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# Introduction

DSS (decision support system) project assumes development of complex software which will:

1. Using the data prepared in advance perform Fire simulation.
2. Using Fire simulation results perform post-processing analysis.
3. Represent post-processing analysis in a user- friendly way, via charts, diagrams, summary tables.

This report describes and explains step (2) - what is post-processing, which risk metrics are included at the stage of DSS prototype development. What are the outputs of the risk metrics.

## Fire simulation and its results (pre post-processing step).

FROST application performs fire simulations. If to say very succinctly, FROST (using different settings) runs fire simulation (regime simulation) for a range of years. The results of each regime simulation are stored in SQLite databases. One regime simulation may consist of many fireyears. Fireyear is a term which being used in FROST. One fireyear may have either one (wild fires) or two (wild fires and prescribed burns) seasons (scenarios). Many fires can occur during each scenario. Each fire burns a particular area. This area is represented by a number of simulation cells (*aka simcell*, currently 180x180m). FROST generates and stores some information about each simulation cell that has been affected by fire. The structure of this information is as followed

*fire id*

*cell id*

*fire intensity (kW/m)*

*flame height (m)*

*flame depth (m)*

*ember density (#/m2)*

*convection (mW)*

*FFDI*

*rate of spread (m/hr)*

When FROST runs in regime where it utilizes LANDIS (inverse – exponential with Landis fuel machine) it generates some additional outputs which refer to biological succession and harvesting.

These FROST and LANDIS outputs are then utilised in the following post-processors.

# Post - processing

The main idea of so-called post-processing is to analyze, how fire impacts different forest values. Fire simulation in FROST gives us the information about fires and its impact on landscape. Knowing this impact, we can calculate and analyze how it affects forest values.

Post-processing is represented by number of post-processors. Each post-processor in turn is a separate unit which contains an algorithm(s) to identify an impact of fire on particular forest value. Each post-processor takes its own necessary extra data (prepared in advance) which is being loaded up during post-processing calculation.

## Biodiversity post-processor

#### **Extra data includes grids specifying:**

* the *minimum tolerable fire interval* for each simcell (BG1)
* *ecological fire group (EFG)* Id for each simcell (BG2)
* the presence of *high-value ecological entities* in wet forest (BG3) – boolean grid (0 or 1)
* the presence of *ecological refuges* (BG4) – boolean grid (0 or 1)
* the presence of ecological entities considered important in NaturePrint (NaturePrint is a mechanism being developed by DEPI to integrate and analyse their best statewide information - available through DEPI databases - about biodiversity values, threatening processes and ecosystem function at the landscape scale (BG5) boolean grid (0 or 1)
* the presence of *Leadbeater's possums* (BG6) - boolean grid (0 or 1)

#### **Algorithm:**

The post-processor retrieves the list of simcells affected during the fireyear that has a ROS > 0 and Intensity > 0 **1**. These simcells are then allocated their Ecological Fire Groups (EFG) ID, and then grids BG1 - BG6 are used to identify for each EFG, the:

* number of *fuelcells* affected by fire after maximum TFI (reading BG1) **2**
* number of *fuelcells* affected by fire before minimum TFI (reading BG1) **2**
* number of simcells affected by fire in wet forest (reading BG3)
* number of simcells containing ecological refuges affected by fire (reading BG4)
* number of simcells containing ecological entities considered important in NaturePrint affected by fire (reading BG5)
* number of simcells containing Leadbeater's possums affected by fire (reading BG6)

These results are stored in DB.

#### **Processing notes:**

**1** Fire severity is NOT included here. As ROS > 0 and Intensity >0 then it is all or nothing in terms of which sim cells are affected. For instance, if the intensity of a fire is low, then “Leadbeater possum” cell is “affected” – there is no differentiation to say whether the fire was a surface fire or a crown.

**2**BG1 grid has 30x30 m resolution. BG2 – BG6 grids have 180x180 m resolution. Ie there is 36 TFI fuel cells per simcell.

## Infrastructure post-processor

#### **Extra data includes grids specifying:**

* the *length of road* (m) in each simulation cell (IG1)
* the *length of powerline* (m) in each simulation cell (IG2)

the number of infrastructure units in each simulation cell, the units have different fire tolerance (IG3-IG7); see output for tolerance definitions - infrastructure units mean what?

#### **Algorithm:**

The post-processor retrieves the list of simcells that were affected during the fire year. The post-processor goes through all of them and using (IG1 – IG7) identifies:

* total length of road loss (m) (reading IG1), affected by fires with the intensity greater than 10000.
* total length of power lines loss (m) (reading IG2), affected by fires with the intensity greater than 10000.
* number of infrastructure units (events, camps and parks) affected by fire with the intensity greater than 0 (reading IG3) – output column Fh\_1.**2**
* number of infrastructure units (houses, hospitals, hotels, non-residential buildings and schools) affected**1** (reading IG4) – output column Fh\_2.**2**
* number of infrastructure units (biodiversity and gardens) affected by fire with the intensity greater than 3000 (reading IG5)- – output column Fh\_3.**2**
* number of infrastructure units (pumps, comms, power, roads, industry, DryForest25, catchments and bridges lost) affected by fire with the intensity greater than 10000 (reading IG6) – output column Fh\_4.**2**
* number of infrastructure units (structures not vulnerable to fire) affected by fire with the intensity greater than 50000 (reading IG7) – output column Fh\_5.**2**

These results are stored in DB.

#### **Processing notes:**

**1** Houses lost is based on probability, and calculated **per simcell** using the following method;

1. The following probability equations (by Tolhurst) are used to calculate the probability of houses being burnt:

Pr (HouseLoss) = 1 - EXP(2.03142 - 0.03239 \* FH - 0.06737 \* ED - 0.000003 \* C) / (1 + EXP(2.03142 - 0.03239 \* FH - 0.06737 \* ED -0.000003 \* C))

where:

FH is flame height (m);

ED is ember density (#/m2);

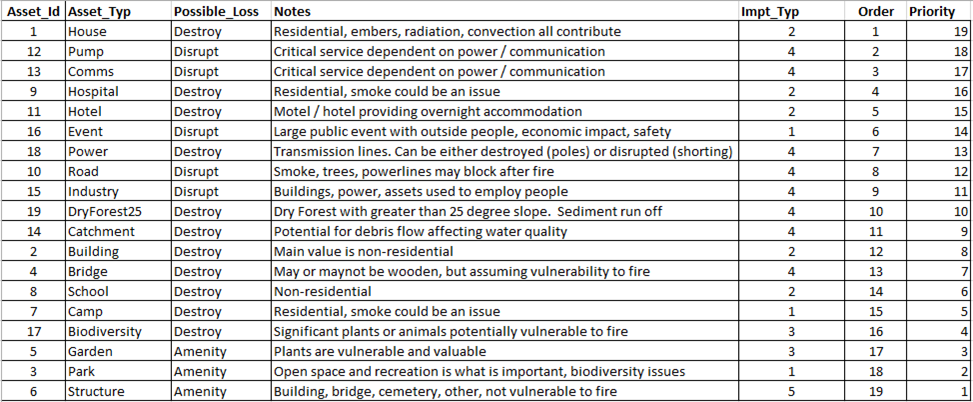
C is convective strength (mW);

Then, it is necessary to apply scaling to the output:

Zeroed Pr (HouseLoss) = 1.1311 \* Pr (HouseLoss) - 0.1311

1. The scaled house loss probability is multiplied by the number of total houses in the equivalent simcell to calculate the numbers of houses lost per simcell:

Houses lost = Zeroed Pr (HouseLoss) \* number of houses in a cell

2 Definitions o f infrastructure units is as follows:

## People house loss post-processor

#### **Extra data includes:**

* house density grid - the *number of houses* in each simulation cell (PHG1)
* people density grid - the *number of people* in each simulation cell (PHG2)
* commercial buildings density grid - the *number of commercial buildings* in each simulation cell (PHG3) – not yet used in Frappe
* industrial buildings density grid - the *number of industrial buildings* in each simulation cell (PHG4) – not yet used in Frappe
* 2 datasets defined by an intensity threshold raster (fire intensity above this threshold will trigger retrofitted houses to be destroyed). Each intensity raster has 20 associated grids specifying number of retrofitted houses in each simulation cell (4 subsets of 5 replicates). Data sets are a combination of:
  + *Intensity 12* or *Intensity 40* grids; and
  + Number of retrofitted house grids – calculated as 1, 5, 10 or 30 percent of total houses per simcell1

#### **Algorithm:**

The post-processor retrieves the list of simcells that were affected during the fire year. It goes through all of the affected simcells and using (PHG1 – PHG10) identifies:

* total number of houses exposed due to fire (reading PHG1)
* total number of houses lost due to fire (reading PHG1) - House loss is then calculated using the same house loss probability algorithm used in the Infrastructure post-processor.
* total number of people exposed due to fire (reading PHG2)
* total number of retrofitted houses lost for each dataset. Depending on fire severity and a houses’ fire resistance, the total number of houses lost will vary for each dataset available.1
* The following are not yet available in Frappe:
  + total number of commercial buildings exposed (reading PHG3)
  + total number of commercial buildings lost (reading PHG3)
  + total number of industrial buildings exposed (reading PHG4)
  + total number of industrial buildings lost (reading PHG)

These results are stored in two separate DB. One for house and people loss only (first 3 outputs listed) and the second for retrofitted houses only.

#### **Processing notes:**

1Each retrofitted house number grid (1, 5, 10 and 30%) has five replicates. Each replicate has changed locations of the retrofitted houses (randomly chosen). We calculate the houses lost value for each grid of each dataset (40 in total at the moment) per scenario.

## Hydro post-processor

Hydro post processor involves three hydro – related models. They are water quality model, water yield model and RUSLE model.

### Water quality model

~~Model which calculates, per fireyear, the distribution of values of "annual exceedance probability" (AEP) of the critical I12 (which would initiate a debris flow) across the simulation cells in each catchment~~. Model calculates, per fire year, the probability that a fire will trigger a debris flow across the simulation cells in each catchment.

#### **Extra data:**

* The headwaters, specified as a collection of geographical points, each associated with an *aridity index* value and a *slope* value (based on a 20m resolution)
* A set of geographical grids specifying the *possible* *I12* value for a specific *annual return interval (ARI)*(years) in each cell; there is one grid per *ARI* (for 1 year return interval, then for 2, 5, 10, 20, 50 and 100), totaling 7 grids.
* Lookup table for *critical I12*values (the critical rainfall intensity (in mm) required to initiate debris flow)
* Grid specifying which the *catchment* (if any) in which each simulation cells falls
* Grid specifying the *canopy top height* (m) value for each simulation cell
* Grid specifying the *canopy depth* (m) value for each simulation cell

#### **Algorithm:**

The post processor collects any simcells that have been burnt during the current fire year or the year prior (if it fall into a catchment). Then for each headwater (there may be more than 1 in each simcell) the cell post-processor calculates:

* the probability of debris flow occurring due to fire in the current year
* the probability of debris flow occurring due to fire in the prior year

These results are stored in the hydro data base.

#### **Processing notes:**

Full steps and reasoning to calculate debris flow probability is outlined in the Hydro V.1 document. A basic outline is provided below, where, for each **headwater** identified as being burn in the current or prior fire year, the post processor:

1. Calculates its *delta Normalised Burn Ratio (dNBR*), as a function of *canopy top height*, *canopy depth*, *fire intensity* and *flame height*. Fire intensity and flame heightare outputs of FROST. Where simcells have been double burnt, a headwater is allocated the dNBR of the year in which the most severe burn occurred.
2. Sets its *time since fire* to 0.434 (burnt during the last fire year) or 1.434 (*burnt* during the fire year before last).
3. Uses the look-up table to allocate its *critical I12* - a function of *dNBR*, *aridity index*, *slope* and *time since fire*
4. Calculates the *ARI* of the *critical I12*– this is done by cubic interpolation of the headwaters’ *critical I12* against the 7 *possible* *I12* values
5. Calculates the *annual exceedance probability (AEP*) corresponding to the *ARI, where;*

AEP = 1- e( -1/ ARI)

This value is zero if ARI is infinite.

1. If the *AEP* value is zero, the headwater is ignored as debris flow is unlikely to occur. If the value is non-zero then the probability of debris flow (PDF) occurring is calculated.

PDF(current year)= AEP(current year), or ????? is this first year only where second year AEP=0?

PDF(current year or prior year)= AEP(first year) + (1- AEP(first year))\* AEP(second year),

is this for first year AND second year where second year AEP>0?

### Water yield model

This model calculates *mean annual streamflow* as a difference between mean annual precipitation and estimated annual evapotranspiration.

#### **Extra data:**

Grid specifying

* the *catchment* (if any) into which a simulation cells falls
* the *mean annual precipitation* value for each simulation cell
* the *potential evapotranspiration* value for each simulation cell
* whether a simulation cell falls in an *ash forest*, *mixed forest*, or neither
* the *canopy top height* (m) value for each simulation cell
* the *canopy depth* (m) value for each simulation cell

#### **Algorithm:**

The post-processor retrieves the list of simcells that fall into a catchment area *and* are either classed as an “ash” or “mixed” forest type. The post processor calculates for each catchment area;

* the proportion burnt by wildfires
* its total mean annual stream flow (by aggregating the stream flow of all simcells in that catchment)

#### **Processing notes:**

Full steps and reasoning to calculate mean annual stream flow is outlined in the Hydro V.1 document. A basic outline is provided below, where, after each WF scenario (PB fires are not included) the post-processor calculating mean annual stream flow in each simcell using its:

1. mean annual precipitation
2. potential evapotranspiration
3. sapwood area measurement

Sapwood area measurement is calculated for each simcell using its;

1. time since fire. This is allocated:

* 0 years if the cell was burnt by wildfire and the fire severity was high enough to affect sapwood area of the vegetation presented in the simcell
* +1 years to the tsf of the cell if it had been previously burnt
* 250 years if the cell has never been burnt, of burnt but not severe enough to effect sapwood area

1. delta Normalised Burn Ratio (*dNBR)* which is based on canopy damage. Canopy is classified as unburnt, or either low, medium, or high damage using *canopy top height*, *canopy depth*, *fire intensity* and *flame height*. A cell is allocated its *dNBR* as follows:

Canopy Fire Damage Unburnt = 18.33583625,

Canopy Fire Damage Low = 116.9361804

Canopy Fire Damage Medium = 268.0966016,

Canopy Fire Damage High = 416.9085875,

Canopy Fire Damage Burnt = 688.9502298.

1. forest type (ash or mixed)

Could possibly insert work flow diagram here if required?

### RUSLE model

The RUSLE model calculates the *average long-term mean annual erosion rate* in a water catchment (tons per year per hectare) through the calculation of *long-term mean annual erosion rate* for each forest simcell (A) in water catchment and then averaging it. This parameter changes due to effect of fire and harvesting.

#### **Extra data:**

* grid specifying *rainfall-runoff erosivity factor* (R)in each simulation cell (WRG1)
* grid specifying *base* *soil erodibility factor* (S) in each simulation cell (WRG2)
* grid specifying the *slope length* (L) in each simulation cell (WRG3)
* grid specifying the *slope steepness* parameter in each simulation cell (WRG4)
* grid specifying the *base cover management factor* in each simulation cell (WRG5)
* grid specifying the *support practice factor* (P) in each simulation cell (WRG6)
* grid specifying the *aridity index* in each simulation cell (WRG7)
* map specifying if simcell was harvested during the succession year, which usually following fireyear (optional)

(A) is calculated for each simcell based on linear equation:

A = R \* K \* L \* S \* C \* P

where:

R is the rainfall-runoff erosivity factor (MJ mm ha-1 h-1 y-1 );

K is soil erodibility factor (t ha h ha-1 MJ-1 mm-1 );

L is the slope length factor; (dimensionless, 0-1);

S is the slope steepness parameter (dimensionless, 0-1);

C is the cover management factor (dimensionless, 0-1);

and P is the support practice factor (dimensionless, 0-1, set equal to 1 here)

A is the average annual soil erosion at each cell (t ha-1 y-1 );

After each fireyear post-processor goes through each forest simcell of each water catchment and calculates *time since last fire* and harvesting. It also calculates the *dNBR* (delta normalised burn ratio), as a function of *canopy top height*, *canopy depth*, *fire intensity* and *flame height.* Factors C and K are calculated (see “water risk metric v.1.5” document for more details about this equation and its variables). R, L, S and P are constant values which we read from WRG1, WRG3, WRG2, WRG6 grids respectively.

The information about average long term mean annual erosion rate for each water catchment is stored in DB.

## GMA (geometric mean abundance) post-processor

#### **Extra data includes:**

* grid specifying the *ecological fire group (EFG)* ID for simulation cell
* grid specifying the *GMA region* ID for simulation cell (user defined)
* .csv file describing, for each *EFG* ID, their;
  + name
  + age class - Juvenille, Adolescent, Mature or Old
  + the range (in years) of each age class
* .csv file containing information about the optimal growth stage distribution of each EFG age class per region ID. 1

#### **Algorithm:**

The post-processor retrieves simcells of interest (those that have Region ID and EFG ID) and identifies their *time since fire*. *Time since fire* is then used to allocate each simcell with an EFG age class. For each

GMA region, the post processor identifies:

* relative entropy – output calculated for each EFG2
* Shannon’s diversity index– output calculated per region 3
* Fractal dimension index – output calculated per region 4

These results are stored in DB.

#### **Processing notes:**

1We currently only have the optimal growth stage distribution information for region 1 and 2. Therefore we are unable to get relative entropy information for the other regions.

2Relative entropy is calculated per region, per EFG, by comparing the actual growth stage distribution and optimal growth stage distribution of each **age class** and summing them together for each EFG:

Relative entropy = ∑ p1 \* log (p1/p2)

where:

p1 is the “actual” growth stage distribution for each EFG age class (also known in this context as probability). The distribution of age classes across an EFG is presented as a proportion of 1. e.g. In Region 1, EFG 1, we could have Juvenile = 0.4, Adolescent= 0.2, Mature = 0.3 and Old = 0.1

p2 is the “optimal” growth stage distribution proportions for each EFG age class given in the sustainable supply distribution csv. Note that where optimal growth stage is zero, we substitute in 0.001 so as not to have a zero denominator in the equation.

3Shannon’s diversity index (SDI) calculated **per region**, as:

SDI= ∑ pi \* ln pi

where:

pi is the proportion of the landscape occupied by the age class (Juvenile, Adolescent, Mature and Old)

4Fractal dimension index (FRAC) calculated for the **region,** is calculated in two steps:

1. Calculate the FRAC for each “patch” found in the landscape. Each patch is made of simcells of the same age class which are spatially touching. Patches are connected here using 4 directions (rook’s case). FRAC per path is calculated by:

FRAC (patch) = 2 \* ln (0.25 pij) / ln aij

where:

pij is the perimeter (m) of patch,

aij is the area (m2) of the patch

1. Calculate landscape FRAC per region, by averaging the FRAC index of each patch within that region:

FRAC (landscape) = (∑ FRACpatch) / n (FRACpatch)

## Viewshed post-processor

Calculates a *Visual aesthetics of burnt forests (VAB)* index and a *Visual aesthetics of harvested forests (VAH)* index for a viewshed. Viewshed is the area which is visible for human eye from a particular point/polygon. *VAB* and *VAH* index tend to initially decline due to the respective impact of fire and harvesting.

#### **Extra data:**

* grids containing single viewsheds – these are pre-prepared in fromage1
* look up table which gives VAB index for a simcell2
* look up table which gives VAH index for a simcell3
* 2 x rasters containing total biomass (live above ground biomass) per simcell – output prior to and post LANDIS succession year

#### **Algorithm:**

The post processor identifies the VAB and VAH index for each simcell per year. These simcells are averaged to calculate for each viewshed:

* a VAB index2
* a VAH index3

This information is stored in DB.

#### **Processing notes:**

1The viewsheds are pre-processed in fromage by;

1. taking a stakeholder made shapefile with defined “viewshed objects” – known as the viewshed observation zone. This can be comprised of a single or multiple simcells.
2. calculating the viewshed around this object – known as the viewshed target zone. Line of site (currently at a total distance of 16km – this value is optional and can be changed) from the viewshed observation zone is used to create the viewshed target zone. Elevation of the observation zone simcells and the elevation of the surrounding topography is used to select whether a simcell along this line of site is able to be “seen” from the observation zone. If so, it is then included in the target zone.

Note: If the observation zone has multiple simcells then *any* simcells “seen” (regardless of whether they have been seen by one or multiple observation simcells) is included in the viewshed target zone.

1. overlaying these two zones to make a complete viewshed – our “total viewshed”

2Years since fire (0-60) and fire severity (low and high) are used to allocate the VAB index for each simcell.

The post processor allocates fire severity per simcell based on canopy damage level, where;

* Low severity is allocated to unburnt, low and medium damage level
* High severity is allocated to high damage and burnt canopy

The level of canopy damage is in turn based on:

1. canopy top height - if absent *unburnt*
2. flame length – if less that 0.2m *unburnt*
3. where scorch height (calculated from fire intensity using the Mackey et al. equation) reaches to in relation to canopy base (top height – depth) and canopy top – gives *high, medium* or *low*
4. flame length > canopy top – *burnt*

3Years since harvesting (0-90) and harvest prescription performed (clearfell, aggregated or selective) are used to allocate the VAH index for each simcell.

The post processor allocates a harvesting prescription per harvested simcell by calculating the total biomass change per LANDIS succession year, where:

* clearfell = biomass loss 90-100%,
* aggregate = biomass loss 40-90%
* selective = biomass loss 10-40%

## HCV post-processor

**The High Conservation Values (HCV) post-processor identifies the ratio between *high conservation area* accessible to the public and *total area* accessible to the public. HCV area is defined as accessible forested area which has present either old growth trees (min 60 yo) or rainforest (both** *N. cunninghamii* and ***A. moschatum* present).**

#### **Extra data:**

* a grid defining the age of trees in the landscape – from LANDIS
* a boolean grid identifying the presence of Nothofagus cunninghamii (nothcunn) - from LANDIS
* a boolean grid identifying the presence of Atherosperma moschatum (athermosc) - from LANDIS
* a shapefile identifying the road network (sourced from National Geoscience Dataset) with a 180m buffer area around each road – considered *total* area accessible to the public

#### **Algorithm:**

The post-processor retrieves all simcells within the road buffer zone and identifies which have old growth trees or rainforest. The post processor translates simcell count data into area and outputs;

* the total area accessible to the public across the simulation landscape
* the HCV area accessible to the public across the simulation landscape
* the ratio between the HCV area and total area accessible to the public

This information is aggregated by fire and stored in DB.

#### **Processing notes:**

None.

## CarbonLandis post-processor

The CarbonLandis post processor is based on LANDIS outputs. **It calculates yearly change in carbon stores from biomass change.**

#### **Extra data:**

LANDIS provides grids defining;

* Live biomass
* Dead woody biomass
* Dead non-woody biomass

#### **Algorithm:**

After each succession year the post processor retrieves all simcells that have vegetation present (any type of biomass > 0). This biomass is aggregated across the landscape and the post processor converts biomass to carbon stock1. The output given is:

* *Total* carbon stock at the start and end of the succession year2
* The difference in amount of *total* carbon over the year
* *Live* carbon stock at the start and end of the succession year3
* The difference in amount of *live* carbon over the year

This information is stored in CarbonLandis table of succession\_results.sqlite database.

#### **Processing notes:**

1Biomass is converted to carbon using the following;

C= B x 0.5

where:

C is the amount of carbon (Mg);

B is the amount of biomass (Mg)

2Total carbon stock (Mg) is calculated from the aggregation of live, dead woody and dead-non woody biomass values.

3Live carbon stock (Mg) is calculated from live biomass values only.

## Carbon post-processor

**Carbon post-processor is based on FROST fire simulation results. This post-processor calculates carbon lost due to fire activity only and does not have any connection to Landis, therefore can be run without it.**

#### **Extra data:**

None

#### **Algorithm:**

The post-processor retrieves the simcells affected during each fire year1**.** For each fire, in each fire scenario (WF/PB), it calculates;

* the *amount of fuel consumed* 2
* the *amount of carbon released* 3

This information is stored in Carbon table of phibc\_post\_proc\_results.sqlite database.

#### **Processing notes:**

1Simcells affected are those where a ROS >0 and Intensity > 0

2 For each affected simcell amount of fuel consumed is calculated using the following equation

F= (36 000 \* I / (H \* ROS)) \* A

where:

F is the amount of consumed PHOENIX fuel load (Mg);

I is the PHONIX fire intensity (kW/m);

H is the fuel low heat of combustion (kJ/kg)- given as a constant 18600 (by Trent Penman);

ROS is the PHOENIX fire rate of spread (m/hr);

A is simcell area (ha)

3 For each affected simcell consumed fuel is converted to carbon released

C = F x 0.5

where:

C is the amount of carbon released due to fire (Mg);

F is the amount of consumed PHOENIX fuel load (Mg)

## Succession post-processor

This can be run only if FROST was running in “inverse-exponential with landis” regime, hence, LANDIS output data is available. A fire year is first run in FROST, this is followed by a succession year run in LANDIS (where vegetation growth or succession is enacted).

### Biomass model

The *amount of biomass (AOB)* in this model is aboveground live biomass.

#### **Extra data:**

This model retrieves the total *AOB* and *AOB* per species (tons) at the beginning and end of each succession year for each simcell.

#### **Algorithm:**

After each succession year the post processor aggregates each simcell to calculates for the study area:

* The *AOB* at the start of the succession year
* The *AOB* at the end of the succession year
* The difference in amount of biomass over the year

These outputs are also available for the following species;

Acacia dealbata (acacdeal), Acacia obliquinervia (acacobli), Eucalyptus acerina (eucaacer), Eucalyptus delicata (eucadeli), Eucalyptus obliqua (eucaobli), Eucalyptus pauha (eucapauh), Eucalyptus regnans (eucaregn), Nothofagus cunninghamii (nothcunn)

### Harvest model

#### **Extra data:**

The model retrieves *summary-log.csv file* from the LANDIS output. The file contains harvesting information for each succession year.

#### **Algorithm:**

The post processor calculates the following data for each *harvest prescription type*;

* number of sites harvested
* number of cohorts completely harvested
* number of cohorts partially harvested
* total amount of biomass harvested
* amount of biomass of "ash" species harvested1
* amount of biomass of "mix" species harvested2

amount of biomass of "other" species harvested3

This information is stored in xxxxx database.

#### **Processing notes:**

1Species included as an “ash” type include:

eucaregn, eucanite, eucadeli, eucadent

2Species included as an “mix” type include:

eucaobli, eucacype, eucavimi, eucasieb, eucaglob, eucadalr, eucarubi

3Species included as an “other” type include:

acacdeal, acacmear, acacmela, acacobli, athemosc, eucaglau, eucapaul, eucacama, eucadive, eucamacr, eucaradi, eucaacer, eucapauh, eucamicr, eucapoly, eucatric, leptgran, leptlani, melasqua, nothcunn, pinuradi

## Genasset post-processor

#### **Extra data:**

* information about probabilities of damage levels for different asset groups within group of fire impact levels (.csv file)
* grid/grids specifying asset group ID for cell
* look up table of asset group IDs and their names

**This post-processor is under development**