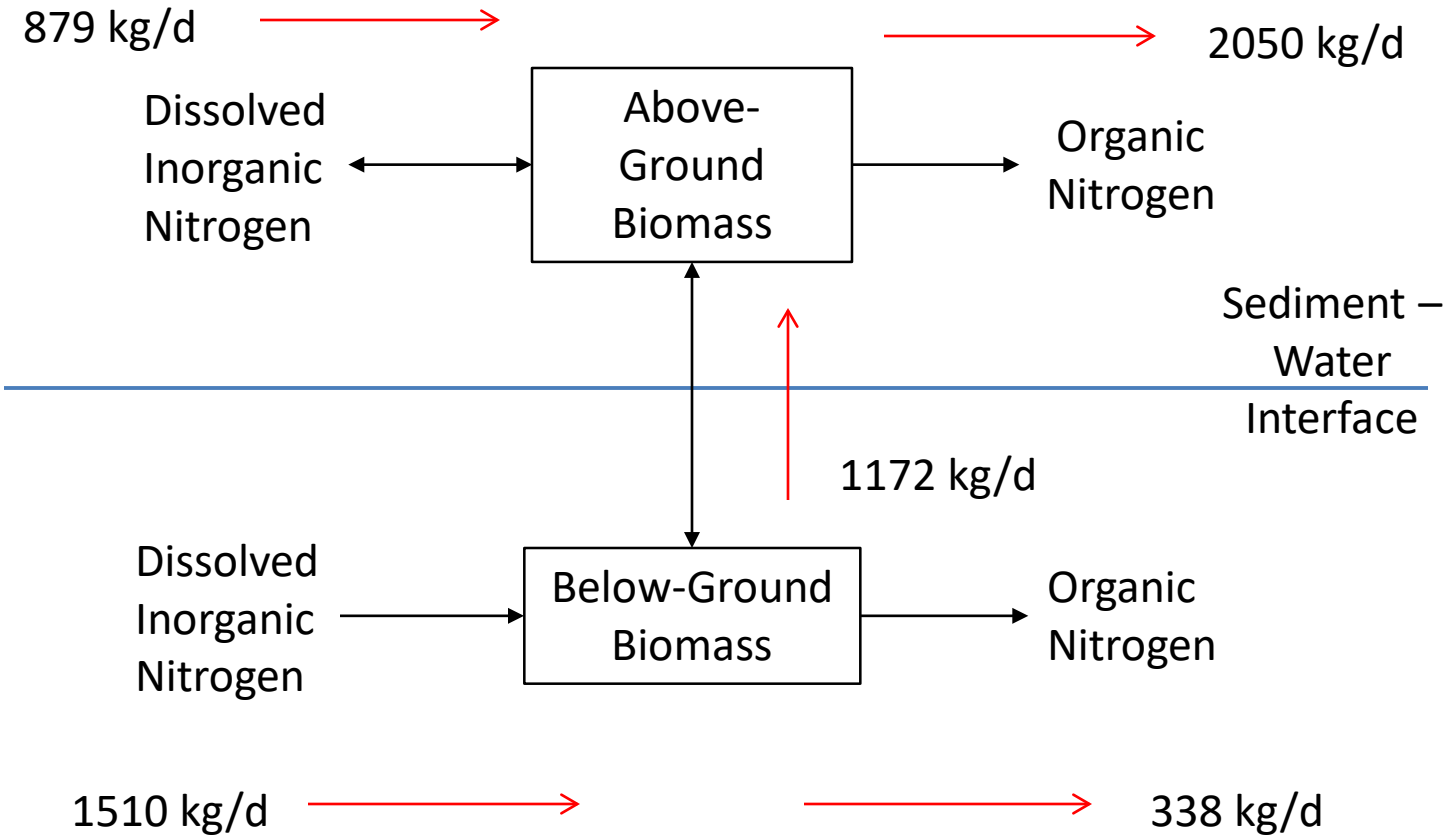
The Question

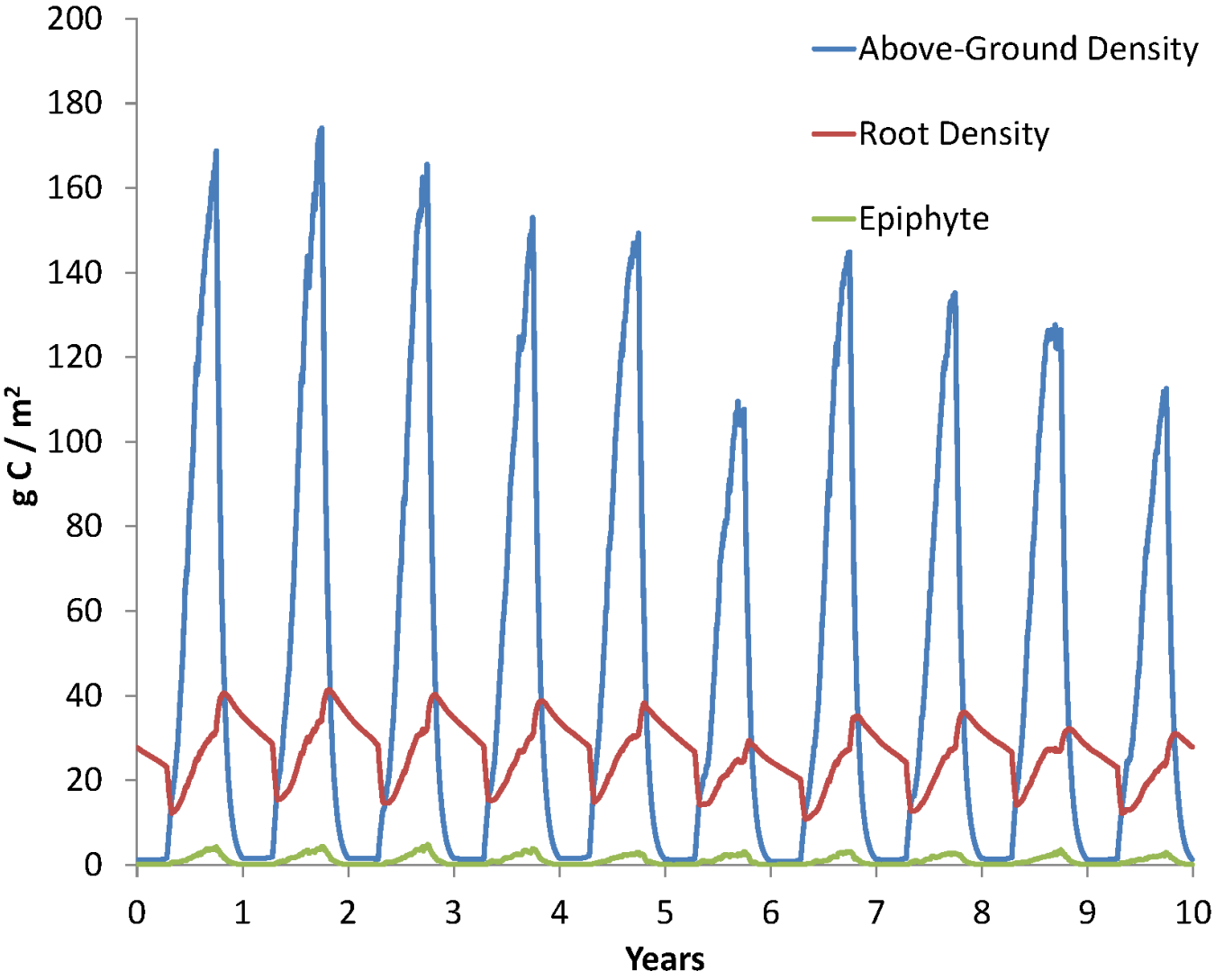
- We want to know how SAV influences nutrient cycling. How much nutrient is removed from water column by SAV?
- We quantify these fluxes within the model code.
- We need to export the desired information from the code and put it into useful form.

The Nitrogen Cycle CB1TF

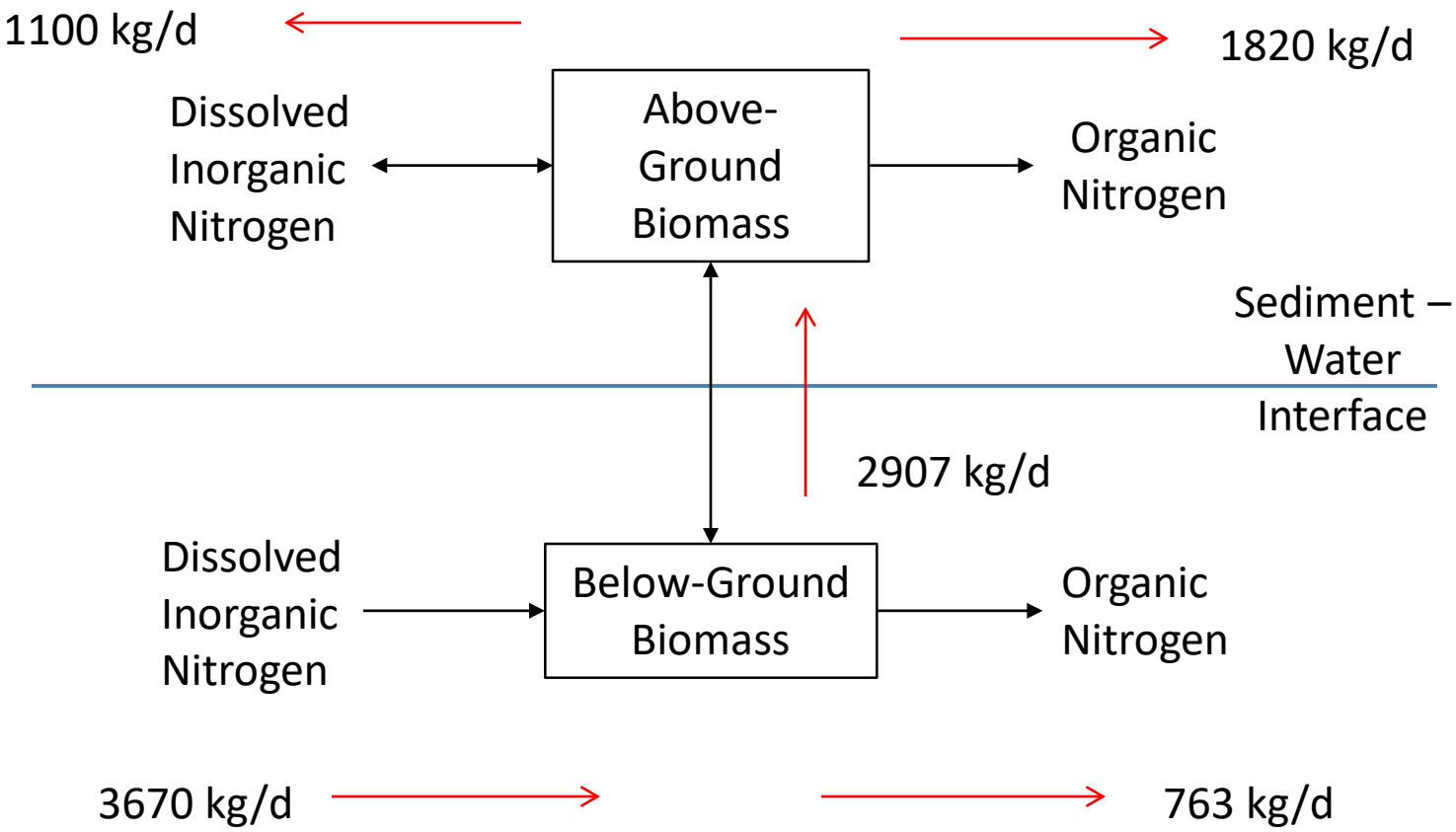


We quantify and can report out the indicated fluxes (CB1TF, vallisneria).

SAV Density CB1TF

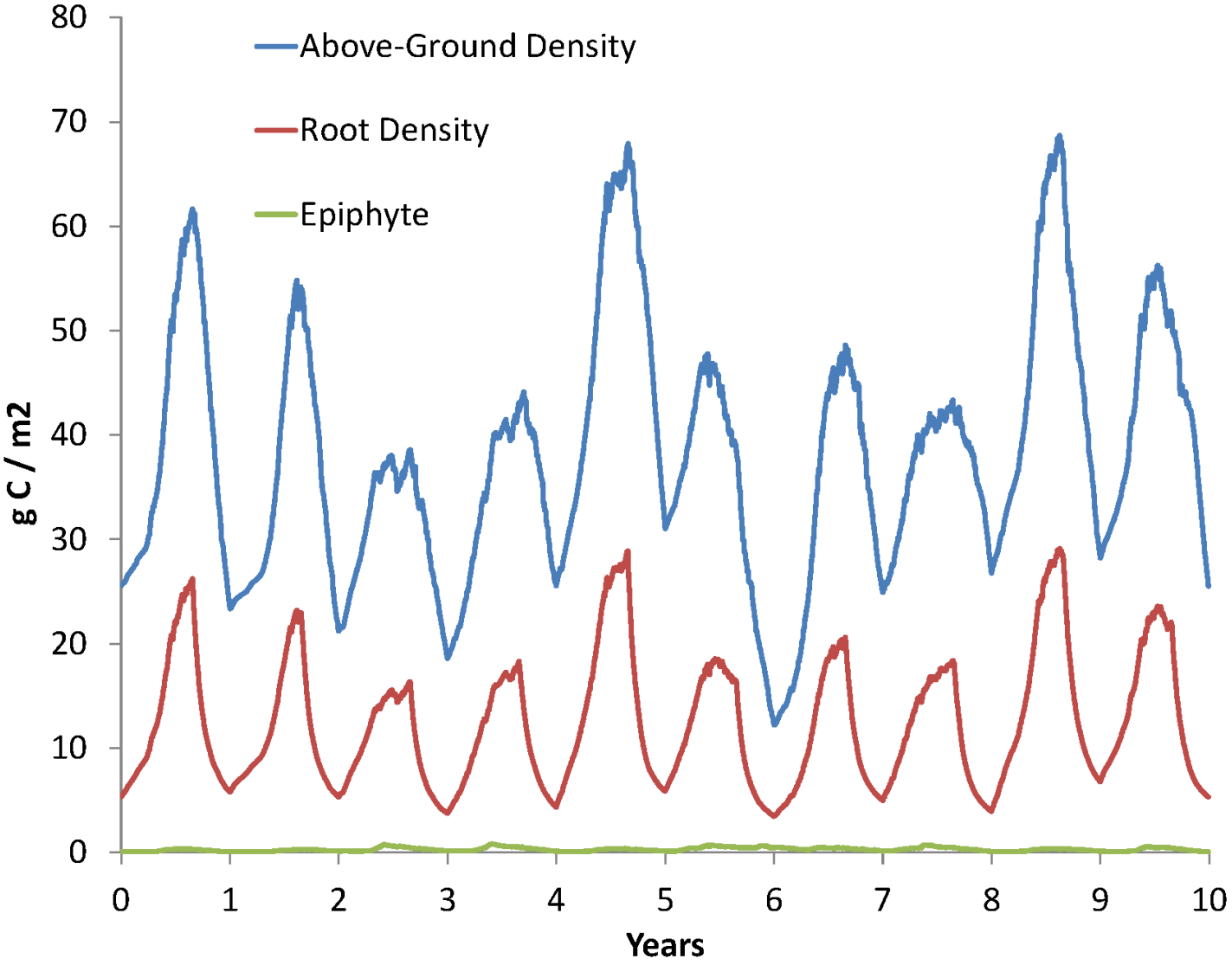


The Nitrogen Cycle

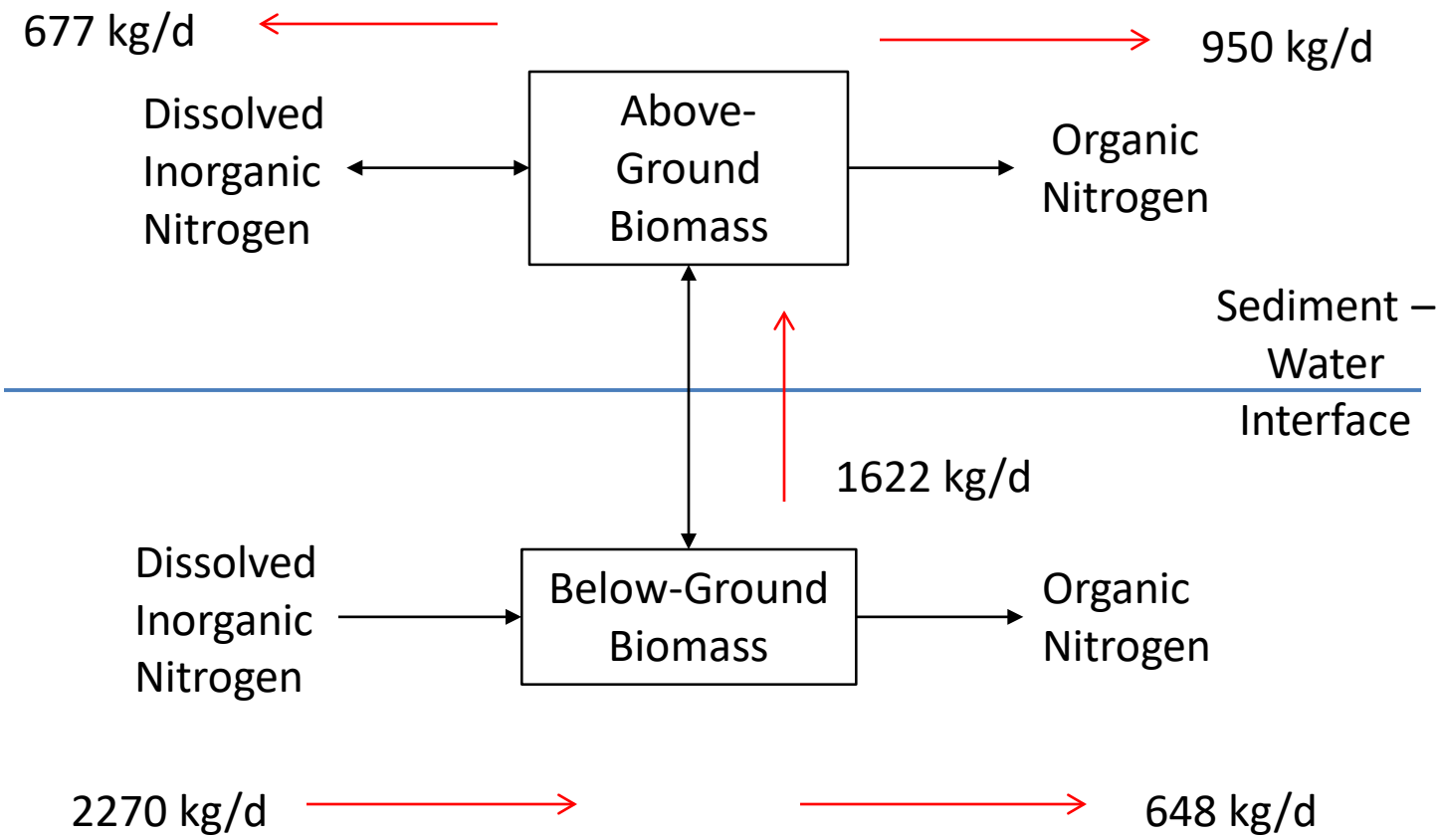


We quantify and can report out the indicated fluxes (TANMH, ruppia).

SAV Density TANMH

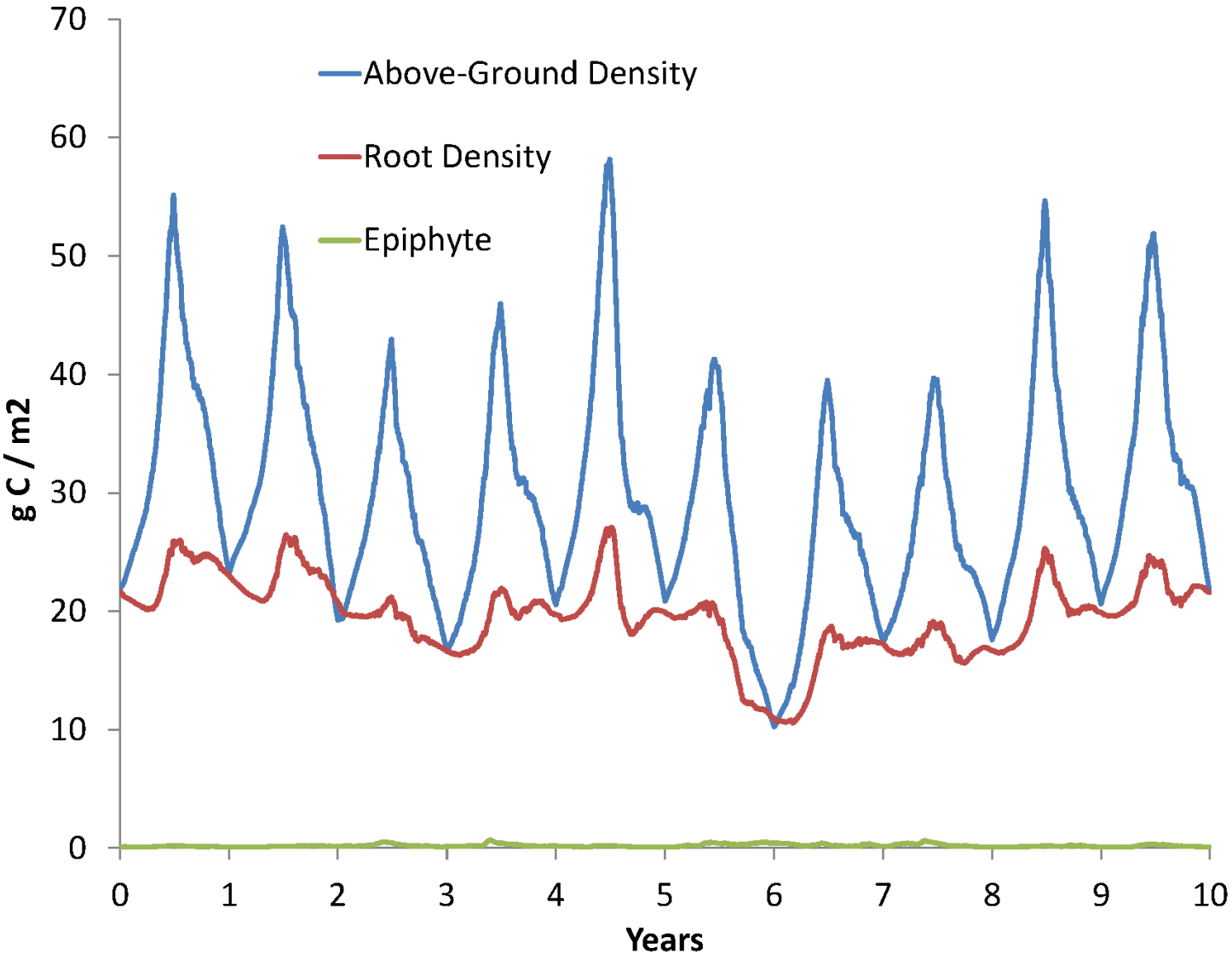


The Nitrogen Cycle

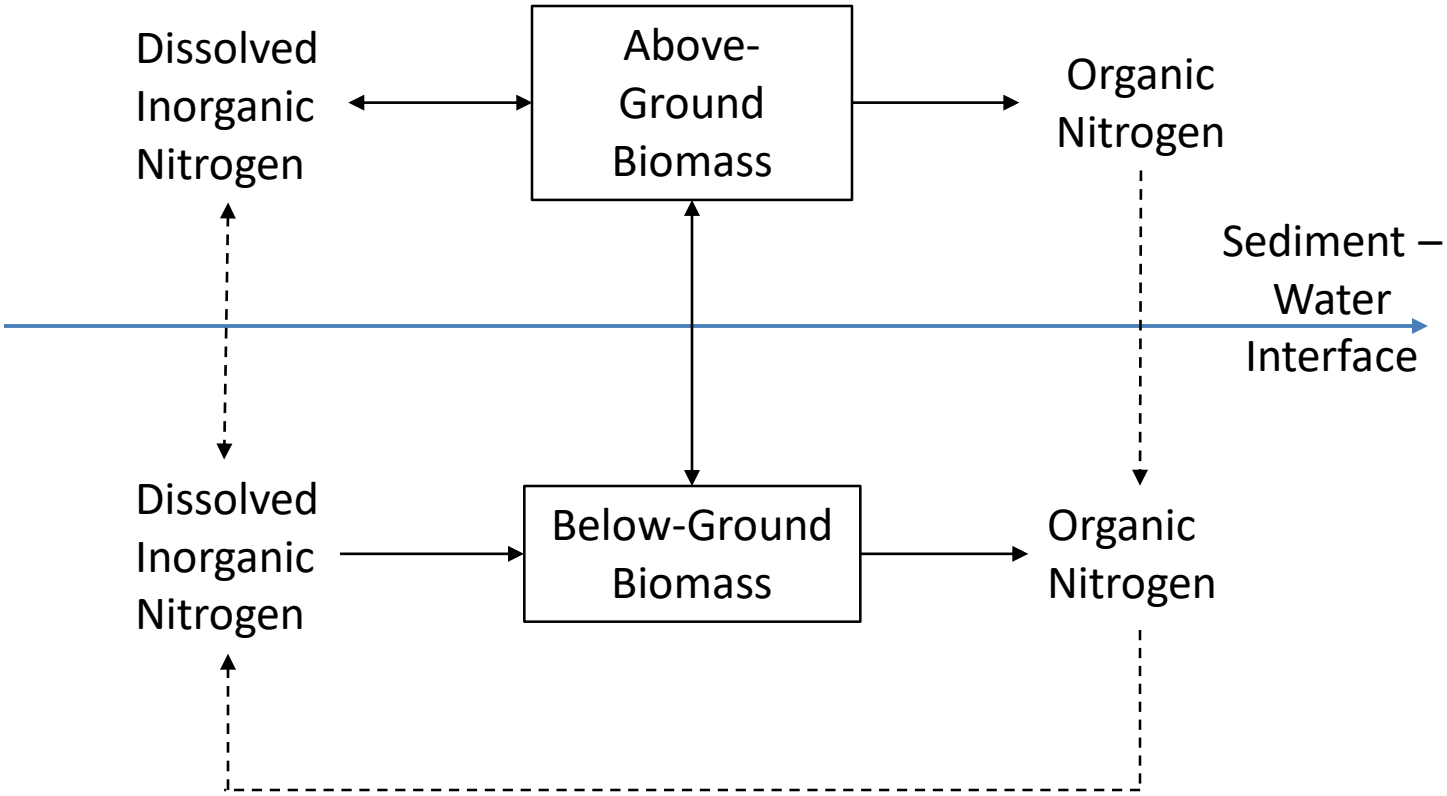


We quantify and can report out the indicated fluxes (CB7PH, zostera).

SAV Density CB7PH



Complications



We quantify and can report out the additional fluxes but it is difficult to isolate the influence of SAV.

Outline of Tasks for Determination of SAV on Nutrient Budgets in the Bay 070820

We want to determine the role of SAV in Bay nutrient budgets under present and WIP conditions. In particular, we are interested in determining if there is enhanced denitrification with SAV restoration. An outline of tasks is as follows:

We want to employ the code we have developed to examine SAV fluxes as part of the kinetics output file.

The code for the sediment model includes the variable BENDEN. This is sediment denitrification in mg N/m2/d (check this). This variable was installed long ago when we were checking internal mass balances. We no longer follow this variable nor do we write it out. We need to develop a daily-average variable ABENDEN, analogous to ABENNH4, and write it to the APL file.

We will need to modify the code that reassembles results from individual processors into a single file. We need to add ABENDEN.

We need to develop a postprocessor capable of reading the APL file and extracting the mass-balance variables in which we are interested. In particular, sediment-water fluxes of dissolved and particulate nutrients and denitrification fluxes. Combine the SAV fluxes and the sediment-water fluxes to create budgets for Chesapeake Bay Program Segments. Compare budgets to local and system-wide watershed loads.

We need to complete the following model runs with the modified code:

1) Base calibration
2) Base calibration with SAV turned off. This will require a ten-year spin-up with SAV turned off.
3) WIP run. This should be the same run we used for examining the SAV fluxes. This run will be made with the modified code.
4) WIP run with SAV turned off. This will require a ten-year spin-up with SAV turned off.

Do we wish to examine SAV effects on water quality? For the wetlands work, we worked with a modification of the stoplight plots. For CBPS, determine average DO and chlorophyll concentrations (and suspended solids based on sediment transport model variables?). Also run routine stoplight examination of standards violations.

Task One

Perform code modifications necessary to complete sediment-water nutrient and carbon budgets. In particular, report out denitrification flux.

Task Two

We need to complete the following model runs with the modified code:

1) Base calibration
2) Base calibration with SAV turned off. This will require a ten-year spin-up with SAV turned off.
3) WIP run. This should be the same run we used for examining the SAV fluxes. This run will be made with the modified code.
4) WIP run with SAV turned off. This will require a ten-year spin-up with SAV turned off.

Task Three

Complete detailed nutrient and carbon budgets for individual CBPS and system-wide. Compare to local and system-wide watershed loads. Isolate influence of SAV.

Task Four

Isolate effect of SAV on water quality under WIP3 conditions. Stoplight plots and DO concentration, light attenuation, chlorophyll with and without SAV.