**Wood Budget Analysis - Progress Report**

**Two scripts are required to calculate the wood budget. The script “input\_functions” contains all the required functions to run the model. The script “wood-budget” loads the required data and runs the functions to calculate the input for budget.**

**Update on wood budget analysis:**

*\*Missing data on the 3rd species:*

* The VRI dataset appears to be missing some columns that I think are important for the analysis.
* While LVSP(x), provides estimates on volume per hectar for the leading 1,2 and 3rd species, the VRI dataframe only gives projected heights for the 1st and 2nd leading species, and an estimate of the diameter for the leading species.
* This has implications for the equation below, where height and diameters of each species are required for E(Vb)
* Right now, I have the code set to calculate the budget for the top two leading species, with the diameter estimate from the first species attributed to the second species. I am not sure how to deal with the missing data for the third species for the equations below.

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*\* Confusion with dZ*

* I am a little confused with how to include dZ in the equations.
* For example, for the equation Im, from reading the Hassan et al., 2016 paper, it seems Im is summed up for increasing distances from the bank in 1 metre increments…(to the length of a tree from the channel). But shouldn’t the increase somehow decay with distance from the bank?
* **\*\*\* I think the decay comes from E(Vb) – therefore a for loop needs to be included in my functions that changes z as input for E(Vb) from 1:max tree height?**

*\* General questions about bank erosion and mortality equations…*

* In the Hassan paper, Ds it is referred to as density of trees (with units of m3/ha). I think it should be a volume…therefore the m3/ha data was used in the code and converted to m3/m2

*\* General questions about mortality questions…*

* From what I understand from the Hassan et al., paper, and through reading Steve’s description of his code, I think that I only need the E(Vb) function for my equations? I can’t see in the paper mention of the **two** E(Vb) functions that Steve wrote and am not sure how I should incorporate both of them?
* Right now, the code only includes: ev2\_rnd

*\* Volume of coarse woody debris for tipsy model*

* Note – I couldn’t find a good estimate of coarse woody debris on the forest floor for the model. I instead used the estimate for CWD after running the tipsy model for 100 years.

*\* Volume of coarse woody debris for tipsy model*

* Wood budget for the harvested polygons – tipsy seems to only give parameters for the leading species. Therefore tipsy estimates only come from the leading species.

**\***Estimate for Pf

* As in the Hassan et al., paper, estimates for Pf were derived from Burns and Honkala (1990)
* For the harvested cutblock, Pf set to 0.004, the estimate for lodgepole pine (the leading species)

**Update on references used for values in code:**

* Reference info on derived characteristics for tipsy model can be found in the folder “References”.

The following files in the folder TIPSY are:

* **Cutblock\_slope.csv** – an excel file of transects data pulled from google earth to estimate the slope of the harvested cutblock for tipsy
* **slopes.kmz** – kmz file showing the top and bottom of the transects used in google earth
* **Cutblock\_species.csv** – excel file showing the characteristics of the polygon used to derive estimates of the forest conditions for the harvested cutblock for the tipsy model
* **tipsy\_screenshots folder** – screenshots of the input parameters used for tipsy
* **Forest characteristics for tipsy** – sources for other reference data used in the model, or that can be used for comparison
* **raw tipsy outputs –** raw text outputs from TIPSY.
  + tipsy\_regen – height, diameter and volume regeneration characteristics for the forest
  + tipsy\_cwd\_LP – cwd regeneration estimate for lodepole pine (the leading species)
  + tipsy\_cwd\_WS – cwd regeneration estimate for white spruce – I didn’t use this in the model as tipsy\_regen doesn’t stratify the results by species type.
* **VRI key –** truncated version of the VRI attribute table from <https://catalogue.data.gov.bc.ca/dataset/vri-forest-vegetation-composite-polygons-and-rank-1-layer> for reference

\*Things that still need to be calculated or replaced in the code

* **B** – bank erosion estimate is still needed
* **W** – width of the channel is still needed
* **Stream layer** – currently the calculations are based on a stream layer that I digitized
* **dZ** – not sure how to deal with this one in the equations…

**Note: transport and output must still be incorporated in the model**