticism (cf. reply to Referee #1). The text has been extended and quantitative aspects of the discussion were strengthened.

*1.3. Sampling network should be developed in section materials and methods*

We agree. The section Materials and methods has been thoroughly modified and extended. New data were added in the revised version of the manuscript.

*1.4. In page 5 first paragraph, authors should give the scientific basis for depth classification – is this classification related to depth of the root zone or not.*

Agreed. The required information was provided in the revised version of the manuscript

*1.5. Comments on model result are not well developed*

We accept the criticism, expressed also by Referee #1. The modeling section was thoroughly revised and extended. Quantitative estimate of the expected impact was included in the revised manuscript.

*1.6. One striking point is the lack of discussion taking into account the isotopic, hydrochemistry and model result in term of flow exchange and contribution and validate them with the system functioning and stream flow with regard the new pumping stress*

Additional sections addressing this issue were added in the revised manuscript (see revised section 4.5).

*1.7. Abstract does not reflect main findings of the ms*

Abstract has been modified accordingly.

## **2. Specific comments**

*2.1. A lot of style and grammatical errors – may be some revisions for the writing will help*

Although Referee # 1 was of somewhat contrasting opinion (see page C4013 of his comments, line 5 from the top), we will nevertheless try to improve the writing.

*2.2. References in text should be in date order*

Done.

*2.3. Page 7 last paragraph of conceptual model should be in this part – however, I propose to authors to add a section related to hydrodynamic in section “results” where conceptual model should be described*

As adequate conceptual model is the starting point of any investigation, we think that its description fits better to the section "Study area" than to "Results and discussion" where we make reference to it and discuss whether any changes in the model are needed in light of the results obtained.

*2.4. First paragraph and sentence in page 9 is too long.*

This sentence has been removed and the discussion was extended by adding a new paragraph presenting the stratigraphy and lithology of the aquifer in the area of Wielkie Bloto fen obtained from drilling performed in July 2014 (see revised text).