**Pseudocode for Burn Severity**.  
  
// New mortality sub model for Scrpple used to model site level mortality to site level variables (Clay%, ET, Windspeed, Water Deficit, and Fuel), and then use species level variables for bark thickness accumulation with age to calculate cohort level mortality. The function for the site level mortality is generalized linear model utilizing a gamma distribution with an inverse link, the cohort level mortality is a binomial distribution -ZR  
  
// Establish the variables   
  
/// For delayed relative delta normalized burn ratio (DRdNBR) calculation   
//R- These will come from the input file  
**Beta\_naught\_d** //The parameter fit for the intercept   
**Beta\_Clay** //The parameter fit for site level clay % in Soil.  
**Beta\_ET** //The parameter fit for site level previous years annual ET  
**Beta\_Windspeed** // The parameter fit for site level Effective Windspeed   
**Beta\_Water\_Deficit //**The parameter fit for site level P-ET  
**Beta\_Fuel //**The parameter fit for site level P-ET

// R- These variables will come from LANDIS-II  
**Clay** // site level clay % in Soil  
**Et** // site level previous years ET  
**Windspeed** // site level Effective Windspeed  
**Water Deficit //** The parameter fit for site level previous year’s annual P-ET **Fuel** // The fuel   
// Cohort Mortality   
// These are the variables need to calculate the mortality per cohort given the DRdNBR

**Beta\_naught\_m //** Intercept parameter for mortality curve  **Beta\_Bark** // The parameter fit for the relationship between bark thickness and mortality.   
**Beta\_Site\_Mortality** // The parameter fit for the relationship between site level and individual level mortality.

// From the input file each species will need   
**AgeDBH\_Parameter**// **AgeDBH \_Parameter** is a parameter to scale Age and DBH estimated from a function in the form of

**barkthickness= .**

// It is essentially the half-life of the MaxBarkThickness \*Age relationship. This is a logistic survival code with the // MaxBarkThickness being asymptote. As age increase DBH approaches MaxBarkThickness

**MaxBarkThickness //** The maximum measured Bark thickness (sort of hypothetical). The asymptote of the logistic survival curve. In practice this was calculated by using a species-specific bark DBH Coefficient described in Cansler 2020 and the maximum measured DBH form FIA.   
  
// Cansler, C. A., Hood, S. M., Varner, J. M., van Mantgem, P. J., Agne, M. C., Andrus, R. A., ... & //Bentz, B. J. (2020). The Fire and Tree Mortality Database, for empirical modeling of individual tree //mortality after fire. *Scientific data*, *7*(1), 1-14.

**Beta\_naught\_m =** Intercept parameter for the mortality curve.

// Main function   
*For each site with active fire:*  
 ## Gamma distributions are fit with a inverse link   
  
 **Site\_Level\_Mortality** = (Beta\_naught+Beta\_Clay\*Clay+BetaET\*ET+Beta\_Windspeed\*Windspeed+Beta\_Fuel\*Fuel)^-1

*For each cohort at that site:*

//// **CohortAge**  The age of the cohort  
 **BarkThickness** =   
 **Pm** = exp(Beta\_naught\_m + Beta\_Bark \* BarkThickness+ Beta\_Site\_Mortality \* Site\_Level\_Mortality)

P\_Mort= Pm/(1+Pm)  
 **Draw\_Mort =** Generate a float between (0,1)

If P\_Mort > Draw\_Mort:

Cohort is removed.

// To Recap the input file will need slots for:

//Globally  
// Severity  
**Beta\_naught\_d**   
**Beta\_Clay**  
**Beta\_ET**  
**Beta\_Windspeed  
Beta\_Water\_Deficit  
//**  Mortality   
**Beta\_naught\_m  
Beta\_Bark  
Beta\_Site\_Mortality**  
  
// For each species  
//eg. AcerRubr AgeDBH\_Parameter, MaxBarkThickness