**Reconciliation memo for Dr. Heather Golden’s review of “SSWR 4.3.C.1, Enhanced version of the VELMA ecohydrological modeling and decision support framework to address engineered and natural applications of green infrastructure for reducing nonpoint inputs of nutrients, contaminants”**

Responses to reviewer comments for comments on Technical Review Form

Reviewer comment: “It is obvious a lot of effort has gone into developing the updated VELMA model and the associated manual (and package). This is very impressive. I've gone through the "quick example" to run VELMA via its GUI. I made some relatively minor comments throughout the "quick example" document and the user manual file. Both documents are detailed enough for a new user to sufficiently understand how to develop a new VELMA project and associated input files. Additional specification might be needed on page 8 of the user's manual if changes to VELMA reflect the Green Infrastructure capabilities that the group is currently working on - perhaps the disturbance modules are where such implementation could be simulated. It is also possible these very new additions are not part of this particular version. If they are included, however, that needs to be clear on Page 8. Additional comments can be found throughout the aforementioned documents.”

Response:

We thank Dr. Golden for her time and effort in doing this review. We appreciate her constructive comments and praise for this work, particularly in regard to the model (VELMA version 2.0) and the usability of the new Graphical User Interface (GUI).

In regard to Dr. Golden’s comments on the model’s current green infrastructure capabilities, we have revised and expanded our discussion of green infrastructure model enhancements in the Chapters 1 and 2 of the user manual. In summary, the SSWR 4.3.C product package includes all the green infrastructure capabilities our group has demonstrated to date, particularly with regard to the effectiveness of riparian buffers for reducing stream nitrogen loads in response to forest clearcutting (Abdelnour et al. 2013) and agricultural practices (McKane et al. 2012, 2014). We have included several PowerPoint presentations summarizing these green infrastructure applications. These are located in two subfolders of the VELMA Model package:

* “VELMA Model\Supporting Documents\VELMA Presentations”
* “VELMA Model\Supporting Documents\VELMA Publications”

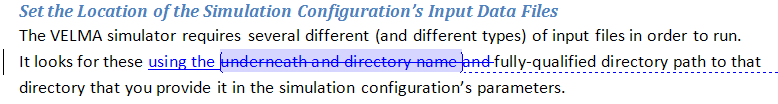
Responses to reviewer comments for **VELMA v2.0 User Manual**

Reviewer comment, page 1: “There isn’t a “5” superscript in the list of authors.”

Response: A superscript “5” has been added: “Alex G. Abdelnour (abdelnouralex@gmail.com)3,5”

Reviewer comment, page 3: “What does this (underneath the directory name) mean? Need to be clearer.”

Response: The text in question was edited for clarification as follows.



Reviewer comment, page 3: “Also, need a line saying to click on “startups” under “All Parameters” tab first.”

Response: done

Reviewer comment, page 8: “These are excellent enhancements and will be very helpful for considering the complexities for forest nutrient cycling and spatial variability in soils, land cover types, and weather parameters in the model. Will the next version (2.01 or 2.1) include the green infrastructure implementations in the Hydrological and/or Biogeochemical submodules that the group has been working on?”

Response: new and revised text added to Chapters I and II:

Chapter 1 – Introduction: “VELMA was recently redesigned (version 2.0, described herein) to better address both these goals. Green infrastructure (GI) involves the establishment of riparian buffers (streamside vegetation), cover crops, constructed wetlands, and other measures to intercept, store and transform nutrients, toxics and other contaminants that might otherwise reach surface and ground waters. GI enhancements have also strengthened model capabilities for quantifying how alternative land use and policy scenarios affect tradeoffs among important ecosystem services – that is, the capacity of an ecosystem to provide clean water, flood control, food and fiber, climate (greenhouse gas) regulation, fish and wildlife habitat, among others (Millennium Ecosystem Assessment 2005). Model development has been guided by the principle of parsimony to enable VELMA to efficiently address multiple spatial and temporal scales – plots to basins, days to centuries.

Chapter II – Changes in VELMA Version 2.0: “The original version of VELMA (henceforth referred to as version 1.0 or v1.0) has been previously described (Abdelnour et al. 2011, 2013). VELMA version 2.0 (v2.0), described herein, includes a number of important changes that are designed to facilitate green infrastructure and ecosystem service applications of interest to communities, tribes, land managers and policy makers. In summary, this required:

* Enhancements to the hydrological and biogeochemical submodels to better simulate effects of green infrastructure management practices on the fate and transport of water, nutrients and toxics across multiple spatial and temporal scales – plots to basins, days to centuries (details below).
* A new graphical-user-interface (GUI) to assist novice and experienced model users in scenario development, model calibration, and visualization and interpretation of results.
* Rewriting the program code in Java / Eclipse to facilitate debugging and open source (community) model development. The version 1.0 Processing code is no longer supported.
* A new user manual (this document) that provides a step-by-step guide to setting up and applying VELMA v2.0.

Details follow on changes to the hydrological and biogeochemical submodels in VELMA v2.0…”

Reviewer comment, page 8: “Will mercury submodule from Version 1 be included?”

Response: yes, the mercury submodel in version 1.0 will be added to version 2.0 during 2015.

Reviewer comment, page 13: “These boxes would be even more useful if set off in a different color, like the blue used for the section headings.”

Response: We will experiment with this in the next version of the user manual. For now we have used this approach, which serves to draw attention:

***IMPORTANT NOTE***  
*The example above uses Microsoft Window file system “back slash” separators, however you should ALWAYS use “forward slash” (a.k.a. Unix-style) separators when specifying path name values for the simulator configuration’s ID Keys.*

Reviewer comment, page 14: “I assume there will be more info provided on these later in the manual? This isn’t really intuitive what species ID #s are and what soil parameter IDs are as well.”

Response: Correct, these are explained in detail in Chapter IV, sections 4.0 and 5.0.

Reviewer comment, page 24: “The width of a cell in the DEM grid (should match the “cellsize” header value in the DEM Grid ASCII file and will be a value in meters).”

Response: Good catch, thanks for inserting this clarification.

Reviewer comment, page 33: “Wondering here if you should stay consistent and use colored boxes (as suggested earlier) to make these important notes…”

Response: We use yellow-highlighted boxes for critically important notes, i.e., for recommended actions, without which the model will crash or work poorly. We use yellow highlighted text for notes that will be helpful to the user but are not critically important.

Reviewer comment, page 33: Reviewer inserted, “To reiterate, the DEM used for VELMA simulations must be modified using the JPDEM processor (see Appendix 7).”

Response: The following insertion was made. “We highly recommend that the DEM used for VELMA simulations be pre-processed using the JPDEM software, rather than by other available “flat-processor” software (see Appendix 7).”

Reviewer comment, page 40: “Is there a reason for this particular highlight?”

Response: Yes, this table of soil parameter values is very useful to users as a starting point when configuring a new model simulation. The yellow highlighting also advises users that, for the reasons stated, these are offered only as a starting point.

Reviewer comment, page 41: “Do you have references for these values? Just curious how they were derived.”

##### Response: reference for Table 1, Physical characteristics of major soil texture classes is “Pan et al. 2009, VELMA v1.0 User Manual”.

Reviewer comment, page 45: “More of a general interest question: This file is required but what if you’re working in an urban or mixed land cover or ag watershed where forest age/management isn’t that important?”

Response: We made an Insertion at the end of the paragraph in question -- “Note that cover age maps can be applied to cover types other than forests, e.g., rangeland vegetation that may have a more diverse mixt of species than vegetation recovering from a recent fire.”

Reviewer comment, page 64: “Interesting improvements. Curious how urban deposition is handled – just the same depo [sic deposition] rate throughout the year and accumulation of that on impervious surfaces, grasses, etc., until a precip event occurs?”

Response: we have added “(see calibration notes, below)” to direct users to an Excel spreadsheet that provides general instructions for implementing the N deposition submodel. The user can use the spreadsheet to experiment with the N deposition parameters to fit their particular site, whether forest, grassland, urban, etc.

Reviewer comment, page 90: “Annual estimate? Monthly or daily?” [referring to Nash-Sutcliffe calculations]

Response: Inserted “annual” as follows: “Whenever possible, the VELMA simulator automatically computes a Nash-Sutcliffe Coefficient for observed vs simulated annual runoff values. “

Reviewer comment, page 114: “I’m not sure why but this wasn’t available to me during the test simulations. I was only able to visualize the time series.” [referring to list of visualizations available for runtime GUI]

Response: This is the first report we have received for this problem and we are unable replicate it on our PCs. We will need to work with the reviewer using a screen-share setup to see what the problem might be. Possibilities include (1) shortage of RAM memory (can be fixed by specifying more memory during the Command Line set up); and (2) the default GUI screen size was adjusted by the user at some point (this has caused other types of problems with the visualization display).

Responses to reviewer comments for **VELMA v2.0 Quick Example**

Reviewer comment, page 5: “What does this mean? Need to be clearer.”

Response: we revised the passage in question as follows -- “The VELMA simulator requires several different (and different types) of input files in order to run. It looks for these using the fully-qualified directory path to the directory that you provide it in the simulation configuration’s parameters.”

Reviewer comment, page 5: “Also, need a line saying to click on “startups” under “All Parameters” tab first.”

Response: The passage in question has been revised to, “Under the “All Parameters”   
GUI tab, click the drop-down button above the “Group” column and select “Startups”; then use the All Parameters outline selector to choose “1.0 Input Data Location”

Reviewer comment, page 6: “Need to select “calibration” in Parameters drop-down prior to this step.”

Response: The passage in question has been revised to, “Under the “All Parameters”   
GUI tab, click the drop-down button above the “Group” column and select “Calibration”; then use the All Parameters outline selector to choose “2.0 Results Data Location (Results Data Directory Placed Under This Location)”:

Reviewer comment, page 6: “I wasn’t able to see the spatial changes in soil saturation or concentrations; only the time series was visible. It’s possible my screen was set up wrong to see this…”

Response: We will need to do a screen-share with the reviewer to determine the cause of the problem.