

## ***Interactive comment on “The artificial water catchment “Chicken Creek” as an observatory for critical zone processes and structures” by W. Gerwin et al.***

**Anonymous Referee #1**

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This article provides important background information on a unique project and will have historic significance for future studies in area. However, the current version needs considerable editing and additions before it should be published. Specifically:

Introduction P2 L19 to P3 L6 and P3 L25; some of the detail on other projects can be reduced and a cleared distinction between this approach and other studies should be made. Many hillslope erosion studies have been done, like the USLE plot studies, French and UK erosion plots, reclamation studies, Schumm's classic study in Perth Amboy, etc. It should be clarified that this study is unique because of its size and multi-disciplinary nature. Adding some additional details on the soil and vegetation studies

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would help.

Data management; a tremendous amount of data and samples will be collected in this project; some details on how the data and samples will be managed will be helpful to others,

P2-L14; reword; the critical zone is not the “basis of life on earth” but the location of most life on earth

P3-L14 and elsewhere; “established” or “mature” would be better word choice than “adult”;

P4L19 ecosystem “development” is often includes evolutionary processes; while this study is really about ecosystem establishment and primary succession. This distinction should be made throughout the paper.

Table 1: Mean annual rainfall and climate zone of each should be added; text also needs to be edited; for example: what is a “reinforced” hillslope for Hydrohill, is the total area of S. Bison Hills 10,000 m<sup>2</sup> or each subsite, free succession should be natural succession surface area

Figure 2 caption; should clarify that this is the hypothesis the study is testing;

P5 L21; describe process model in greater detail. Is the plan to develop a spatially explicit or 1 dimensional model, lumped or discrete parameter etc., ..

P6 L24; if the stream restoration is linked to this project it should be mentioned in greater detail; when

P7 L1; how was this volume estimated;  $117,500/6 \text{ ha} = 1.96 \text{ m deep}$ ; P8 L12 indicates that 2 to 3 meters of quaternary substrate was placed on 2 meters of clay... .

P7L20 explain how it was “proven” that a functional groundwater aquiclude exist. Just because there is a water table within the fill does not imply there is no deep seepage.

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Page 8; this is one of the most important parts of the paper and needs some additional detail Top of Page 8; sentence is unclear if the substrate mentioned is from Chicken Creek or the original site; A simple soil profile figure that showed the various layers that were used would greatly improve the article P8L23; how deep is the lake' Add some additional information on the climate and geomorphology of the pre-mine area; was it forested, grasslands, mountainous or flat etc. This will help establish a framework for the long-term development of the new site

Reference sites This appears to be a excellent sampling strategy and clear contribution of the project; however it is not clear how they are linked to the Chicken Creek sampling, how they will help model development, how they are selected; where they are located relative to Chicken Creed P9L9 define SFB/TRR 38?

Fig 6; P10-11; this figure is not very effective; labels on x axis are to small and numerous and the patterns of the lines are hard to connect with the text; Adding precipitation would help explain the large jumps in some of the lines;

P12 L3; "poorly vegetated" please expand; add some statement as to what type of vegetation was established after the second year; patches of grass...herbs...??

P12 L9-11 there seems to be a considerable amount of information on soil organic material that can be added or explained in greater detail

Fig 7; rainfall intensity increases toward the end of the event and reaches a Max at 11; however the surface runoff line also ends as 11; the graph would be improved by extending the graph until the runoff returned to normal..

Fig 8; was runoff tipping counter installed for the entire period or just in 2007? Does the graph indicate that it took 1 plus years for runoff to develop and that it developed after the lake was stable? If so this is the most interesting thing on the current paper..however the first runoff observed in March 2007 seems relatively large given the rain and there seems to be a disconnect with the rainfall and runoff in late 2007.

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 6, 1769, 2009.

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