

# Package: BerkeleyForestsAnalytics (via r-universe)

January 11, 2025

**Title** Compute and Summarize Core Forest Metrics from Field Data

**Version** 2.0.4

**Description** A suite of open-source R functions designed to produce standard metrics for forest management and ecology from forest inventory data. The overarching goal is to minimize potential inconsistencies introduced by the algorithms used to compute and summarize core forest metrics. Learn more about the purpose of the package and the specific algorithms used in the package at <https://github.com/kearutherford/BerkeleyForestsAnalytics>.

**License** file LICENSE

**URL** <https://github.com/kearutherford/BerkeleyForestsAnalytics>

**Depends** R (>= 2.10)

**Imports** utils

**Suggests** dplyr, knitr, rmarkdown, testthat (>= 3.0.0), tidyr

**VignetteBuilder** knitr

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**Roxygen** list(markdown = TRUE)

**RoxygenNote** 7.3.2

**Repository** <https://kearutherford.r-universe.dev>

**RemoteUrl** <https://github.com/kearutherford/berkeleyforestsanalytics>

**RemoteRef** HEAD

**RemoteSha** 7acf3d2c79261f28828f9f6de043c768455c3b88

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BiomassNSVB

*BiomassNSVB***Description**

Uses the national-scale volume and biomass (NSVB) framework, from GTR-WO-104, to estimate above-ground tree biomass and carbon. The package will summarize to the tree or plot level, with options to additionally summarize by species and/or status. The package is specifically designed for use in California ecosystems, and, therefore, only covers the ecoregions found in California (260, M260, 320, and 340).

**Usage**

```
BiomassNSVB(
  data,
  sp_codes = "4letter",
  input_units = "metric",
  output_units = "metric",
  results = "by_plot"
)
```

**Arguments**

data	A dataframe or tibble with the following columns: division, province, site, plot, exp_factor, status, decay_class, species, dbh, ht1, ht2, crown_ratio, top, and cull. Each row must be an observation of an individual tree.
sp_codes	Not a variable (column) in the provided dataframe or tibble. Specifies whether the species variable follows the four-letter code or FIA naming convention (see README file for more detail). Must be set to either "4letter" or "fia". The default is set to "4letter".
input_units	Not a variable (column) in the provided dataframe or tibble. Specifies (1) whether the input dbh, ht1, and ht2 variables were measured using metric (centimeters and meters) or imperial (inches and feet) units; and (2) whether the input expansion factor is in metric (stems per hectare) or imperial (stems per acre) units. Must be set to either "metric" or "imperial". The default is set to "metric".
output_units	Not a variable (column) in the provided dataframe or tibble. Specifies whether results will be given in metric (kilograms or megagrams per hectare) or imperial (US tons or US tons per acre) units. Must be set to either "metric" or "imperial". The default is set to "metric".
results	Not a variable (column) in the provided dataframe or tibble. Specifies whether the results will be summarized by tree, by plot, by plot as well as species, by plot as well as status (live/dead), or by plot as well as species and status. Must be set to either "by_tree", "by_plot", "by_species", "by_status", or "by_sp_st". The default is set to "by_plot".

**Value**

Depends on the results setting:

- `by_tree`: a list with two components: (1) total run time for the function and (2) a dataframe with tree-level biomass and carbon estimates (reported in kilograms or US tons).
- `by_plot`: a list with two components: (1) total run time for the function and (2) a dataframe with plot-level biomass and carbon estimates (reported in megagrams per hectare or US tons per acre).
- `by_species`: a list with two components: (1) total run time for the function and (2) a dataframe with plot-level biomass and carbon estimates, further summarized by species (reported in megagrams per hectare or US tons per acre).
- `by_status`: a list with two components: (1) total run time for the function and (2) a dataframe with plot-level biomass and carbon estimates, further summarized by status (live/dead; reported in megagrams per hectare or US tons per acre).
- `by_sp_st`: a list with two components: (1) total run time for the function and (2) a dataframe with plot-level biomass and carbon estimates, further summarized by species as well as by status (reported in megagrams per hectare or US tons per acre).

**Examples**

```
BiomassNSVB(data = nsvb_demo,  
             sp_codes = "4letter",  
             input_units = "metric",  
             output_units = "metric",  
             results = "by_plot")
```

```
BiomassNSVB(data = nsvb_demo,  
             sp_codes = "4letter",  
             input_units = "metric",  
             output_units = "metric",  
             results = "by_status")
```

---

bio\_demo\_data

*Data for biomass demonstrations*

---

**Description**

A fake dataset created for biomass demonstration purposes only

**Usage**

```
bio_demo_data
```

**Format**

A dataframe with 9 rows and 7 columns:

**Forest** Broader location or forest where the data were collected

**Plot\_id** Plot in which the individual tree was measured

**SPH** Stems per hectare

**Live** Live (1) or dead (0)

**Decay** 1-5 for standing dead trees. NA for live trees.

**SPP** Species of the individual tree, using four-letter species codes

**DBH\_CM** Diameter at breast height in centimeters

**HT\_M** Tree height in meters

**Source**

Created by Kea Rutherford for demonstration purposes

---

bio\_NT\_demo

*Data for biomass demonstrations*

---

**Description**

A fake dataset created for biomass demonstration purposes only. Includes a plot without trees.

**Usage**

bio\_NT\_demo

**Format**

A dataframe with 9 rows and 7 columns:

**Forest** Broader location or forest where the data were collected

**Plot\_id** Plot in which the individual tree was measured

**SPH** Stems per hectare

**Live** Live (1) or dead (0)

**Decay** 1-5 for standing dead trees. NA for live trees.

**SPP** Species of the individual tree, using four-letter species codes

**DBH\_CM** Diameter at breast height in centimeters

**HT\_M** Tree height in meters

**Source**

Created by Kea Rutherford for demonstration purposes

---

 CoarseFuels

*CoarseFuels*


---

### Description

Estimates coarse woody (1000-hour) fuel loads from line-intercept transects. See [README](#) for details.

### Usage

```
CoarseFuels(
  tree_data,
  fuel_data,
  sp_codes = "4letter",
  units = "metric",
  summed = "no"
)
```

### Arguments

tree_data	A dataframe or tibble with the following columns: time, site, plot, exp_factor, species, and dbh. Each row must be an observation of an individual tree.
fuel_data	A dataframe or tibble. If the summed parameter is set to "no" the following columns are required: time, site, plot, transect, length_1000h, diameter, and status. If the summed parameter is set to "yes" the following columns are required: time, site, plot, transect, length_1000h, ssd_R, and ssd_S.
sp_codes	Specifies whether the species column in tree_data follows the four-letter code or FIA naming convention. Must be set to either "4letter" or "fia." The default is set to "4letter".
units	Specifies whether the input data are in metric (centimeters, meters, and trees per hectare) or imperial (inches, feet, and trees per acre) units. Inputs must be all metric or all imperial (do not mix-and-match units). The output units will match the input units (i.e., if inputs are in metric then outputs will be in metric). Must be set to either "metric" or "imperial". The default is set to "metric".
summed	Specifies whether the sum-of-squared-diameters for sound and rotten 1000-hour fuels has already been calculated by the user. Must be set to either "yes" or "no". The default is set to "no".

### Value

A dataframe with the following columns:

- time: as described above
- site: as described above
- plot: as described above

- `load_1000s_Mg_ha` (or `load_1000s_ton_ac`): fuel load of sound 1000-hour fuels in megagrams per hectare (or US tons per acre)
- `load_1000r_Mg_ha` (or `load_1000r_ton_ac`): fuel load of rotten 1000-hour fuels in megagrams per hectare (or US tons per acre)
- `load_cwd_Mg_ha` (or `load_cwd_ton_ac`): total coarse woody debris fuel load (1000-hour sound + 1000-hour rotten) in megagrams per hectare (or US tons per acre)
- `sc_length_1000s`: slope-corrected transect length (i.e., horizontal transect length) for sound 1000-hour fuels in either meters or feet. This is the total horizontal length of transect sampled for sound 1000-hour fuels at the specific time:site:plot.
- `sc_length_1000r`: slope-corrected transect length (i.e., horizontal transect length) for rotten 1000-hour fuels in either meters or feet. This is the total horizontal length of transect sampled for rotten 1000-hour fuels at the specific time:site:plot.

### Examples

```
CoarseFuels(tree_data = overstory_demo,
            fuel_data = cwd_YS_demo,
            sp_codes = "4letter",
            units = "metric",
            summed = "yes")
```

```
CoarseFuels(tree_data = overstory_demo,
            fuel_data = cwd_NS_demo)
```

---

compilation\_cwd\_demo *Coarse woody debris data for compilation demonstrations*

---

### Description

A fake dataset created for coarse woody debris compilation demonstration purposes only.

### Usage

```
compilation_cwd_demo
```

### Format

A dataframe with 9 rows and 9 columns:

**time** year in which the data were collected

**site** broader location or forest where the data were collected

**stratum** stratum within site

**plot** plot within stratum

**load\_1000s\_Mg\_ha** fuel load of sound 1000-hour fuels in megagrams per hectare

**load\_1000r\_Mg\_ha** fuel load of rotten 1000-hour fuels in megagrams per hectare

**load\_cwd\_Mg\_ha** total coarse woody debris fuel load in megagrams per hectare

**sc\_length\_1000s** slope-corrected transect length for sound 1000-hour fuels in meters

**sc\_length\_1000r** slope-corrected transect length for rotten 1000-hour fuels in meters

### Source

Created by Kea Rutherford for demonstration purposes.

---

compilation\_ffs\_demo *Data for general Fire and Fire Surrogate demonstrations*

---

### Description

A fake dataset created for general compilation demonstration purposes only.

### Usage

compilation\_ffs\_demo

### Format

A dataframe with 9 rows and 8 columns:

**time** year in which the data were collected

**trt\_type** treatment type (burn, thin, thin + burn, control)

**site** compartment

**plot** plot within compartment

**sph** stems per hectare

**ba\_m2\_ha** basal area in meters squared per hectare

**qmd\_cm** quadratic mean diameter in centimeters

**dbh\_cm** average diameter at breast height in centimeters

### Source

Created by Kea Rutherford for demonstration purposes.



---

compilation\_fpc\_demo *FPC data for general simple random sampling demonstrations*

---

**Description**

A fake dataset created for general compilation demonstration purposes only.

**Usage**

compilation\_fpc\_demo

**Format**

A dataframe with 2 rows and 3 columns:

**site** broader location or forest where the data were collected

**N** number of possible plots for the site

**n** number of plots measured

**Source**

Created by Kea Rutherford for demonstration purposes.

---

compilation\_fwd\_demo *Fine woody debris data for compilation demonstrations*

---

**Description**

A fake dataset created for fine woody debris compilation demonstration purposes only.

**Usage**

compilation\_fwd\_demo

**Format**

A dataframe with 9 rows and 11 columns:

**time** year in which the data were collected

**site** broader location or forest where the data were collected

**stratum** stratum within site

**plot** plot within stratum

**load\_1h\_Mg\_ha** fuel load of 1-hour fuels in megagrams per hectare

**load\_10h\_Mg\_ha** fuel load of 10-hour fuels in megagrams per hectare

**load\_100h\_Mg\_ha** fuel load of 100-hour fuels in megagrams per hectare  
**load\_fwd\_Mg\_ha** total fine woody debris fuel load in megagrams per hectare  
**sc\_length\_1h** slope-corrected transect length for 1-hour fuels in meters  
**sc\_length\_10h** slope-corrected transect length for 10-hour fuels in meters  
**sc\_length\_100h** slope-corrected transect length for 100-hour fuels in meters

### Source

Created by Kea Rutherford for demonstration purposes.

---

compilation\_srs\_demo *Data for general simple random sampling demonstrations*

---

### Description

A fake dataset created for general compilation demonstration purposes only.

### Usage

compilation\_srs\_demo

### Format

A dataframe with 9 rows and 7 columns:

**time** year in which the data were collected  
**site** broader location or forest where the data were collected  
**plot** plot within site  
**sph** stems per hectare  
**ba\_m2\_ha** basal area in meters squared per hectare  
**qmd\_cm** quadratic mean diameter in centimeters  
**dbh\_cm** average diameter at breast height in centimeters

### Source

Created by Kea Rutherford for demonstration purposes.

---

compilation\_srs\_sp\_demo

*Data for general simple random sampling demonstrations*

---

**Description**

A fake dataset created for general compilation demonstration purposes only.

**Usage**

compilation\_srs\_sp\_demo

**Format**

A dataframe with 8 rows and 8 columns:

**time** year in which the data were collected

**site** broader location or forest where the data were collected

**plot** plot within site

**species** tree species

**dominance** relative basal area in percent

**Source**

Created by Kea Rutherford for demonstration purposes.

---

compilation\_strs\_demo *Data for general stratified random sampling demonstrations*

---

**Description**

A fake dataset created for general compilation demonstration purposes only.

**Usage**

compilation\_strs\_demo

**Format**

A dataframe with 9 rows and 8 columns:

**time** year in which the data were collected

**site** broader location or forest where the data were collected

**stratum** stratum within site

**plot** plot within stratum

**sph** stems per hectare

**ba\_m2\_ha** basal area in meters squared per hectare

**qmd\_cm** quadratic mean diameter in centimeters

**dbh\_cm** average diameter at breast height in centimeters

**Source**

Created by Kea Rutherford for demonstration purposes.

---

compilation\_wt\_demo    *Weight data for stratified random sampling demonstrations*

---

**Description**

A fake dataset created for general compilation demonstration purposes only.

**Usage**

compilation\_wt\_demo

**Format**

A dataframe with 4 rows and 3 columns:

**site** broader location or forest where the data were collected

**stratum** stratum within site

**wh** stratum weight

**Source**

Created by Kea Rutherford for demonstration purposes.

---

 CompilePlots

*CompilePlots*


---

## Description

Compiles data beyond the plot level. Recognizes simple random sampling and stratified random sampling designs. Also recognizes the design of the Fire and Fire Surrogate. See [README](#) for details.

## Usage

```
CompilePlots(data, design, wt_data = "not_needed", fpc_data = "not_needed")
```

## Arguments

data	<p>A dataframe or tibble. Data must already be summarized to the plot-level. Required columns depend on the sampling design:</p> <ul style="list-style-type: none"> <li>• Simple random sampling: must have time, site, and plot columns. A species column is optional. Other columns can be any numerical variables of interest (any column names, any number of variables).</li> <li>• Stratified random sampling: must have time, site, stratum, and plot columns. A species column is optional. Other columns can be any numerical variables of interest (any column names, any number of variables).</li> <li>• Fire and Fire Surrogate: must have time, trt_type, site, and plot columns. A species column is optional. Other columns can be any numerical variables of interest (any column names, any number of variables).</li> </ul>
design	<p>Specifies the sampling design. Must be set to "SRS" (simple random sample), "STRS" (stratified random sample), or "FFS" (Fire and Fire Surrogate). There is no default.</p>
wt_data	<p>Only required for stratified random sampling designs. A dataframe or tibble with the following columns: time (optional), site, stratum, and wh (stratum weight). The default is set to "not_needed", and should be left as such for design = "SRS" or design = "FFS".</p>
fpc_data	<p>An optional dataframe or tibble. Incorporates the finite population correction factor (FPC) when samples were taken without replacement. The default is set to "not_needed". Required columns depend on the sampling design:</p> <ul style="list-style-type: none"> <li>• Simple random sampling: must have site, N, and n columns. A time column is optional.</li> <li>• Stratified random sampling: must have site, stratum, N, and n columns. A time column is optional.</li> <li>• Fire and Fire Surrogate: must have trt_type, site, N and n columns. A time column in optional.</li> </ul>

**Value**

Depends on the sampling design:

- Simple random sampling: a dataframe with site-level summaries.
- Stratified random sampling: a list with two components: (1) a dataframe with stratum-level summaries and (2) a dataframe with site-level summaries.
- Fire and Fire Surrogate: a list with two components: (1) a dataframe with site-level (i.e., compartment-level) summaries and (2) a dataframe with treatment-level summaries.

**Examples**

```
CompilePlots(data = compilation_srs_demo,  
             design = "SRS",  
             wt_data = "not_needed",  
             fpc_data = "not_needed")
```

```
CompilePlots(data = compilation_strs_demo,  
             design = "STRS",  
             wt_data = compilation_wt_demo,  
             fpc_data = "not_needed")
```

---

CompileSurfaceFuels    *CompileSurfaceFuels*

---

**Description**

Compiles surface fuel data beyond the plot level. Specifically designed to further summarize outputs from the FineFuels and/or CoarseFuels functions. Recognizes simple random sampling and stratified random sampling designs. Also recognizes the design of the Fire and Fire Surrogate. See [README](#) for details.

**Usage**

```
CompileSurfaceFuels(  
  fwd_data = "none",  
  cwd_data = "none",  
  design,  
  wt_data = "not_needed",  
  fpc_data = "not_needed",  
  units = "metric"  
)
```

**Arguments**

fwd_data	<p>A dataframe or tibble. Fine woody debris (FWD) loads must already be calculated at the plot-level using the FineFuels function. Required columns depend on the sampling design:</p> <ul style="list-style-type: none"> <li>• Simple random sampling: must have time, site, plot, sc_length_1h, sc_length_10h, and sc_length_100h columns. Must also have load_1h_Mg_ha, load_10h_Mg_ha, and load_100h_Mg_ha (OR load_1h_ton_ac, load_10h_ton_ac, and load_100h_ton_ac).</li> <li>• Stratified random sampling: must have time, site, stratum, plot, sc_length_1h, sc_length_10h, and sc_length_100h columns. Must also have load_1h_Mg_ha, load_10h_Mg_ha, and load_100h_Mg_ha (OR load_1h_ton_ac, load_10h_ton_ac, and load_100h_ton_ac).</li> <li>• Fire and Fire Surrogate: must have time, trt_type, site, plot, sc_length_1h, sc_length_10h, and sc_length_100h columns. Must also have load_1h_Mg_ha, load_10h_Mg_ha, and load_100h_Mg_ha (OR load_1h_ton_ac, load_10h_ton_ac, and load_100h_ton_ac).</li> </ul>
cwd_data	<p>A dataframe or tibble. Coarse woody debris (CWD) loads must already be calculated at the plot-level using the CoarseFuels function. Required columns depend on the sampling design:</p> <ul style="list-style-type: none"> <li>• Simple random sampling: must have time, site, plot, sc_length_1000s, and sc_length_1000r columns. Must also have load_1000s_Mg_ha, load_1000r_Mg_ha, and load_cwd_Mg_ha (OR load_1000s_Mg_ha, load_1000r_Mg_ha, and load_cwd_Mg_ha).</li> <li>• Stratified random sampling: must have time, site, stratum, plot, sc_length_1000s, and sc_length_1000r columns. Must also have load_1000s_Mg_ha, load_1000r_Mg_ha, and load_cwd_Mg_ha (OR load_1000s_Mg_ha, load_1000r_Mg_ha, and load_cwd_Mg_ha).</li> <li>• Fire and Fire Surrogate: must have time, trt_type, site, plot, sc_length_1000s, and sc_length_1000r columns. Must also have load_1000s_Mg_ha, load_1000r_Mg_ha, and load_cwd_Mg_ha (OR load_1000s_Mg_ha, load_1000r_Mg_ha, and load_cwd_Mg_ha).</li> </ul>
design	<p>Specifies the sampling design. Must be set to "SRS" (simple random sample), "STRS" (stratified random sample), or "FFS" (Fire and Fire Surrogate). There is no default.</p>
wt_data	<p>Only required for stratified random sampling designs. A dataframe or tibble with the following columns: time (optional), site, stratum, and wh (stratum weight). The default is set to "not_needed", and should be left as such for design = "SRS" or design = "FFS".</p>
fpc_data	<p>An optional dataframe or tibble. Incorporates the finite population correction factor (FPC) when samples were taken without replacement. The default is set to "not_needed". Required columns depend on the sampling design:</p> <ul style="list-style-type: none"> <li>• Simple random sampling: must have site, N, and n columns. A time column is optional.</li> <li>• Stratified random sampling: must have site, stratum, N, and n columns. A time column is optional.</li> <li>• Fire and Fire Surrogate: must have trt_type, site, N and n columns. A time column is optional.</li> </ul>

**units** Specifies whether the input data are in metric (megagrams per hectare) or imperial (US tons per acre) units. Inputs must be all metric or all imperial (do not mix-and-match units). The output units will match the input units (i.e., if inputs are in metric then outputs will be in metric). Must be set to either “metric” or “imperial”. The default is set to “metric”.

### Value

Depends on the sampling design:

- Simple random sampling: a dataframe with site-level summaries.
- Stratified random sampling: a list with two components: (1) a dataframe with stratum-level summaries and (2) a dataframe with site-level summaries.
- Fire and Fire Surrogate: a list with two components: (1) a dataframe with site-level (i.e., compartment-level) summaries and (2) a dataframe with treatment-level summaries.

### Examples

```
CompileSurfaceFuels(fwd_data = compilation_fwd_demo,
                    cwd_data = compilation_cwd_demo,
                    design = "STRS",
                    wt_data = compilation_wt_demo,
                    fpc_data = "not_needed",
                    units = "metric")
```

```
CompileSurfaceFuels(fwd_data = compilation_fwd_demo,
                    cwd_data = "none",
                    design = "STRS",
                    wt_data = compilation_wt_demo,
                    fpc_data = "not_needed",
                    units = "metric")
```

---

cwd\_NS\_demo

*Data for coarse woody debris demonstrations*

---

### Description

A fake dataset created for coarse surface fuel demonstration purposes only. Sum-of-squared-diameters for sound and rotten 1000-hour fuels NOT already calculated.

### Usage

```
cwd_NS_demo
```



**Format**

A dataframe with 16 rows and 8 columns:

**time** Year in which the data were collected

**site** Broader location or forest where the data were collected

**plot** Plot in which the individual transect was measured

**transect** Transect on which the 1000-hour fuel measurements were taken

**length\_1000h** Length of the sampling transect for 1000-hour fuels in meters

**slope** Slope along the transect in percent

**diameter** Diameter of 1000-hour fuel in centimeters

**status** Rotten (R) or sound (S)

**Source**

Created by Kea Rutherford for demonstration purposes

---

cwg\_Ys\_demo

*Data for coarse woody debris demonstrations*

---

**Description**

A fake dataset created for coarse surface fuel demonstration purposes only. Sum-of-squared-diameters for sound and rotten 1000-hour fuels already calculated.

**Usage**

cwg\_Ys\_demo

**Format**

A dataframe with 12 rows and 8 columns:

**time** Year in which the data were collected

**site** Broader location or forest where the data were collected

**plot** Plot in which the individual transect was measured

**transect** Transect on which the 1000-hour fuel measurements were taken

**length\_1000h** Length of the sampling transect for 1000-hour fuels in meters

**slope** Slope along the transect in percent

**ssd\_S** Sum-of-squared-diameters for sound 1000-hour fuels

**ssd\_R** Sum-of-squared-diameters for rotten 1000-hour fuels

**Source**

Created by Kea Rutherford for demonstration purposes.

---

 FineFuels
 

---

*FineFuels***Description**

Estimates fine woody (1-hour, 10-hour, and 100-hour) fuel loads from line-intercept transects. See [README](#) for details.

**Usage**

```
FineFuels(fuel_data, tree_data, sp_codes = "4letter", units = "metric")
```

**Arguments**

<code>fuel_data</code>	A dataframe or tibble with the following columns: time, site, plot, transect, count_1h, count_10h, count_100h, length_1h, length_10h, and length_100h. A slope column is optional. Each row must be an observation of an individual transect at a specific time/site/plot.
<code>tree_data</code>	A dataframe or tibble with the following columns: time, site, plot, exp_factor, species, and dbh. Each row must be an observation of an individual tree.
<code>sp_codes</code>	Specifies whether the species column in <code>tree_data</code> follows the four-letter code or FIA naming convention. Must be set to either "4letter" or "fia." The default is set to "4letter".
<code>units</code>	Specifies whether the input data are in metric (centimeters, meters, and trees per hectare) or imperial (inches, feet, and trees per acre) units. Inputs must be all metric or all imperial (do not mix-and-match units). The output units will match the input units (i.e., if inputs are in metric then outputs will be in metric). Must be set to either "metric" or "imperial". The default is set to "metric".

**Value**

A dataframe with the following columns:

- time: as described above
- site: as described above
- plot: as described above
- load\_1h\_Mg\_ha (or load\_1h\_ton\_ac): fuel load of 1-hour fuels in megagrams per hectare (or US tons per acre)
- load\_10h\_Mg\_ha (or load\_10h\_ton\_ac): fuel load of 10-hour fuels in megagrams per hectare (or US tons per acre)
- load\_100h\_Mg\_ha (or load\_100h\_ton\_ac): fuel load of 100-hour fuels in megagrams per hectare (or US tons per acre)
- load\_fwd\_Mg\_ha (or load\_fwd\_ton\_ac): total fine woody debris fuel load (1-hour + 10-hour + 100-hour) in megagrams per hectare (or US tons per acre)

- `sc_length_1h`: slope-corrected transect length (i.e., horizontal transect length) for 1-hour fuels in either meters or feet. This is the total horizontal length of transect sampled for 1-hour fuels at the specific time:site:plot.
- `sc_length_10h`: slope-corrected transect length (i.e., horizontal transect length) for 10-hour fuels in either meters or feet. This is the total horizontal length of transect sampled for 10-hour fuels at the specific time:site:plot.
- `sc_length_100h`: slope-corrected transect length (i.e., horizontal transect length) for 100-hour fuels in either meters or feet. This is the total horizontal length of transect sampled for 100-hour fuels at the specific time:site:plot.

### Examples

```
FineFuels(tree_data = overstory_demo,
          fuel_data = fwd_demo)
```

---

ForestComp

*ForestComp*

---

### Description

Compiles forest composition at the plot level. Measured as relative basal area or relative density for live trees.

### Usage

```
ForestComp(
  data,
  site,
  plot,
  exp_factor,
  status,
  species,
  dbh,
  relative = "BA",
  units = "metric"
)
```

### Arguments

<code>data</code>	A dataframe or tibble. Each row must be an observation of an individual tree.
<code>site</code>	Must be a character variable (column) in the provided dataframe or tibble. Describes the broader location or forest where the data were collected.
<code>plot</code>	Must be a character variable (column) in the provided dataframe or tibble. Identifies the plot in which the individual tree was measured.

exp_factor	Must be a numeric variable (column) in the provided dataframe or tibble. The expansion factor specifies the number of trees per hectare (or per acre) that a given plot tree represents.
status	Must be a character variable (column) in the provided dataframe or tibble. Specifies whether the individual tree is alive (1) or dead (0).
species	Must be a character variable (column) in the provided dataframe or tibble. Specifies the species of the individual tree.
dbh	Must be a numeric variable (column) in the provided dataframe or tibble. Provides the diameter at breast height (DBH) of the individual tree in either centimeters or inches.
relative	Not a variable (column) in the provided dataframe or tibble. Specifies whether forest composition should be measured as relative basal area or relative density. Must be set to either "BA" or "density". The default is set to "BA".
units	Not a variable (column) in the provided dataframe or tibble. Specifies whether the dbh variable was measured using metric (centimeters) or imperial (inches) units. Must be set to either "metric" or "imperial". The default is set to "metric".

### Value

A dataframe with the following columns:

- site: as described above
- plot: as described above
- species: as described above
- dominance: relative basal area (or relative density) in percent (%)

### Examples

```
ForestComp(data = for_demo_data,
            site = "Forest",
            plot = "Plot_id",
            exp_factor = "SPH",
            status = "Live",
            species = "SPP",
            dbh = "DBH_CM",
            relative = "BA",
            units = "metric")
```

---

ForestStr

*ForestStr*

---

### Description

Compiles forest structure at the plot level.

**Usage**

```
ForestStr(data, site, plot, exp_factor, dbh, ht = "ignore", units = "metric")
```

**Arguments**

<code>data</code>	A dataframe or tibble. Each row must be an observation of an individual tree.
<code>site</code>	Must be a character variable (column) in the provided dataframe or tibble. Describes the broader location or forest where the data were collected.
<code>plot</code>	Must be a character variable (column) in the provided dataframe or tibble. Identifies the plot in which the individual tree was measured.
<code>exp_factor</code>	Must be a numeric variable (column) in the provided dataframe or tibble. The expansion factor specifies the number of trees per hectare (or per acre) that a given plot tree represents.
<code>dbh</code>	Must be a numeric variable (column) in the provided dataframe or tibble. Provides the diameter at breast height (DBH) of the individual tree in either centimeters or inches.
<code>ht</code>	Default is set to "ignore", which indicates that tree heights were not taken. If heights were taken, it can be set to a numeric variable (column) in the provided dataframe or tibble, providing the height of the individual tree in either meters or feet.
<code>units</code>	Not a variable (column) in the provided dataframe or tibble. Specifies (1) whether the dbh and ht variables were measured using metric (centimeters and meters) or imperial (inches and feet) units; (2) whether the expansion factor is in metric (stems per hectare) or imperial (stems per acre) units; and (3) whether results will be given in metric or imperial units. Must be set to either "metric" or "imperial". The default is set to "metric".

**Value**

A dataframe with the following columns:

- `site`: as described above
- `plot`: as described above
- `sph` (or `spa`): stems per hectare (or stems per acre)
- `ba_m2_ha` (or `ba_ft2_ac`): basal area in meters squared per hectare (or feet squared per acre).
- `qmd_cm` (or `qmd_in`): quadratic mean diameter in centimeters (or inches). Weighted by the expansion factor.
- `dbh_cm` (or `dbh_in`): average diameter at breast height in centimeters (or inches). Weighted by the expansion factor.
- `ht_m` (or `ht_ft`): average height in meters (or feet) if `ht` argument was set. Weighted by the expansion factor.

## Examples

```
ForestStr(data = for_demo_data,  
          site = "Forest",  
          plot = "Plot_id",  
          exp_factor = "SPH",  
          dbh = "DBH_CM",  
          ht = "HT_M",  
          units = "metric")
```

---

for\_demo\_data

*Data for forest composition and structure demonstrations*

---

## Description

A fake dataset created for composition and structure demonstration purposes only

## Usage

for\_demo\_data

## Format

A dataframe with 9 rows and 7 columns:

**Forest** Broader location or forest where the data were collected

**Plot\_id** Plot in which the individual tree was measured

**SPH** Stems per hectare

**Live** Live (1) or dead (0)

**SPP** Species of the individual tree, using four-letter species codes

**DBH\_CM** Diameter at breast height in centimeters

**HT\_M** Tree height in meters

## Source

Created by Kea Rutherford for demonstration purposes

---

for\_NT\_demo

*Data for forest composition and structure demonstrations*

---

**Description**

A fake dataset created for composition and structure demonstration purposes only. Includes a plot without trees.

**Usage**

for\_NT\_demo

**Format**

A dataframe with 9 rows and 7 columns:

**Forest** Broader location or forest where the data were collected

**Plot\_id** Plot in which the individual tree was measured

**SPH** Stems per hectare

**Live** Live (1) or dead (0)

**SPP** Species of the individual tree, using four-letter species codes

**DBH\_CM** Diameter at breast height in centimeters

**HT\_M** Tree height in meters

**Source**

Created by Kea Rutherford for demonstration purposes.

---

fwd\_demo

*Data for fine woody debris demonstrations*

---

**Description**

A fake dataset created for fine surface fuel demonstration purposes only

**Usage**

fwd\_demo

**Format**

A dataframe with 12 rows and 11 columns:

**time** Year in which the data were collected

**site** Broader location or forest where the data were collected

**plot** Plot in which the individual transect was measured

**transect** Transect on which the fuel tallies were collected

**count\_1h** Count of 1-hour fuels

**count\_10h** Count of 10-hour fuels

**count\_100h** Count of 100-hour fuels

**length\_1h** Length of the sampling transect for 1-hour fuels in meters

**length\_10h** Length of the sampling transect for 10-hour fuels in meters

**length\_100h** Length of the sampling transect for 100-hour fuels in meters

**slope** Slope along the transect in percent

**Source**

Created by Kea Rutherford for demonstration purposes

---

LitterDuff

*LitterDuff*

---

**Description**

Estimates duff and litter fuel loads. See [README](#) for details.

**Usage**

```
LitterDuff(
  fuel_data,
  tree_data,
  sp_codes = "4letter",
  units = "metric",
  measurement = "separate"
)
```

**Arguments**

fuel_data	A dataframe or tibble. If the measurement parameter is set to "separate" the following columns are required: time, site, plot, transect, litter_depth, and duff_depth. If the measurement parameter is set to "combined" the following columns are required: time, site, plot, transect, and lit_duff_depth.
tree_data	A dataframe or tibble with the following columns: time, site, plot, exp_factor, species, and dbh. Each row must be an observation of an individual tree.



sp_codes	Specifies whether the species column in tree_data follows the four-letter code or FIA naming convention. Must be set to either "4letter" or "fia". The default is set to "4letter".
units	Specifies whether the input data are in metric (centimeters, meters, and trees per hectare) or imperial (inches, feet, and trees per acre) units. Inputs must be all metric or all imperial (do not mix-and-match units). The output units will match the input units (i.e., if inputs are in metric then outputs will be in metric). Must be set to either "metric" or "imperial". The default is set to "metric".
measurement	Specifies whether duff and litter were measured together or separately. Must be set to "combined" or "separate". The default is set to "separate".

### Value

A dataframe with the following columns:

- If measurement is set to "separate"
  - time: as described above
  - site: as described above
  - plot: as described above
  - litter\_Mg\_ha (or litter\_ton\_ac): litter load in megagrams per hectare (or US tons per acre)
  - duff\_Mg\_ha (or duff\_ton\_ac): duff load in megagrams per hectare (or US tons per acre)
- If measurement is set to "combined"
  - time: as described above
  - site: as described above
  - plot: as described above
  - lit\_duff\_Mg\_ha (or lit\_duff\_ton\_ac): combined litter and duff load in megagrams per hectare (or US tons per acre)

### Examples

```
LitterDuff(tree_data = overstory_demo,
           fuel_data = lit_duff_demo)
```

---

lit_duff_avg_demo	<i>Data for duff and litter demonstrations</i>
-------------------	--

---

### Description

A fake dataset created for duff and litter fuel demonstration purposes only. Depths already averaged together for each transect.

### Usage

```
lit_duff_avg_demo
```

**Format**

A dataframe with 24 rows and 6 columns:

**time** Year in which the data were collected

**site** Broader location or forest where the data were collected

**plot** Plot in which the individual transect was measured

**transect** Transect on which the duff/litter depths were measured

**litter\_depth** Litter depth in centimeters

**duff\_depth** Duff depth in centimeters

**Source**

Created by Kea Rutherford for demonstration purposes.

---

lit_duff_demo	<i>Data for duff and litter demonstrations</i>
---------------	--

---

**Description**

A fake dataset created for duff and litter fuel demonstration purposes only. Depths NOT already averaged together for each transect.

**Usage**

```
lit_duff_demo
```

**Format**

A dataframe with 24 rows and 6 columns:

**time** Year in which the data were collected

**site** Broader location or forest where the data were collected

**plot** Plot in which the individual transect was measured

**transect** Transect on which the duff/litter depths were measured

**litter\_depth** Litter depth in centimeters

**duff\_depth** Duff depth in centimeters

**Source**

Created by Kea Rutherford for demonstration purposes.

---

nsvb\_demo

*Data for NSVB framework biomass and carbon demonstrations*

---

### **Description**

A fake dataset created for NSVB framework biomass and carbon demonstration purposes only

### **Usage**

nsvb\_demo

### **Format**

A dataframe with 16 rows and 14 columns:

**division** Ecodivision in which the data were collected

**province** Province in which the data were collected

**site** Forest where the data were collected

**plot** Plot in which the individual tree was measured

**exp\_factor** Stems per hectare

**status** Live (1) or dead (0)

**decay\_class** 1-5 for standing dead trees. NA for live trees.

**Species** Species of the individual tree, using four-letter species codes

**dbh** Diameter at breast height in centimeters

**ht1** Tree height 1 in meters

**ht2** Tree height 2 in meters

**crown\_ratio** Live crown ratio

**top** Yes top (Y) or no top (N)

**cull** Percent wood cull

### **Source**

Created by Kea Rutherford for demonstration purposes

---

overstory_demo	<i>Overstory data for surface and ground fuel demonstrations</i>
----------------	--

---

**Description**

A fake dataset created for surface and ground fuel demonstration purposes only

**Usage**

overstory\_demo

**Format**

A dataframe with 14 rows and 6 columns:

**time** Year in which the data were collected

**site** Broader location or forest where the data were collected

**plot** Plot in which the individual tree was measured

**exp\_factor** Stems per hectare

**species** Species of the individual tree, using four-letter species codes

**dbh** Diameter at breast height in centimeters

**Source**

Created by Kea Rutherford for demonstration purposes

---

SummaryBiomass	<i>SummaryBiomass</i>
----------------	-----------------------

---

**Description**

Uses Forest Inventory and Analysis (FIA) Regional Biomass Equations to estimate above-ground stem, bark, and branch tree biomass. The package will summarize by plot or by plot as well as species. The package uses the California equation set and should not be used for data from other regions.

**Usage**

```
SummaryBiomass(
  data,
  site,
  plot,
  exp_factor,
  status,
  decay_class,
  species,
  dbh,
  ht,
  sp_codes = "4letter",
  units = "metric",
  results = "by_plot"
)
```

**Arguments**

<code>data</code>	A dataframe or tibble. Each row must be an observation of an individual tree.
<code>site</code>	Must be a character variable (column) in the provided dataframe or tibble. Describes the broader location or forest where the data were collected.
<code>plot</code>	Must be a character variable (column) in the provided dataframe or tibble. Identifies the plot in which the individual tree was measured.
<code>exp_factor</code>	Must be a numeric variable (column) in the provided dataframe or tibble. The expansion factor specifies the number of trees per hectare (or per acre) that a given plot tree represents.
<code>status</code>	Must be a character variable (column) in the provided dataframe or tibble. Specifies whether the individual tree is alive (1) or dead (0).
<code>decay_class</code>	Must be a character variable (column) in the provided dataframe or tibble. For standing dead trees, the decay class should be 1, 2, 3, 4, or 5 (see README file for more detail). For live trees, the decay class should be NA or 0.
<code>species</code>	Must be a character variable (column) in the provided dataframe or tibble. Specifies the species of the individual tree. Must follow four-letter species code or FIA naming conventions (see README file for more detail).
<code>dbh</code>	Must be a numeric variable (column) in the provided dataframe or tibble. Provides the diameter at breast height (DBH) of the individual tree in either centimeters or inches.
<code>ht</code>	Must be a numeric variable (column) in the provided dataframe or tibble. Provides the height of the individual tree in either meters or feet.
<code>sp_codes</code>	Not a variable (column) in the provided dataframe or tibble. Specifies whether the species variable follows the four-letter code or FIA naming convention (see README file for more detail). Must be set to either "4letter" or "fia". The default is set to "4letter".
<code>units</code>	Not a variable (column) in the provided dataframe or tibble. Specifies (1) whether the dbh and ht variables were measured using metric (centimeters and meters)

or imperial (inches and feet) units; (2) whether the expansion factor is in metric (stems per hectare) or imperial (stems per acre) units; and (3) whether results will be given in metric (megagrams per hectare) or imperial (US tons per acre) units. Must be set to either "metric" or "imperial". The default is set to "metric".

**results** Not a variable (column) in the provided dataframe or tibble. Specifies whether the results will be summarized by plot or by plot as well as species. Must be set to either "by\_plot" or "by\_species." The default is set to "by\_plot".

### Value

A dataframe with the following columns:

- site: as described above
- plot: as described above
- species: if results argument was set to "by\_species"
- live\_Mg\_ha (or live\_ton\_ac): above-ground live tree biomass in megagrams per hectare (or US tons per acre)
- dead\_Mg\_ha (or dead\_ton\_ac): above-ground dead tree biomass in megagrams per hectare (or US tons per acre)

### Examples

```
SummaryBiomass(data = bio_demo_data,
               site = "Forest",
               plot = "Plot_id",
               exp_factor = "SPH",
               status = "Live",
               decay_class = "Decay",
               species = "SPP",
               dbh = "DBH_CM",
               ht = "HT_M",
               results = "by_species")
```

---

TreeBiomass

*TreeBiomass*

---

### Description

Uses Forest Inventory and Analysis (FIA) Regional Biomass Equations to estimate above-ground stem, bark, and branch tree biomass. The package uses the California equation set and should not be used for data from other regions.

**Usage**

```
TreeBiomass(
  data,
  status,
  species,
  dbh,
  ht,
  decay_class = "ignore",
  sp_codes = "4letter",
  units = "metric"
)
```

**Arguments**

<code>data</code>	A dataframe or tibble. Each row must be an observation of an individual tree.
<code>status</code>	Must be a character variable (column) in the provided dataframe or tibble. Specifies whether the individual tree is alive (1) or dead (0).
<code>species</code>	Must be a character variable (column) in the provided dataframe or tibble. Specifies the species of the individual tree. Must follow four-letter species code or FIA naming conventions (see README file for more detail).
<code>dbh</code>	Must be a numeric variable (column) in the provided dataframe or tibble. Provides the diameter at breast height (DBH) of the individual tree in either centimeters or inches.
<code>ht</code>	Must be a numeric variable (column) in the provided dataframe or tibble. Provides the height of the individual tree in either meters or feet.
<code>decay_class</code>	Default is set to "ignore", indicating that biomass estimates for standing dead trees will not be adjusted for structural decay. It can be set to a character variable (column) in the provided dataframe or tibble. For standing dead trees, the decay class should be 1, 2, 3, 4, or 5 (see README file for more detail). For live trees, the decay class should be NA or 0.
<code>sp_codes</code>	Not a variable (column) in the provided dataframe or tibble. Specifies whether the species variable follows the four-letter code or FIA naming convention (see README file for more detail). Must be set to either "4letter" or "fia". The default is set to "4letter".
<code>units</code>	Not a variable (column) in the provided dataframe or tibble. Specifies whether the dbh and ht variables were measured using metric (centimeters and meters) or imperial (inches and feet) units. Also specifies whether the results will be given in metric (kilograms) or imperial (US tons) units. Must be set to either "metric" or "imperial". The default is set to "metric".

**Value**

The original dataframe, with four new columns. If `decay_class` is provided, the biomass estimates for standing dead trees will be adjusted for structural decay.

- `stem_bio_kg` (or `stem_bio_tons`): biomass of stem in kilograms (or tons)

- `bark_bio_kg` (or `bark_bio_tons`): biomass of bark in kilograms (or tons)
- `branch_bio_kg` (or `branch_bio_tons`): biomass of branches in kilograms (or tons)
- `total_bio_kg` (or `total_bio_tons`): biomass of tree (stem + bark + branches) in kilograms (or tons)

### Examples

```
TreeBiomass(data = bio_demo_data,
            status = "Live",
            species = "SPP",
            dbh = "DBH_CM",
            ht = "HT_M",
            sp_codes = "4letter",
            units = "metric")
```

```
TreeBiomass(data = bio_demo_data,
            status = "Live",
            species = "SPP",
            dbh = "DBH_CM",
            ht = "HT_M",
            decay_class = "Decay",
            sp_codes = "4letter",
            units = "metric")
```

---

vign\_fuels\_1

*Fuel data for vignette, version 1*


---

### Description

A dataset with intentional errors for demonstration purposes

### Usage

```
vign_fuels_1
```

### Format

A dataframe with 236 rows and 16 columns:

**time** pre (pre-burn) or post (post-burn)

**site** compartment (60, 340, or 400)

**plot** plot in which the individual transect was measured

**transect** azimuth of transect on which the fuel data were collected

**count\_1h** count of 1-hour fuels

**count\_10h** count of 10-hour fuels

**count\_100h** count of 100-hour fuels



**length\_1h** length of the sampling transect for 1-hour fuels in meters  
**length\_10h** length of the sampling transect for 10-hour fuels in meters  
**length\_100h** length of the sampling transect for 100-hour fuels in meters  
**length\_1000h** length of the sampling transect for 1000-hour fuels in meters  
**ssd\_S** sum-of-squared-diameters for sound 1000-hour fuels  
**ssd\_R** sum-of-squared-diameters for rotten 1000-hour fuels  
**litter\_depth** litter depth in centimeters  
**duff\_depth** duff depth in centimeters  
**slope** slope along the transect in percent

### Source

Fire and Fire Surrogate Study, Stephens Lab, University of California, Berkeley

---

vign\_fuels\_2

*Fuel data for vignette, version 2*

---

### Description

A dataset with intentional errors for demonstration purposes

### Usage

vign\_fuels\_2

### Format

A dataframe with 236 rows and 16 columns:

**time** pre (pre-burn) or post (post-burn)  
**site** compartment (60, 340, or 400)  
**plot** plot in which the individual transect was measured  
**transect** azimuth of transect on which the fuel data were collected  
**count\_1h** count of 1-hour fuels  
**count\_10h** count of 10-hour fuels  
**count\_100h** count of 100-hour fuels  
**length\_1h** length of the sampling transect for 1-hour fuels in meters  
**length\_10h** length of the sampling transect for 10-hour fuels in meters  
**length\_100h** length of the sampling transect for 100-hour fuels in meters  
**length\_1000h** length of the sampling transect for 1000-hour fuels in meters  
**ssd\_S** sum-of-squared-diameters for sound 1000-hour fuels  
**ssd\_R** sum-of-squared-diameters for rotten 1000-hour fuels  
**litter\_depth** litter depth in centimeters  
**duff\_depth** duff depth in centimeters  
**slope** slope along the transect in percent

**Source**

Fire and Fire Surrogate Study, Stephens Lab, University of California, Berkeley

---

vign\_fuels\_3

*Fuel data for vignette, version 3*

---

**Description**

A dataset with intentional errors for demonstration purposes

**Usage**

vign\_fuels\_3

**Format**

A dataframe with 236 rows and 16 columns:

**time** pre (pre-burn) or post (post-burn)

**site** compartment (60, 340, or 400)

**plot** plot in which the individual transect was measured

**transect** azimuth of transect on which the fuel data were collected

**count\_1h** count of 1-hour fuels

**count\_10h** count of 10-hour fuels

**count\_100h** count of 100-hour fuels

**length\_1h** length of the sampling transect for 1-hour fuels in meters

**length\_10h** length of the sampling transect for 10-hour fuels in meters

**length\_100h** length of the sampling transect for 100-hour fuels in meters

**length\_1000h** length of the sampling transect for 1000-hour fuels in meters

**ssd\_S** sum-of-squared-diameters for sound 1000-hour fuels

**ssd\_R** sum-of-squared-diameters for rotten 1000-hour fuels

**litter\_depth** litter depth in centimeters

**duff\_depth** duff depth in centimeters

**slope** slope along the transect in percent

**Source**

Fire and Fire Surrogate Study, Stephens Lab, University of California, Berkeley

---

`vign_fuels_4`*Fuel data for vignette, version 4*

---

**Description**

A dataset with intentional errors and warnings for demonstration purposes

**Usage**`vign_fuels_4`**Format**

A dataframe with 236 rows and 16 columns:

**time** pre (pre-burn) or post (post-burn)

**site** compartment (60, 340, or 400)

**plot** plot in which the individual transect was measured

**transect** azimuth of transect on which the fuel data were collected

**count\_1h** count of 1-hour fuels

**count\_10h** count of 10-hour fuels

**count\_100h** count of 100-hour fuels

**length\_1h** length of the sampling transect for 1-hour fuels in meters

**length\_10h** length of the sampling transect for 10-hour fuels in meters

**length\_100h** length of the sampling transect for 100-hour fuels in meters

**length\_1000h** length of the sampling transect for 1000-hour fuels in meters

**ssd\_S** sum-of-squared-diameters for sound 1000-hour fuels

**ssd\_R** sum-of-squared-diameters for rotten 1000-hour fuels

**litter\_depth** litter depth in centimeters

**duff\_depth** duff depth in centimeters

**slope** slope along the transect in percent

**Source**

Fire and Fire Surrogate Study, Stephens Lab, University of California, Berkeley

---

vign\_fuels\_5

*Fuel data for vignette, version 5*

---

### Description

A clean dataset for demonstration purposes

### Usage

vign\_fuels\_5

### Format

A dataframe with 236 rows and 16 columns:

**time** pre (pre-burn) or post (post-burn)

**site** compartment (60, 340, or 400)

**plot** plot in which the individual transect was measured

**transect** azimuth of transect on which the fuel data were collected

**count\_1h** count of 1-hour fuels

**count\_10h** count of 10-hour fuels

**count\_100h** count of 100-hour fuels

**length\_1h** length of the sampling transect for 1-hour fuels in meters

**length\_10h** length of the sampling transect for 10-hour fuels in meters

**length\_100h** length of the sampling transect for 100-hour fuels in meters

**length\_1000h** length of the sampling transect for 1000-hour fuels in meters

**ssd\_S** sum-of-squared-diameters for sound 1000-hour fuels

**ssd\_R** sum-of-squared-diameters for rotten 1000-hour fuels

**litter\_depth** litter depth in centimeters

**duff\_depth** duff depth in centimeters

**slope** slope along the transect in percent

### Source

Fire and Fire Surrogate Study, Stephens Lab, University of California, Berkeley

---

vign\_trees\_1

*Tree data for vignette, version 1*

---

**Description**

A dataset with intentional errors for demonstration purposes

**Usage**

vign\_trees\_1

**Format**

A dataframe with 2250 rows and 10 columns:

**id** time:site combined

**time** pre (pre-burn) or post (post-burn)

**site** compartment (60, 340, or 400)

**plot** plot in which the individual tree was measured

**exp\_factor** stems per hectare

**status** live (1) or dead (0)

**decay** 1-5 for standing dead trees. 0 for live trees.

**species** Species of the individual tree, using four-letter species codes

**dbh** diameter at breast height in centimeters

**ht** tree height in meters

**Source**

Fire and Fire Surrogate Study, Stephens Lab, University of California, Berkeley

---

vign\_trees\_2

*Tree data for vignette, version 2*

---

**Description**

A dataset with intentional errors for demonstration purposes

**Usage**

vign\_trees\_2

**Format**

A dataframe with 2250 rows and 10 columns:

**id** time:site combined

**time** pre (pre-burn) or post (post-burn)

**site** compartment (60, 340, or 400)

**plot** plot in which the individual tree was measured

**exp\_factor** stems per hectare

**status** live (1) or dead (0)

**decay** 1-5 for standing dead trees. 0 for live trees.

**species** Species of the individual tree, using four-letter species codes

**dbh** diameter at breast height in centimeters

**ht** tree height in meters

**Source**

Fire and Fire Surrogate Study, Stephens Lab, University of California, Berkeley

---

vign\_trees\_3

*Tree data for vignette, version 3*

---

**Description**

A dataset with intentional warnings for demonstration purposes

**Usage**

vign\_trees\_3

**Format**

A dataframe with 2250 rows and 10 columns:

**id** time:site combined

**time** pre (pre-burn) or post (post-burn)

**site** compartment (60, 340, or 400)

**plot** plot in which the individual tree was measured

**exp\_factor** stems per hectare

**status** live (1) or dead (0)

**decay** 1-5 for standing dead trees. 0 for live trees.

**species** Species of the individual tree, using four-letter species codes

**dbh** diameter at breast height in centimeters

**ht** tree height in meters

**Source**

Fire and Fire Surrogate Study, Stephens Lab, University of California, Berkeley

---

vign\_trees\_4                      *Tree data for vignette, version 4*

---

**Description**

A dataset with intentional warnings for demonstration purposes

**Usage**

vign\_trees\_4

**Format**

A dataframe with 2250 rows and 10 columns:

**id** time:site combined

**time** pre (pre-burn) or post (post-burn)

**site** compartment (60, 340, or 400)

**plot** plot in which the individual tree was measured

**exp\_factor** stems per hectare

**status** live (1) or dead (0)

**decay** 1-5 for standing dead trees. 0 for live trees.

**species** Species of the individual tree, using four-letter species codes

**dbh** diameter at breast height in centimeters

**ht** tree height in meters

**Source**

Fire and Fire Surrogate Study, Stephens Lab, University of California, Berkeley

---

vign\_trees\_5

*Tree data for vignette, version 5*

---

**Description**

A clean dataset for demonstration purposes

**Usage**

vign\_trees\_5

**Format**

A dataframe with 2250 rows and 10 columns:

**id** time:site combined

**time** pre (pre-burn) or post (post-burn)

**site** compartment (60, 340, or 400)

**plot** plot in which the individual tree was measured

**exp\_factor** stems per hectare

**status** live (1) or dead (0)

**decay** 1-5 for standing dead trees. 0 for live trees.

**species** Species of the individual tree, using four-letter species codes

**dbh** diameter at breast height in centimeters

**ht** tree height in meters

**Source**

Fire and Fire Surrogate Study, Stephens Lab, University of California, Berkeley



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