# Package 'whitebox'

May 27, 2024

**Type** Package

**Title** 'WhiteboxTools' R Frontend

**Version** 2.4.0

**Description** An R frontend for the 'WhiteboxTools' library, which is an advanced geospatial data analysis platform developed by Prof. John Lindsay at the University of Guelph's Geomorphometry and Hydrogeomatics Research Group. 'WhiteboxTools' can be used to perform common geographical information systems (GIS) analysis operations, such as cost-distance analysis, distance buffering, and raster reclassification. Remote sensing and image processing tasks include image enhancement (e.g. panchromatic sharpening, contrast adjustments), image mosaicing, numerous filtering operations, simple classification (k-means), and common image transformations. 'WhiteboxTools' also contains advanced tooling for spatial hydrological analysis (e.g. flow-accumulation, watershed delineation, stream network analysis, sink removal), terrain analysis (e.g. common terrain indices such as slope, curvatures, wetness index, hillshading; hypsometric analysis; multi-scale topographic position analysis), and LiDAR data processing. Suggested citation: Lindsay (2016) <doi:10.1016/j.cageo.2016.07.003>.

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**License** MIT + file LICENSE

**SystemRequirements** WhiteboxTools
(https://github.com/jblindsay/whitebox-tools/releases/latest)

**Encoding** UTF-8

**Language** en-US

**RoxygenNote** 7.3.1

**URL** https://whiteboxr.gishub.org/,
https://github.com/opengeos/whiteboxR

**BugReports** https://github.com/opengeos/whiteboxR/issues

**Suggests** knitr, rmarkdown, testthat, terra, sf, raster

**VignetteBuilder** knitr

**Depends** R (>= 3.0.0)

**LazyData** true

**NeedsCompilation** no

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**Repository** CRAN

**Date/Publication** 2024-05-27 12:10:03 UTC

# R topics documented:

check_whitebox_binary    *Check for 'WhiteboxTools' executable path*

### Description

Check for 'WhiteboxTools' executable path

### Usage

```
check_whitebox_binary(silent = TRUE)
```

### Arguments

silent          logical. Print help on installation/setting path. Default TRUE.

### Value

logical if 'WhiteboxTools' executable file exists.

### See Also

[wbt_exe_path()](wbt_exe_path())

sample_dem_data          *Convenience method for path to sample DEM*

### Description

Get a file path to DEM.tif stored in extdata subfolder of whitebox package installation directory. If needed, download the TIFF file from GitHub.

### Usage

```
sample_dem_data(
  destfile = file.path(system.file("extdata", package = "whitebox"), "DEM.tif"),
  ...
)
```

### Arguments

destfile        Path to target location of sample data. Will be downloaded if does not exist. Defaults to file path of extdata subfolder of whitebox package installation directory.

...             additional arguments to download.file()

## Value

character.

## Examples

```
if (check_whitebox_binary()) {
  wbt_slope(sample_dem_data(), output = "slope.tif")
}
unlink(c('slope.tif', 'settings.json'))
```

---

wbt                          *Run WhiteboxTools by Tool Name*

---

## Description

You are required to specify all required arguments as either paths to files, or R object types that can be associated with a file.

wbt_result(): return a combined list of results from either the history of a wbt_result (if present and history=TRUE), or the result of a wbt_result

## Usage

```
wbt(
  result,
  tool_name,
  ...,
  crs = NULL,
  verbose_mode = FALSE,
  command_only = FALSE
)

## S3 method for class 'wbt_result'
wbt(
  result,
  tool_name,
  ...,
  crs = NULL,
  verbose_mode = FALSE,
  command_only = FALSE
)

wbt_result(result, i = NULL, history = TRUE, attribute = "output")

## S3 method for class 'character'
wbt(
  result,
```

```
  tool_name,
  ...,
  crs = NULL,
  verbose_mode = FALSE,
  command_only = FALSE
)

## S3 method for class '`function`'
wbt(
  result,
  tool_name,
  ...,
  crs = NULL,
  verbose_mode = FALSE,
  command_only = FALSE
)

## S3 method for class 'missing'
wbt(
  result,
  tool_name,
  ...,
  crs = NULL,
  verbose_mode = FALSE,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| `result` | an object of class `wbt_result` |
| `tool_name` | character. name of the tool to run. Or a tool/function name (i.e. a symbol) that is non-standard evaluated as a character. |
| `...` | arguments to tool |
| `crs` | character Optional: a WKT Coordinate Reference System string, or other identifier such as EPSG code or PROJ string |
| `verbose_mode` | passed to `wbt_run_tool()` |
| `command_only` | Return command that would be run with `system()`? Default: `FALSE` |
| `i` | Optional index of result list element to return as result. Default is whole list. |
| `history` | Default: `TRUE` returns a list of all history results |
| `attribute` | Default: `"output"` |

## Details

Supports SpatRaster / RasterLayer input / output. Arguments are transformed from their source class and passed to WhiteboxTools executable as standard character string arguments involving file paths.

To print help for any tool, see `wbt_tool_help()`

`tool_name` may be specified with or without quotes or `wbt_` prefix. e.g. `"wbt_slope"`, `wbt_slope`, `slope`, and `"slope"` are identical.

## Value

a list with class `"wbt_result"` containing elements:

- `tool` - the tool name
- `args` - arguments passed to executable
- `stdout` - console output (result of `wbt_run_tool()`)
- `crs` - Coordinate Reference System string (WKT or PROJ)
- `result` - any 'result' parameters (`--output`) that can be converted to R objects after run. A list of RasterLayer or character. May be a `try-error` if arguments are specified incorrectly.
- `history` - history of 'result' when `wbt_result` was passed as input, most recent output at end

list of result in `attribute` if `"history"` is present, otherwise the result in `attribute`. If `i` is specified, just the `i`th element of the list.

## See Also

[wbt_tool_help()](wbt_tool_help())

---

|   |   |
|---|---|
| wbttoolparameters | *'WhiteboxTools' Tool Parameters* |

---

## Description

This data set is a `data.frame` containing tool parameters and associated metadata

## Usage

```
wbttoolparameters
```

## Format

An object of class `data.frame` with 2198 rows and 13 columns.

## Variables

- `"function_name"` - R function name
- `"tool_name"` - 'WhiteboxTools' tool name
- `"name"` - parameter name
- `"flags"` - flags used to specify parameter on command line; comma separated
- `"description"` - parameter description

- `"parameter_class"` - parameter type
- `"parameter_detail"` - parameter details; character: data type followed by colon and more specifics, For OptionList possible values, comma-separated (if defined)
- `"default_value"` - parameter default value, if any
- `"optional"` - parameter "optional" flag; note that some combination of optional parameters may be required for certain conditions
- `"label"` - labels for selected subset of `"flags"` **used as R function argument names** for wbt_ functions
- `"is_input"` - logical. Classification of 'input' parameters
- `"is_output"` - logical. Classification of 'output' parameters

### Source

[WhiteboxTools](#)

### See Also

[wbttools](#) [wbt_tool_parameters()](#)

---

wbttools                              *'WhiteboxTools' Tool List*

---

### Description

This data set is a `data.frame` containing tools by name and associated R function name

### Usage

    wbttools

### Format

An object of class `data.frame` with 537 rows and 8 columns.

### Variables

- `"tool_name"` - 'WhiteboxTools' tool name
- `"function_name"` - R function name
- `"toolbox_name"` - 'WhiteboxTools' toolbox name
- `"label"` - 'WhiteboxTools' tool label
- `"description"` - Brief description
- `"github"` - Link to related code on 'GitHub'
- `"book"` - Link to 'WhiteboxTools' Manual
- `"is_extension"` - Tool is part of 'General Toolset Extension' (GTE), as opposed to the "open core"

## Source

[WhiteboxTools](WhiteboxTools)

## See Also

[wbttoolparameters](wbttoolparameters) [wbt_list_tools()](wbt_list_tools())

---

`wbt_absolute_value`     *Absolute value*

---

## Description

Calculates the absolute value of every cell in a raster.

## Usage

```
wbt_absolute_value(
  input,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| `input` | Input raster file path. See `wbt_file_path()` for details. |
| `output` | Output raster file. |
| `wd` | Changes the working directory. Default: `NULL` will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| `verbose_mode` | Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| `compress_rasters` | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| `command_only` | Return command that would be executed by `system()` rather than running tool. Default: `FALSE`. |

## Value

Returns the tool text outputs.

wbt_accumulation_curvature

*Accumulation curvature*

---

### Description

This tool calculates accumulation curvature from an input DEM.

### Usage

```
wbt_accumulation_curvature(
  dem,
  output,
  log = FALSE,
  zfactor = 1,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| dem | Name of the input raster DEM file. |
| output | Name of the output raster image file. |
| log | Display output values using a log-scale. |
| zfactor | Z conversion factor. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

| wbt_activate | *Activate 'WhiteboxTools' Extensions* |

### Description

Activate 'WhiteboxTools' Extensions

### Usage

```
wbt_activate(
  email,
  activation_key,
  seat = 1,
  destdir = dirname(wbt_exe_path(shell_quote = FALSE))
)
```

### Arguments

| | |
|---|---|
| email | Email Address |
| activation_key | Activation Key |
| seat | Seat Number (Default 1) |
| destdir | Directory containing `whitebox_tools` and `/plugins/` folder. |

### Value

`0` for success (invisibly). Try-error on error.

| wbt_adaptive_filter | *Adaptive filter* |

### Description

Performs an adaptive filter on an image.

### Usage

```
wbt_adaptive_filter(
  input,
  output,
  filterx = 11,
  filtery = 11,
  threshold = 2,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| `input` | Input raster file path. See wbt_file_path() for details. |
| `output` | Output raster file. |
| `filterx` | Size of the filter kernel in the x-direction. |
| `filtery` | Size of the filter kernel in the y-direction. |
| `threshold` | Difference from mean threshold, in standard deviations. |
| `wd` | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see wbt_wd() for details. |
| `verbose_mode` | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| `compress_rasters` | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| `command_only` | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

| `wbt_add` | *Add* |
|---|---|

---

## Description

Performs an addition operation on two rasters or a raster and a constant value.

## Usage

```
wbt_add(
  input1,
  input2,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| `input1` | Input raster file or constant value. |
| `input2` | Input raster file or constant value. |
| `output` | Output raster file. |
| `wd` | Changes the working directory. Default: `NULL` will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| `verbose_mode` | Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| `compress_rasters` | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| `command_only` | Return command that would be executed by `system()` rather than running tool. Default: `FALSE`. |

## Value

Returns the tool text outputs.

---

`wbt_add_point_coordinates_to_table`
*Add point coordinates to table*

---

## Description

Modifies the attribute table of a point vector by adding fields containing each point's X and Y coordinates.

## Usage

```
wbt_add_point_coordinates_to_table(
  input,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| `input` | Input vector Points file. |
| `wd` | Changes the working directory. Default: `NULL` will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |

| | |
|---|---|
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_aggregate_raster     *Aggregate raster*

---

## Description

Aggregates a raster to a lower resolution.

## Usage

```
wbt_aggregate_raster(
  input,
  output,
  agg_factor = 2,
  type = "mean",
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| output | Output raster file. |
| agg_factor | Aggregation factor, in pixels. |
| type | Statistic used to fill output pixels. |
| wd | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |

compress_rasters

> Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details.

command_only Return command that would be executed by `system()` rather than running tool. Default: `FALSE`.

## Value

Returns the tool text outputs.

---

wbt_and                           *And*

---

## Description

Performs a logical AND operator on two Boolean raster images.

## Usage

```
wbt_and(
  input1,
  input2,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

input1          Input raster file path. See `wbt_file_path()` for details.

input2          Input raster file path. See `wbt_file_path()` for details.

output          Output raster file.

wd              Changes the working directory. Default: `NULL` will use the value in Whitebox-Tools settings, see `wbt_wd()` for details.

verbose_mode    Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details.

compress_rasters

> Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details.

command_only    Return command that would be executed by `system()` rather than running tool. Default: `FALSE`.

**Value**

Returns the tool text outputs.

---

wbt_anova                    *Anova*

---

**Description**

Performs an analysis of variance (ANOVA) test on a raster dataset.

**Usage**

```
wbt_anova(
  input,
  features,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

**Arguments**

| | |
|---|---|
| input | Input raster file path. See `wbt_file_path()` for details. |
| features | Feature definition (or class) raster. |
| output | Output HTML file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| command_only | Return command that would be executed by `system()` rather than running tool. Default: FALSE. |

**Value**

Returns the tool text outputs.

| wbt_arcosh | *Arcosh* |
|---|---|

### Description

Returns the inverse hyperbolic cosine (arcosh) of each values in a raster.

### Usage

```
wbt_arcosh(
  input,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

| wbt_arc_cos | *Arc cos* |
|---|---|

#### Description

Returns the inverse cosine (arccos) of each values in a raster.

#### Usage

```
wbt_arc_cos(
  input,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

#### Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

#### Value

Returns the tool text outputs.

---

wbt_arc_sin *Arc sin*

---

### Description

Returns the inverse sine (arcsin) of each values in a raster.

### Usage

```
wbt_arc_sin(
  input,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

input      Input raster file path. See wbt_file_path() for details.

output      Output raster file.

wd      Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details.

verbose_mode      Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details.

compress_rasters

     Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details.

command_only      Return command that would be executed by system() rather than running tool. Default: FALSE.

### Value

Returns the tool text outputs.

wbt_arc_tan                    *Arc tan*

### Description

Returns the inverse tangent (arctan) of each values in a raster.

### Usage

```
wbt_arc_tan(
  input,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input raster file path. See `wbt_file_path()` for details. |
| output | Output raster file. |
| wd | Changes the working directory. Default: `NULL` will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| verbose_mode | Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| command_only | Return command that would be executed by `system()` rather than running tool. Default: `FALSE`. |

### Value

Returns the tool text outputs.

wbt_arsinh                        *Arsinh*

## Description

Returns the inverse hyperbolic sine (arsinh) of each values in a raster.

## Usage

```
wbt_arsinh(
  input,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

input                 Input raster file path. See `wbt_file_path()` for details.

output                Output raster file.

wd                    Changes the working directory. Default: `NULL` will use the value in Whitebox-
                      Tools settings, see `wbt_wd()` for details.

verbose_mode          Sets verbose mode. If verbose mode is `FALSE`, tools will not print output mes-
                      sages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()`
                      for details.

compress_rasters
                      Sets the flag used by 'WhiteboxTools' to determine whether to use compression
                      for output rasters. Default: `NULL` will use the value in WhiteboxTools settings,
                      see `wbt_compress_rasters()` for details.

command_only          Return command that would be executed by `system()` rather than running tool.
                      Default: `FALSE`.

## Value

Returns the tool text outputs.

wbt_artanh                      *Artanh*

#### Description

Returns the inverse hyperbolic tangent (arctanh) of each values in a raster.

#### Usage

```
wbt_artanh(
  input,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

#### Arguments

| | |
|---|---|
| input | Input raster file path. See `wbt_file_path()` for details. |
| output | Output raster file. |
| wd | Changes the working directory. Default: `NULL` will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| verbose_mode | Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| command_only | Return command that would be executed by `system()` rather than running tool. Default: `FALSE`. |

#### Value

Returns the tool text outputs.

---

wbt_ascii_to_las          *Ascii to las*

---

### Description

Converts one or more ASCII files containing LiDAR points into LAS files.

### Usage

```
wbt_ascii_to_las(
  inputs,
  pattern,
  proj = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| inputs | Input LiDAR ASCII files (.csv). |
| pattern | Input field pattern. |
| proj | Well-known-text string or EPSG code describing projection. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

---

wbt_aspect                    *Aspect*

---

### Description

Calculates an aspect raster from an input DEM.

### Usage

```
wbt_aspect(
  dem,
  output,
  zfactor = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| output | Output raster file. |
| zfactor | Optional multiplier for when the vertical and horizontal units are not the same. |
| wd | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

---

wbt_assess_route       *Assess route*

---

### Description

This tool assesses a route for slope, elevation, and visibility variation.

### Usage

```
wbt_assess_route(
  routes,
  dem,
  output,
  length = "",
  dist = 20,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| routes | Name of the input routes vector file. |
| dem | Name of the input DEM raster file. |
| output | Name of the output lines shapefile. |
| length | Maximum segment length (m). |
| dist | Search distance, in grid cells, used in visibility analysis. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_atan2                        *Atan2*

### Description

Returns the 2-argument inverse tangent (atan2).

### Usage

```
wbt_atan2(
  input_y,
  input_x,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input_y | Input y raster file or constant value (rise). |
| input_x | Input x raster file or constant value (run). |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

---

wbt_attribute_correlation

*Attribute correlation*

---

### Description

Performs a correlation analysis on attribute fields from a vector database.

### Usage

```
wbt_attribute_correlation(
  input,
  output = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

input              Input vector file path. See wbt_file_path() for details.

output             Output HTML file (default name will be based on input file if unspecified).

wd                 Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details.

verbose_mode       Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details.

compress_rasters

                   Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details.

command_only       Return command that would be executed by system() rather than running tool. Default: FALSE.

### Value

Returns the tool text outputs.

---

wbt_attribute_correlation_neighbourhood_analysis
*Attribute correlation neighbourhood analysis*

---

## Description

Performs a correlation on two input vector attributes within a neighbourhood search windows.

## Usage

```
wbt_attribute_correlation_neighbourhood_analysis(
  input,
  field1,
  field2,
  radius = NULL,
  min_points = NULL,
  stat = "pearson",
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input vector file path. See wbt_file_path() for details. |
| field1 | First input field name (dependent variable) in attribute table. |
| field2 | Second input field name (independent variable) in attribute table. |
| radius | Search Radius (in map units). |
| min_points | Minimum number of points. |
| stat | Correlation type; one of 'pearson' (default) and 'spearman'. |
| wd | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_attribute_histogram

*Attribute histogram*

---

## Description

Creates a histogram for the field values of a vector's attribute table.

## Usage

```
wbt_attribute_histogram(
  input,
  field,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input vector file path. See `wbt_file_path()` for details. |
| field | Input field name in attribute table. |
| output | Output HTML file (default name will be based on input file if unspecified). |
| wd | Changes the working directory. Default: `NULL` will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| verbose_mode | Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| command_only | Return command that would be executed by `system()` rather than running tool. Default: `FALSE`. |

## Value

Returns the tool text outputs.

wbt_attribute_scattergram

*Attribute scattergram*

## Description

Creates a scattergram for two field values of a vector's attribute table.

## Usage

```
wbt_attribute_scattergram(
  input,
  fieldx,
  fieldy,
  output,
  trendline = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| fieldx | Input field name in attribute table for the x-axis. |
| fieldy | Input field name in attribute table for the y-axis. |
| output | Output HTML file (default name will be based on input file if unspecified). |
| trendline | Draw the trendline. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

```
wbt_average_flowpath_slope
```
                    *Average flowpath slope*

---

### Description

Measures the average slope gradient from each grid cell to all upslope divide cells.

### Usage

```
wbt_average_flowpath_slope(
  dem,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_average_normal_vector_angular_deviation

*Average normal vector angular deviation*

### Description

Calculates the circular variance of aspect at a scale for a DEM.

### Usage

```
wbt_average_normal_vector_angular_deviation(
  dem,
  output,
  filter = 11,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| output | Output raster file. |
| filter | Size of the filter kernel. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_average_overlay          *Average overlay*

## Description

Calculates the average for each grid cell from a group of raster images.

## Usage

```
wbt_average_overlay(
  inputs,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| inputs | Input raster file paths, concatenated with `","` or `";"`. See `wbt_file_path()` for details. |
| output | Output raster file. |
| wd | Changes the working directory. Default: `NULL` will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| verbose_mode | Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| command_only | Return command that would be executed by `system()` rather than running tool. Default: `FALSE`. |

## Value

Returns the tool text outputs.

wbt_average_upslope_flowpath_length

*Average upslope flowpath length*

#### Description

Measures the average length of all upslope flowpaths draining each grid cell.

#### Usage

```
wbt_average_upslope_flowpath_length(
  dem,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

#### Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

#### Value

Returns the tool text outputs.

wbt_balance_contrast_enhancement

*Balance contrast enhancement*

## Description

Performs a balance contrast enhancement on a colour-composite image of multispectral data.

## Usage

```
wbt_balance_contrast_enhancement(
  input,
  output,
  band_mean = 100,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input colour composite image file. |
| output | Output raster file. |
| band_mean | Band mean value. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

wbt_basins                    *Basins*

### Description

Identifies drainage basins that drain to the DEM edge.

### Usage

```
wbt_basins(
  d8_pntr,
  output,
  esri_pntr = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| d8_pntr | Input raster D8 pointer file. |
| output | Output raster file. |
| esri_pntr | D8 pointer uses the ESRI style scheme. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_bilateral_filter     *Bilateral filter*

## Description

A bilateral filter is an edge-preserving smoothing filter introduced by Tomasi and Manduchi (1998).

## Usage

```
wbt_bilateral_filter(
  input,
  output,
  sigma_dist = 0.75,
  sigma_int = 1,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| output | Output raster file. |
| sigma_dist | Standard deviation in distance in pixels. |
| sigma_int | Standard deviation in intensity in pixels. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

```
wbt_block_maximum_gridding
```
                                *Block maximum gridding*

## Description

Creates a raster grid based on a set of vector points and assigns grid values using a block maximum scheme.

## Usage

```
wbt_block_maximum_gridding(
  input,
  field,
  output,
  use_z = FALSE,
  cell_size = NULL,
  base = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input vector Points file. |
| field | Input field name in attribute table. |
| output | Output raster file. |
| use_z | Use z-coordinate instead of field?. |
| cell_size | Optionally specified cell size of output raster. Not used when base raster is specified. |
| base | Optionally specified input base raster file. Not used when a cell size is specified. |
| wd | Changes the working directory. Default: `NULL` will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| verbose_mode | Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| command_only | Return command that would be executed by `system()` rather than running tool. Default: `FALSE`. |

## Value

Returns the tool text outputs.

---

wbt_block_minimum_gridding

*Block minimum gridding*

---

## Description

Creates a raster grid based on a set of vector points and assigns grid values using a block minimum scheme.

## Usage

```
wbt_block_minimum_gridding(
  input,
  field,
  output,
  use_z = FALSE,
  cell_size = NULL,
  base = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input vector Points file. |
| field | Input field name in attribute table. |
| output | Output raster file. |
| use_z | Use z-coordinate instead of field?. |
| cell_size | Optionally specified cell size of output raster. Not used when base raster is specified. |
| base | Optionally specified input base raster file. Not used when a cell size is specified. |
| wd | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_boundary_shape_complexity

*Boundary shape complexity*

---

## Description

Calculates the complexity of the boundaries of raster polygons.

## Usage

```
wbt_boundary_shape_complexity(
  input,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

wbt_breach_depressions

*Breach depressions*

### Description

Breaches all of the depressions in a DEM using Lindsay's (2016) algorithm. This should be preferred over depression filling in most cases.

### Usage

```
wbt_breach_depressions(
  dem,
  output,
  max_depth = NULL,
  max_length = NULL,
  flat_increment = NULL,
  fill_pits = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| output | Output raster file. |
| max_depth | Optional maximum breach depth (default is Inf). |
| max_length | Optional maximum breach channel length (in grid cells; default is Inf). |
| flat_increment | Optional elevation increment applied to flat areas. |
| fill_pits | Optional flag indicating whether to fill single-cell pits. |
| wd | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

**Value**

Returns the tool text outputs.

wbt_breach_depressions_least_cost

*Breach depressions least cost*

**Description**

Breaches the depressions in a DEM using a least-cost pathway method.

**Usage**

```
wbt_breach_depressions_least_cost(
  dem,
  output,
  dist,
  max_cost = NULL,
  min_dist = TRUE,
  flat_increment = NULL,
  fill = TRUE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

**Arguments**

| | |
|---|---|
| dem | Input raster DEM file. |
| output | Output raster file. |
| dist | Maximum search distance for breach paths in cells. |
| max_cost | Optional maximum breach cost (default is Inf). |
| min_dist | Optional flag indicating whether to minimize breach distances. |
| flat_increment | Optional elevation increment applied to flat areas. |
| fill | Optional flag indicating whether to fill any remaining unbreached depressions. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_breach_single_cell_pits

*Breach single cell pits*

---

### Description

Removes single-cell pits from an input DEM by breaching.

### Usage

```
wbt_breach_single_cell_pits(
  dem,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

---

`wbt_breakline_mapping`     *Breakline mapping*

---

### Description

This tool maps breaklines from an input DEM.

### Usage

```
wbt_breakline_mapping(
  dem,
  output,
  threshold = 2,
  min_length = 3,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| dem | Name of the input raster image file. |
| output | Name of the output vector lines file. |
| threshold | Threshold value (0 - infinity but typically 1 to 5 works well). |
| min_length | Minimum line length, in grid cells. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

---

| | |
|---|---|
| wbt_buffer_raster | *Buffer raster* |

---

### Description

Maps a distance-based buffer around each non-background (non-zero/non-nodata) grid cell in an input image.

### Usage

```
wbt_buffer_raster(
  input,
  output,
  size,
  gridcells = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| output | Output raster file. |
| size | Buffer size. |
| gridcells | Optional flag to indicate that the 'size' threshold should be measured in grid cells instead of the default map units. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_burn_streams_at_roads

*Burn streams at roads*

### Description

Burns-in streams at the sites of road embankments.

### Usage

```
wbt_burn_streams_at_roads(
  dem,
  streams,
  roads,
  output,
  width = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| dem | Input raster digital elevation model (DEM) file. |
| streams | Input vector streams file. |
| roads | Input vector roads file. |
| output | Output raster file. |
| width | Maximum road embankment width, in map units. |
| wd | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_canny_edge_detection

*Canny edge detection*

## Description

This tool performs a Canny edge-detection filter on an input image.

## Usage

```
wbt_canny_edge_detection(
  input,
  output,
  sigma = 0.5,
  low = 0.05,
  high = 0.15,
  add_back = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Name of the input raster image file. |
| output | Name of the output raster image file. |
| sigma | Sigma value used in Gaussian filtering, default = 0.5. |
| low | Low threshold, default = 0.05. |
| high | High threshold, default = 0.15. |
| add_back | Add the edge cells back to the input image. |
| wd | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_ceil                    *Ceil*

---

### Description

Returns the smallest (closest to negative infinity) value that is greater than or equal to the values in a raster.

### Usage

```
wbt_ceil(
  input,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

```
wbt_centroid                  Centroid
```

## Description

Calculates the centroid, or average location, of raster polygon objects.

## Usage

```
wbt_centroid(
  input,
  output,
  text_output = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input raster file path. See `wbt_file_path()` for details. |
| output | Output raster file. |
| text_output | Optional text output. |
| wd | Changes the working directory. Default: `NULL` will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| verbose_mode | Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| command_only | Return command that would be executed by `system()` rather than running tool. Default: `FALSE`. |

## Value

Returns the tool text outputs.

wbt_centroid_vector          *Centroid vector*

### Description

Identifies the centroid point of a vector polyline or polygon feature or a group of vector points.

### Usage

```
wbt_centroid_vector(
  input,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input vector file path. See wbt_file_path() for details. |
| output | Output vector file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_change_vector_analysis

*Change vector analysis*

### Description

Performs a change vector analysis on a two-date multi-spectral dataset.

### Usage

```
wbt_change_vector_analysis(
  date1,
  date2,
  magnitude,
  direction,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| date1 | Input raster files for the earlier date. |
| date2 | Input raster files for the later date. |
| magnitude | Output vector magnitude raster file. |
| direction | Output vector Direction raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

---

wbt_circular_variance_of_aspect

*Circular variance of aspect*

---

### Description

Calculates the circular variance of aspect at a scale for a DEM.

### Usage

```
wbt_circular_variance_of_aspect(
  dem,
  output,
  filter = 11,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| output | Output raster file. |
| filter | Size of the filter kernel. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

---

```
wbt_classify_buildings_in_lidar
```
                        *Classify buildings in lidar*

---

### Description

Reclassifies a LiDAR points that lie within vector building footprints.

### Usage

```
wbt_classify_buildings_in_lidar(
  input,
  buildings,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input LiDAR file. |
| buildings | Input vector polygons file. |
| output | Output LiDAR file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_classify_lidar            *Classify lidar*

## Description

Classify points within a LiDAR point cloud based on point properties.

## Usage

```
wbt_classify_lidar(
  input,
  output = NULL,
  radius = 1.5,
  grd_threshold = 0.1,
  oto_threshold = 2,
  planarity_threshold = 0.85,
  linearity_threshold = 0.7,
  iterations = 30,
  facade_threshold = 0.5,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Name of the input LiDAR points. |
| output | Name of the output LiDAR points. |
| radius | Search distance used in neighbourhood search (metres). |
| grd_threshold | Ground threshold (metres). |
| oto_threshold | Off-terrain object threshold (metres). |
| planarity_threshold | |
| | Planarity threshold (0-1). |
| linearity_threshold | |
| | Linearity threshold (0-1). |
| iterations | Number of iterations. |
| facade_threshold | |
| | Facade threshold (metres). |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |

compress_rasters

> Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details.

command_only    Return command that would be executed by `system()` rather than running tool. Default: `FALSE`.

## Value

Returns the tool text outputs.

---

wbt_classify_overlap_points

*Classify overlap points*

---

## Description

Classifies or filters LAS points in regions of overlapping flight lines.

## Usage

```
wbt_classify_overlap_points(
  input,
  output,
  resolution = 2,
  criterion = "max scan angle",
  filter = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

input           Input LiDAR file.

output          Output LiDAR file.

resolution      The size of the square area used to evaluate nearby points in the LiDAR data.

criterion       Criterion used to identify overlapping points; options are 'max scan angle', 'not min point source ID', 'not min time', 'multiple point source IDs'.

filter          Filter out points from overlapping flightlines? If false, overlaps will simply be classified.

wd              Changes the working directory. Default: `NULL` will use the value in Whitebox-Tools settings, see `wbt_wd()` for details.

verbose_mode    Sets verbose mode. If verbose mode is FALSE, tools will not print output mes-
                sages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose()
                for details.

compress_rasters

                Sets the flag used by 'WhiteboxTools' to determine whether to use compression
                for output rasters. Default: NULL will use the value in WhiteboxTools settings,
                see wbt_compress_rasters() for details.

command_only    Return command that would be executed by system() rather than running tool.
                Default: FALSE.

### Value

Returns the tool text outputs.

---

wbt_clean_vector          *Clean vector*

---

### Description

Removes null features and lines/polygons with fewer than the required number of vertices.

### Usage

```
wbt_clean_vector(
  input,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

input           Input vector file path. See wbt_file_path() for details.

output          Output vector file.

wd              Changes the working directory. Default: NULL will use the value in Whitebox-
                Tools settings, see wbt_wd() for details.

verbose_mode    Sets verbose mode. If verbose mode is FALSE, tools will not print output mes-
                sages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose()
                for details.

compress_rasters

                Sets the flag used by 'WhiteboxTools' to determine whether to use compression
                for output rasters. Default: NULL will use the value in WhiteboxTools settings,
                see wbt_compress_rasters() for details.

command_only    Return command that would be executed by system() rather than running tool.
                Default: FALSE.

## Value

Returns the tool text outputs.

---

| wbt_clip | *Clip* |
|---|---|

---

## Description

Extract all the features, or parts of features, that overlap with the features of the clip vector.

## Usage

```
wbt_clip(
  input,
  clip,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input vector file path. See `wbt_file_path()` for details. |
| clip | Input clip polygon vector file. |
| output | Output vector file. |
| wd | Changes the working directory. Default: `NULL` will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| verbose_mode | Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| command_only | Return command that would be executed by `system()` rather than running tool. Default: `FALSE`. |

## Value

Returns the tool text outputs.

---

`wbt_clip_lidar_to_polygon`

*Clip lidar to polygon*

---

### Description

Clips a LiDAR point cloud to a vector polygon or polygons.

### Usage

```
wbt_clip_lidar_to_polygon(
  input,
  polygons,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input LiDAR file. |
| polygons | Input vector polygons file. |
| output | Output LiDAR file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_clip_raster_to_polygon

*Clip raster to polygon*

#### Description

Clips a raster to a vector polygon.

#### Usage

```
wbt_clip_raster_to_polygon(
  input,
  polygons,
  output,
  maintain_dimensions = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

#### Arguments

input               Input raster file path. See wbt_file_path() for details.

polygons            Input vector polygons file.

output              Output raster file.

maintain_dimensions
                    Maintain input raster dimensions?.

wd                  Changes the working directory. Default: NULL will use the value in Whitebox-
                    Tools settings, see wbt_wd() for details.

verbose_mode        Sets verbose mode. If verbose mode is FALSE, tools will not print output mes-
                    sages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose()
                    for details.

compress_rasters
                    Sets the flag used by 'WhiteboxTools' to determine whether to use compression
                    for output rasters. Default: NULL will use the value in WhiteboxTools settings,
                    see wbt_compress_rasters() for details.

command_only        Return command that would be executed by system() rather than running tool.
                    Default: FALSE.

#### Value

Returns the tool text outputs.

---

wbt_closing                        *Closing*

---

### Description

A closing is a mathematical morphology operation involving an erosion (min filter) of a dilation (max filter) set.

### Usage

```
wbt_closing(
  input,
  output,
  filterx = 11,
  filtery = 11,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| output | Output raster file. |
| filterx | Size of the filter kernel in the x-direction. |
| filtery | Size of the filter kernel in the y-direction. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

---

wbt_clump                    *Clump*

---

### Description

Groups cells that form discrete areas, assigning them unique identifiers.

### Usage

```
wbt_clump(
  input,
  output,
  diag = TRUE,
  zero_back = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

input            Input raster file path. See wbt_file_path() for details.

output           Output raster file.

diag             Flag indicating whether diagonal connections should be considered.

zero_back        Flag indicating whether zero values should be treated as a background.

wd               Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details.

verbose_mode     Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details.

compress_rasters
                 Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details.

command_only     Return command that would be executed by system() rather than running tool. Default: FALSE.

### Value

Returns the tool text outputs.

---

```
wbt_colourize_based_on_class
```
*Colourize based on class*

---

### Description

Sets the RGB values of a LiDAR point cloud based on the point classification values.

### Usage

```
wbt_colourize_based_on_class(
  input,
  output = NULL,
  intensity_blending = 50,
  clr_str = "",
  use_unique_clrs_for_buildings = FALSE,
  radius = "",
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Name of the input LiDAR points. |
| output | Name of the output LiDAR points. |
| intensity_blending | |
| | Intensity blending amount (0-100 percent). |
| clr_str | Colour values, e.g. 2: (184, 167, 108); 5: #9ab86c. |
| use_unique_clrs_for_buildings | |
| | Use unique colours for each building?. |
| radius | Search distance used in neighbourhood search. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_colourize_based_on_point_returns
*Colourize based on point returns*

---

## Description

Sets the RGB values of a LiDAR point cloud based on the point returns.

## Usage

```
wbt_colourize_based_on_point_returns(
  input,
  output = NULL,
  intensity_blending = 50,
  only = "(230,214,170)",
  first = "(0,140,0)",
  intermediate = "(255,0,255)",
  last = "(0,0,255)",
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Name of the input LiDAR points. |
| output | Name of the output LiDAR points. |
| intensity_blending | |
| | Intensity blending amount (0-100 percent). |
| only | Only return colour, e.g. (230,214,170), #e6d6aa, or 0xe6d6aa. |
| first | First return colour, e.g. (230,214,170), #e6d6aa, or 0xe6d6aa. |
| intermediate | Intermediate return colour, e.g. (230,214,170), #e6d6aa, or 0xe6d6aa. |
| last | Last return colour, e.g. (230,214,170), #e6d6aa, or 0xe6d6aa. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |

compress_rasters

> Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details.

command_only     Return command that would be executed by system() rather than running tool. Default: FALSE.

## Value

Returns the tool text outputs.

---

wbt_compactness_ratio     *Compactness ratio*

---

## Description

Calculates the compactness ratio (A/P), a measure of shape complexity, for vector polygons.

## Usage

```
wbt_compactness_ratio(
  input,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

input            Input vector polygon file.

wd               Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details.

verbose_mode     Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details.

compress_rasters

> Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details.

command_only     Return command that would be executed by system() rather than running tool. Default: FALSE.

## Value

Returns the tool text outputs.

wbt_conditional_evaluation

*Conditional evaluation*

## Description

Performs a conditional evaluation (if-then-else) operation on a raster.

## Usage

```
wbt_conditional_evaluation(
  input,
  output,
  statement = "",
  true = NULL,
  false = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Name of the input raster file. |
| output | Name of the output raster file. |
| statement | Conditional statement e.g. value > 35.0. This statement must be a valid Rust statement. |
| true | Value where condition evaluates TRUE (input raster or constant value). |
| false | Value where condition evaluates FALSE (input raster or constant value). |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

wbt_conditioned_latin_hypercube
                    *Conditioned latin hypercube*

## Description

Implements conditioned Latin Hypercube sampling.

## Usage

```
wbt_conditioned_latin_hypercube(
  inputs,
  output,
  samples = 500,
  iterations = 25000,
  seed = NULL,
  prob = 0.5,
  threshold = NULL,
  temp = 1,
  temp_decay = 0.05,
  cycle = 10,
  average = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| inputs | Name of the input raster file. |
| output | Output shapefile. |
| samples | Number of sample sites returned. |
| iterations | Maximum iterations (if stopping criteria not reached). |
| seed | Seed for RNG consistency. |
| prob | Probability of random resample or resampling worst strata between `[0,1]`. |
| threshold | Objective function values below the threshold stop the resampling iterations. |
| temp | Initial annealing temperature between `[0,1]`. |
| temp_decay | Annealing temperature decay proportion between `[0,1]`. Reduce temperature by this proportion each annealing cycle. |
| cycle | Number of iterations before decaying annealing temperature. |
| average | Weight the continuous objective function by the 1/N contributing strata. |
| wd | Changes the working directory. Default: `NULL` will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |

| | |
|---|---|
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_conservative_smoothing_filter

*Conservative smoothing filter*

---

## Description

Performs a conservative-smoothing filter on an image.

## Usage

```
wbt_conservative_smoothing_filter(
  input,
  output,
  filterx = 3,
  filtery = 3,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| output | Output raster file. |
| filterx | Size of the filter kernel in the x-direction. |
| filtery | Size of the filter kernel in the y-direction. |
| wd | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |

compress_rasters

> Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details.

command_only   Return command that would be executed by `system()` rather than running tool. Default: `FALSE`.

## Value

Returns the tool text outputs.

---

wbt_construct_vector_tin

*Construct vector tin*

---

## Description

Creates a vector triangular irregular network (TIN) for a set of vector points.

## Usage

```
wbt_construct_vector_tin(
  input,
  output,
  field = NULL,
  use_z = FALSE,
  max_triangle_edge_length = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

input          Input vector points file.

output         Output vector polygon file.

field          Input field name in attribute table.

use_z          Use the 'z' dimension of the Shapefile's geometry instead of an attribute field?.

max_triangle_edge_length

> Optional maximum triangle edge length; triangles larger than this size will not be gridded.

wd             Changes the working directory. Default: `NULL` will use the value in Whitebox-Tools settings, see `wbt_wd()` for details.

| | |
|---|---|
| verbose_mode | Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| command_only | Return command that would be executed by `system()` rather than running tool. Default: `FALSE`. |

## Value

Returns the tool text outputs.

---

```
wbt_contours_from_points
```
*Contours from points*

---

## Description

Creates a contour coverage from a set of input points.

## Usage

```
wbt_contours_from_points(
  input,
  output,
  field = NULL,
  use_z = FALSE,
  max_triangle_edge_length = NULL,
  interval = 10,
  base = 0,
  smooth = 5,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input vector points file. |
| output | Output vector lines file. |
| field | Input field name in attribute table. |
| use_z | Use the 'z' dimension of the Shapefile's geometry instead of an attribute field?. |

max_triangle_edge_length
              Optional maximum triangle edge length; triangles larger than this size will not
              be gridded.

interval      Contour interval.

base          Base contour height.

smooth        Smoothing filter size (in num. points), e.g. 3, 5, 7, 9, 11.

wd            Changes the working directory. Default: NULL will use the value in Whitebox-
              Tools settings, see wbt_wd() for details.

verbose_mode  Sets verbose mode. If verbose mode is FALSE, tools will not print output mes-
              sages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose()
              for details.

compress_rasters
              Sets the flag used by 'WhiteboxTools' to determine whether to use compression
              for output rasters. Default: NULL will use the value in WhiteboxTools settings,
              see wbt_compress_rasters() for details.

command_only  Return command that would be executed by system() rather than running tool.
              Default: FALSE.

## Value

Returns the tool text outputs.

---

wbt_contours_from_raster

              *Contours from raster*

---

## Description

Derives a vector contour coverage from a raster surface.

## Usage

```
wbt_contours_from_raster(
  input,
  output,
  interval = 10,
  base = 0,
  smooth = 9,
  tolerance = 10,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| `input` | Input surface raster file. |
| `output` | Output vector contour file. |
| `interval` | Contour interval. |
| `base` | Base contour height. |
| `smooth` | Smoothing filter size (in num. points), e.g. 3, 5, 7, 9, 11. |
| `tolerance` | Tolerance factor, in degrees (0-45); determines generalization level. |
| `wd` | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| `verbose_mode` | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| `compress_rasters` | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| `command_only` | Return command that would be executed by `system()` rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

`wbt_convert_nodata_to_zero`

*Convert nodata to zero*

---

## Description

Converts nodata values in a raster to zero.

## Usage

```
wbt_convert_nodata_to_zero(
  input,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| `input` | Input raster file path. See `wbt_file_path()` for details. |
| `output` | Output raster file. |
| `wd` | Changes the working directory. Default: `NULL` will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| `verbose_mode` | Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| `compress_rasters` | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| `command_only` | Return command that would be executed by `system()` rather than running tool. Default: `FALSE`. |

## Value

Returns the tool text outputs.

---

wbt_convert_raster_format

*Convert raster format*

---

## Description

Converts raster data from one format to another.

## Usage

```
wbt_convert_raster_format(
  input,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| `input` | Input raster file path. See `wbt_file_path()` for details. |
| `output` | Output raster file. |
| `wd` | Changes the working directory. Default: `NULL` will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |

| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
|---|---|
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_corner_detection    *Corner detection*

---

## Description

Identifies corner patterns in boolean images using hit-and-miss pattern matching.

## Usage

```
wbt_corner_detection(
  input,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| input | Input boolean image. |
|---|---|
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

**Value**

Returns the tool text outputs.

---

wbt_correct_vignetting

*Correct vignetting*

---

**Description**

Corrects the darkening of images towards corners.

**Usage**

```
wbt_correct_vignetting(
  input,
  pp,
  output,
  focal_length = 304.8,
  image_width = 228.6,
  n = 4,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

**Arguments**

| | |
|---|---|
| input | Input raster file path. See `wbt_file_path()` for details. |
| pp | Input principal point file. |
| output | Output raster file. |
| focal_length | Camera focal length, in millimeters. |
| image_width | Distance between photograph edges, in millimeters. |
| n | The 'n' parameter. |
| wd | Changes the working directory. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_wd()` for details. |
| verbose_mode | Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| command_only | Return command that would be executed by `system()` rather than running tool. Default: `FALSE`. |

## Value

Returns the tool text outputs.

---

wbt_cos                        *Cos*

---

## Description

Returns the cosine (cos) of each values in a raster.

## Usage

```
wbt_cos(
  input,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

wbt_cosh                    *Cosh*

#### Description

Returns the hyperbolic cosine (cosh) of each values in a raster.

#### Usage

```
wbt_cosh(
  input,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

#### Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

#### Value

Returns the tool text outputs.

wbt_cost_allocation     *Cost allocation*

## Description

Identifies the source cell to which each grid cell is connected by a least-cost pathway in a cost-distance analysis.

## Usage

```
wbt_cost_allocation(
  source,
  backlink,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| source | Input source raster file. |
| backlink | Input backlink raster file generated by the cost-distance tool. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_cost_distance          *Cost distance*

---

### Description

Performs cost-distance accumulation on a cost surface and a group of source cells.

### Usage

```
wbt_cost_distance(
  source,
  cost,
  out_accum,
  out_backlink,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| source | Input source raster file. |
| cost | Input cost (friction) raster file. |
| out_accum | Output cost accumulation raster file. |
| out_backlink | Output backlink raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_cost_pathway      *Cost pathway*

## Description

Performs cost-distance pathway analysis using a series of destination grid cells.

## Usage

```
wbt_cost_pathway(
  destination,
  backlink,
  output,
  zero_background = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| destination | Input destination raster file. |
| backlink | Input backlink raster file generated by the cost-distance tool. |
| output | Output cost pathway raster file. |
| zero_background | |
| | Flag indicating whether zero values should be treated as a background. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

wbt_count_if                    *Count if*

### Description

Counts the number of occurrences of a specified value in a cell-stack of rasters.

### Usage

```
wbt_count_if(
  inputs,
  output,
  value,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| inputs | Input raster file paths, concatenated with `","` or `";"`. See `wbt_file_path()` for details. |
| output | Output raster file. |
| value | Search value (e.g. countif value = 5.0). |
| wd | Changes the working directory. Default: `NULL` will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| verbose_mode | Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| command_only | Return command that would be executed by `system()` rather than running tool. Default: `FALSE`. |

### Value

Returns the tool text outputs.

---

wbt_create_colour_composite

*Create colour composite*

---

**Description**

Creates a colour-composite image from three bands of multispectral imagery.

**Usage**

```
wbt_create_colour_composite(
  red,
  green,
  blue,
  output,
  opacity = NULL,
  enhance = TRUE,
  zeros = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

**Arguments**

| | |
|---|---|
| red | Input red band image file. |
| green | Input green band image file. |
| blue | Input blue band image file. |
| output | Output colour composite file. |
| opacity | Input opacity band image file (optional). |
| enhance | Optional flag indicating whether a balance contrast enhancement is performed. |
| zeros | Optional flag to indicate if zeros are nodata values. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

**Value**

Returns the tool text outputs.

---

wbt_create_hexagonal_vector_grid

*Create hexagonal vector grid*

---

**Description**

Creates a hexagonal vector grid.

**Usage**

```
wbt_create_hexagonal_vector_grid(
  input,
  output,
  width,
  orientation = "horizontal",
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

**Arguments**

| | |
|---|---|
| input | Input base file. |
| output | Output vector polygon file. |
| width | The grid cell width. |
| orientation | Grid Orientation, 'horizontal' or 'vertical'. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

**Value**

Returns the tool text outputs.

wbt_create_plane *Create plane*

### Description

Creates a raster image based on the equation for a simple plane.

### Usage

```
wbt_create_plane(
  base,
  output,
  gradient = 15,
  aspect = 90,
  constant = 0,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| base | Input base raster file. |
| output | Output raster file. |
| gradient | Slope gradient in degrees (-85.0 to 85.0). |
| aspect | Aspect (direction) in degrees clockwise from north (0.0-360.0). |
| constant | Constant value. |
| wd | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_create_rectangular_vector_grid
*Create rectangular vector grid*

### Description

Creates a rectangular vector grid.

### Usage

```
wbt_create_rectangular_vector_grid(
  input,
  output,
  width,
  height,
  xorig = 0,
  yorig = 0,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input base file. |
| output | Output vector polygon file. |
| width | The grid cell width. |
| height | The grid cell height. |
| xorig | The grid origin x-coordinate. |
| yorig | The grid origin y-coordinate. |
| wd | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_crispness_index          *Crispness index*

## Description

Calculates the Crispness Index, which is used to quantify how crisp (or conversely how fuzzy) a probability image is.

## Usage

```
wbt_crispness_index(
  input,
  output = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

input            Input raster file path. See wbt_file_path() for details.

output           Optional output html file (default name will be based on input file if unspecified).

wd               Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details.

verbose_mode     Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details.

compress_rasters

                 Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details.

command_only     Return command that would be executed by system() rather than running tool. Default: FALSE.

## Value

Returns the tool text outputs.

wbt_cross_tabulation      *Cross tabulation*

### Description

Performs a cross-tabulation on two categorical images.

### Usage

```
wbt_cross_tabulation(
  input1,
  input2,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

input1            Input raster file 1.

input2            Input raster file 1.

output            Output HTML file (default name will be based on input file if unspecified).

wd                Changes the working directory. Default: NULL will use the value in Whitebox-
                  Tools settings, see wbt_wd() for details.

verbose_mode      Sets verbose mode. If verbose mode is FALSE, tools will not print output mes-
                  sages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose()
                  for details.

compress_rasters

                  Sets the flag used by 'WhiteboxTools' to determine whether to use compression
                  for output rasters. Default: NULL will use the value in WhiteboxTools settings,
                  see wbt_compress_rasters() for details.

command_only      Return command that would be executed by system() rather than running tool.
                  Default: FALSE.

### Value

Returns the tool text outputs.

wbt_csv_points_to_vector

*Csv points to vector*

### Description

Converts a CSV text file to vector points.

### Usage

```
wbt_csv_points_to_vector(
  input,
  output,
  xfield = 0,
  yfield = 1,
  epsg = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input CSV file (i.e. source of data to be imported). |
| output | Output vector file. |
| xfield | X field number (e.g. 0 for first field). |
| yfield | Y field number (e.g. 1 for second field). |
| epsg | EPSG projection (e.g. 2958). |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_cumulative_distribution

*Cumulative distribution*

### Description

Converts a raster image to its cumulative distribution function.

### Usage

```
wbt_cumulative_distribution(
  input,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_curvedness                    *Curvedness*

### Description

This tool calculates curvedness from an input DEM.

### Usage

```
wbt_curvedness(
  dem,
  output,
  log = FALSE,
  zfactor = 1,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| dem | Name of the input raster DEM file. |
| output | Name of the output raster image file. |
| log | Display output values using a log-scale. |
| zfactor | Z conversion factor. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_d8_flow_accumulation

*D8 flow accumulation*

### Description

Calculates a D8 flow accumulation raster from an input DEM or flow pointer.

### Usage

```
wbt_d8_flow_accumulation(
  input,
  output,
  out_type = "cells",
  log = FALSE,
  clip = FALSE,
  pntr = FALSE,
  esri_pntr = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input raster DEM or D8 pointer file. |
| output | Output raster file. |
| out_type | Output type; one of 'cells' (default), 'catchment area', and 'specific contributing area'. |
| log | Optional flag to request the output be log-transformed. |
| clip | Optional flag to request clipping the display max by 1 percent. |
| pntr | Is the input raster a D8 flow pointer rather than a DEM?. |
| esri_pntr | Input D8 pointer uses the ESRI style scheme. |
| wd | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_d8_mass_flux          *D8 mass flux*

---

## Description

Performs a D8 mass flux calculation.

## Usage

```
wbt_d8_mass_flux(
  dem,
  loading,
  efficiency,
  absorption,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| loading | Input loading raster file. |
| efficiency | Input efficiency raster file. |
| absorption | Input absorption raster file. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_d8_pointer                 *D8 pointer*

---

### Description

Calculates a D8 flow pointer raster from an input DEM.

### Usage

```
wbt_d8_pointer(
  dem,
  output,
  esri_pntr = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| output | Output raster file. |
| esri_pntr | D8 pointer uses the ESRI style scheme. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

---

wbt_dbscan *Dbscan*

---

### Description

Performs a DBSCAN-based unsupervised clustering operation.

### Usage

```
wbt_dbscan(
  inputs,
  output,
  scaling = "Normalize",
  search_dist = 0.01,
  min_points = 5,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| inputs | Names of the input rasters. |
| output | Name of the output raster file. |
| scaling | Scaling method for predictors. Options include 'None', 'Normalize', and 'Standardize'. |
| search_dist | Search-distance parameter. |
| min_points | Minimum point density needed to define 'core' point in cluster. |
| wd | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

| wbt_decrement | *Decrement* |
|---|---|

### Description

Decreases the values of each grid cell in an input raster by 1.0 (see also InPlaceSubtract).

### Usage

```
wbt_decrement(
  input,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input raster file path. See `wbt_file_path()` for details. |
| output | Output raster file. |
| wd | Changes the working directory. Default: `NULL` will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| verbose_mode | Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| command_only | Return command that would be executed by `system()` rather than running tool. Default: `FALSE`. |

### Value

Returns the tool text outputs.

wbt_dem_void_filling     *Dem void filling*

## Description

This tool can be used to fill the void areas of a DEM using another fill DEM data set.

## Usage

```
wbt_dem_void_filling(
  dem,
  fill,
  output,
  mean_plane_dist = 20,
  edge_treatment = "use DEM",
  weight_value = 2,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| dem | Name of the input raster DEM file, containing the void areas. |
| fill | Name of the input fill DEM file, containing the values used to fill the void areas in the other DEM. |
| output | Name of the output void-filled DEM file. |
| mean_plane_dist | Distance to void edge at which the mean-plane value is used as an offset, measured in grid cells. |
| edge_treatment | How should void-edge cells be treated? Options include 'use DEM' (default), 'use Fill', 'average'. |
| weight_value | Weight value used for IDW interpolation (default is 2.0). |
| wd | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

**Value**

Returns the tool text outputs.

---

wbt_depth_in_sink          *Depth in sink*

---

**Description**

Measures the depth of sinks (depressions) in a DEM.

**Usage**

```
wbt_depth_in_sink(
  dem,
  output,
  zero_background = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

**Arguments**

| | |
|---|---|
| dem | Input raster DEM file. |
| output | Output raster file. |
| zero_background | |
| | Flag indicating whether the background value of zero should be used. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

**Value**

Returns the tool text outputs.

---

wbt_depth_to_water          *Depth to water*

---

### Description

This tool calculates cartographic depth-to-water (DTW) index.

### Usage

```
wbt_depth_to_water(
  dem,
  output,
  streams = NULL,
  lakes = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| dem | Name of the input raster DEM file. |
| output | Name of the output raster image file. |
| streams | Name of the input streams vector (optional). |
| lakes | Name of the input lakes vector (optional). |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_dev_from_mean_elev

*Dev from mean elev*

### Description

Calculates deviation from mean elevation.

### Usage

```
wbt_dev_from_mean_elev(
  dem,
  output,
  filterx = 11,
  filtery = 11,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| output | Output raster file. |
| filterx | Size of the filter kernel in the x-direction. |
| filtery | Size of the filter kernel in the y-direction. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_difference *Difference*

## Description

Outputs the features that occur in one of the two vector inputs but not both, i.e. no overlapping features.

## Usage

```
wbt_difference(
  input,
  overlay,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input vector file path. See wbt_file_path() for details. |
| overlay | Input overlay vector file. |
| output | Output vector file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

wbt_difference_curvature

*Difference curvature*

### Description

This tool calculates difference curvature from an input DEM.

### Usage

```
wbt_difference_curvature(
  dem,
  output,
  log = FALSE,
  zfactor = 1,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| dem | Name of the input raster DEM file. |
| output | Name of the output raster image file. |
| log | Display output values using a log-scale. |
| zfactor | Z conversion factor. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_diff_from_mean_elev

*Diff from mean elev*

### Description

Calculates difference from mean elevation (equivalent to a high-pass filter).

### Usage

```
wbt_diff_from_mean_elev(
  dem,
  output,
  filterx = 11,
  filtery = 11,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| output | Output raster file. |
| filterx | Size of the filter kernel in the x-direction. |
| filtery | Size of the filter kernel in the y-direction. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_diff_of_gaussian_filter
                                         *Diff of gaussian filter*

### Description

Performs a Difference of Gaussian (DoG) filter on an image.

### Usage

```
wbt_diff_of_gaussian_filter(
  input,
  output,
  sigma1 = 2,
  sigma2 = 4,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| output | Output raster file. |
| sigma1 | Standard deviation distance in pixels. |
| sigma2 | Standard deviation distance in pixels. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_directional_relief

*Directional relief*

## Description

Calculates relief for cells in an input DEM for a specified direction.

## Usage

```
wbt_directional_relief(
  dem,
  output,
  azimuth = 0,
  max_dist = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| output | Output raster file. |
| azimuth | Wind azimuth in degrees. |
| max_dist | Optional maximum search distance (unspecified if none; in xy units). |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

wbt_direct_decorrelation_stretch

*Direct decorrelation stretch*

### Description

Performs a direct decorrelation stretch enhancement on a colour-composite image of multispectral data.

### Usage

```
wbt_direct_decorrelation_stretch(
  input,
  output,
  k = 0.5,
  clip = 1,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input colour composite image file. |
| output | Output raster file. |
| k | Achromatic factor (k) ranges between 0 (no effect) and 1 (full saturation stretch), although typical values range from 0.3 to 0.7. |
| clip | Optional percent to clip the upper tail by during the stretch. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

---

`wbt_dissolve` *Dissolve*

---

### Description

Removes the interior, or shared, boundaries within a vector polygon coverage.

### Usage

```
wbt_dissolve(
  input,
  output,
  field = NULL,
  snap = 0,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input vector file path. See wbt_file_path() for details. |
| output | Output vector file. |
| field | Dissolve field attribute (optional). |
| snap | Snap tolerance. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_distance_to_outlet

*Distance to outlet*

### Description

Calculates the distance of stream grid cells to the channel network outlet cell.

### Usage

```
wbt_distance_to_outlet(
  d8_pntr,
  streams,
  output,
  esri_pntr = FALSE,
  zero_background = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| d8_pntr | Input raster D8 pointer file. |
| streams | Input raster streams file. |
| output | Output raster file. |
| esri_pntr | D8 pointer uses the ESRI style scheme. |
| zero_background | |
| | Flag indicating whether a background value of zero should be used. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_diversity_filter     *Diversity filter*

## Description

Assigns each cell in the output grid the number of different values in a moving window centred on each grid cell in the input raster.

## Usage

```
wbt_diversity_filter(
  input,
  output,
  filterx = 11,
  filtery = 11,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| output | Output raster file. |
| filterx | Size of the filter kernel in the x-direction. |
| filtery | Size of the filter kernel in the y-direction. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_divide                    *Divide*

---

### Description

Performs a division operation on two rasters or a raster and a constant value.

### Usage

```
wbt_divide(
  input1,
  input2,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input1 | Input raster file or constant value. |
| input2 | Input raster file or constant value. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_downslope_distance_to_stream

*Downslope distance to stream*

## Description

Measures distance to the nearest downslope stream cell.

## Usage

```
wbt_downslope_distance_to_stream(
  dem,
  streams,
  output,
  dinf = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| streams | Input raster streams file. |
| output | Output raster file. |
| dinf | Use the D-infinity flow algorithm instead of D8?. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

`wbt_downslope_flowpath_length`

*Downslope flowpath length*

### Description

Calculates the downslope flowpath length from each cell to basin outlet.

### Usage

```
wbt_downslope_flowpath_length(
  d8_pntr,
  output,
  watersheds = NULL,
  weights = NULL,
  esri_pntr = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| d8_pntr | Input D8 pointer raster file. |
| output | Output raster file. |
| watersheds | Optional input watershed raster file. |
| weights | Optional input weights raster file. |
| esri_pntr | D8 pointer uses the ESRI style scheme. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_downslope_index          *Downslope index*

### Description

Calculates the Hjerdt et al. (2004) downslope index.

### Usage

```
wbt_downslope_index(
  dem,
  output,
  drop = 2,
  out_type = "tangent",
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| output | Output raster file. |
| drop | Vertical drop value (default is 2.0). |
| out_type | Output type, options include 'tangent', 'degrees', 'radians', 'distance' (default is 'tangent'). |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_d_inf_flow_accumulation

*D inf flow accumulation*

**Description**

Calculates a D-infinity flow accumulation raster from an input DEM.

**Usage**

```
wbt_d_inf_flow_accumulation(
  input,
  output,
  out_type = "Specific Contributing Area",
  threshold = NULL,
  log = FALSE,
  clip = FALSE,
  pntr = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

**Arguments**

| | |
|---|---|
| input | Input raster DEM or D-infinity pointer file. |
| output | Output raster file. |
| out_type | Output type; one of 'cells', 'sca' (default), and 'ca'. |
| threshold | Optional convergence threshold parameter, in grid cells; default is infinity. |
| log | Optional flag to request the output be log-transformed. |
| clip | Optional flag to request clipping the display max by 1 percent. |
| pntr | Is the input raster a D-infinity flow pointer rather than a DEM?. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_d_inf_mass_flux            *D inf mass flux*

---

## Description

Performs a D-infinity mass flux calculation.

## Usage

```
wbt_d_inf_mass_flux(
  dem,
  loading,
  efficiency,
  absorption,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| loading | Input loading raster file. |
| efficiency | Input efficiency raster file. |
| absorption | Input absorption raster file. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_d_inf_pointer          *D inf pointer*

---

### Description

Calculates a D-infinity flow pointer (flow direction) raster from an input DEM.

### Usage

```
wbt_d_inf_pointer(
  dem,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_edge_contamination

*Edge contamination*

## Description

Identifies grid cells within an input DEM that may be impacted by edge contamination for hydrological applications.

## Usage

```
wbt_edge_contamination(
  dem,
  output,
  flow_type = "mfd",
  zfactor = "",
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| dem | Name of the input DEM raster file; must be depressionless. |
| output | Name of the output raster file. |
| flow_type | Flow algorithm type, one of 'd8', 'mfd', or 'dinf'. |
| zfactor | Optional multiplier for when the vertical and horizontal units are not the same. |
| wd | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

wbt_edge_density            *Edge density*

## Description

Calculates the density of edges, or breaks-in-slope within DEMs.

## Usage

```
wbt_edge_density(
  dem,
  output,
  filter = 11,
  norm_diff = 5,
  zfactor = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| output | Output raster file. |
| filter | Size of the filter kernel. |
| norm_diff | Maximum difference in normal vectors, in degrees. |
| zfactor | Optional multiplier for when the vertical and horizontal units are not the same. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

wbt_edge_preserving_mean_filter
*Edge preserving mean filter*

#### Description

Performs a simple edge-preserving mean filter on an input image.

#### Usage

```
wbt_edge_preserving_mean_filter(
  input,
  output,
  threshold,
  filter = 11,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

#### Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| output | Output raster file. |
| threshold | Maximum difference in values. |
| filter | Size of the filter kernel. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

#### Value

Returns the tool text outputs.

---

`wbt_edge_proportion`    *Edge proportion*

---

### Description

Calculate the proportion of cells in a raster polygon that are edge cells.

### Usage

```
wbt_edge_proportion(
  input,
  output,
  output_text = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input raster file path. See `wbt_file_path()` for details. |
| output | Output raster file. |
| output_text | flag indicating whether a text report should also be output. |
| wd | Changes the working directory. Default: `NULL` will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| verbose_mode | Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| command_only | Return command that would be executed by `system()` rather than running tool. Default: `FALSE`. |

### Value

Returns the tool text outputs.

wbt_elevation_above_stream

*Elevation above stream*

## Description

Calculates the elevation of cells above the nearest downslope stream cell.

## Usage

```
wbt_elevation_above_stream(
  dem,
  streams,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| streams | Input raster streams file. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

wbt_elevation_above_stream_euclidean

*Elevation above stream euclidean*

### Description

Calculates the elevation of cells above the nearest (Euclidean distance) stream cell.

### Usage

```
wbt_elevation_above_stream_euclidean(
  dem,
  streams,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| streams | Input raster streams file. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_elev_above_pit          *Elev above pit*

## Description

Calculate the elevation of each grid cell above the nearest downstream pit cell or grid edge cell.

## Usage

```
wbt_elev_above_pit(
  dem,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

wbt_elev_percentile          *Elev percentile*

## Description

Calculates the elevation percentile raster from a DEM.

## Usage

```
wbt_elev_percentile(
  dem,
  output,
  filterx = 11,
  filtery = 11,
  sig_digits = 2,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| output | Output raster file. |
| filterx | Size of the filter kernel in the x-direction. |
| filtery | Size of the filter kernel in the y-direction. |
| sig_digits | Number of significant digits. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

wbt_elev_relative_to_min_max

*Elev relative to min max*

## Description

Calculates the elevation of a location relative to the minimum and maximum elevations in a DEM.

## Usage

```
wbt_elev_relative_to_min_max(
  dem,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_elev_relative_to_watershed_min_max

*Elev relative to watershed min max*

---

### Description

Calculates the elevation of a location relative to the minimum and maximum elevations in a watershed.

### Usage

```
wbt_elev_relative_to_watershed_min_max(
  dem,
  watersheds,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| watersheds | Input raster watersheds file. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

## wbt_eliminate_coincident_points
*Eliminate coincident points*

### Description

Removes any coincident, or nearly coincident, points from a vector points file.

### Usage

```
wbt_eliminate_coincident_points(
  input,
  output,
  tolerance,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input vector file path. See `wbt_file_path()` for details. |
| output | Output vector points file. |
| tolerance | The distance tolerance for points. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| command_only | Return command that would be executed by `system()` rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_elongation_ratio     *Elongation ratio*

### Description

Calculates the elongation ratio for vector polygons.

### Usage

```
wbt_elongation_ratio(
  input,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input vector polygon file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_embankment_mapping

*Embankment mapping*

### Description

Maps and/or removes road embankments from an input fine-resolution DEM.

**Usage**

```
wbt_embankment_mapping(
  dem,
  road_vec,
  output,
  search_dist = 2.5,
  min_road_width = 6,
  typical_width = 30,
  max_height = 2,
  max_width = 60,
  max_increment = 0.05,
  spillout_slope = 4,
  remove_embankments = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

**Arguments**

| | |
|---|---|
| dem | Input raster DEM file. |
| road_vec | Input vector polygons file. |
| output | Output raster file. |
| search_dist | Search distance used to reposition transportation vectors onto road embankments (in map units). |
| min_road_width | Minimum road width; this is the width of the paved road surface (in map units). |
| typical_width | Typical embankment width; this is the maximum width of an embankment with roadside ditches (in map units). |
| max_height | Typical embankment maximum height; this is the height a typical embankment with roadside ditches (in map units). |
| max_width | Maximum embankment width, typically where embankments traverse steep-sided valleys (in map units). |
| max_increment | Maximum upwards increment between neighbouring cells on an embankment (in elevation units). |
| spillout_slope | Spillout slope (in degrees). |
| remove_embankments | Optional flag indicating whether to output a DEM with embankments removed (true) or an embankment raster map (false). |
| wd | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |

compress_rasters

          Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details.

command_only      Return command that would be executed by system() rather than running tool. Default: FALSE.

## Value

Returns the tool text outputs.

---

wbt_emboss_filter        *Emboss filter*

---

## Description

Performs an emboss filter on an image, similar to a hillshade operation.

## Usage

```
wbt_emboss_filter(
  input,
  output,
  direction = "n",
  clip = 0,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

input              Input raster file path. See wbt_file_path() for details.

output           Output raster file.

direction        Direction of reflection; options include 'n', 's', 'e', 'w', 'ne', 'se', 'nw', 'sw'.

clip               Optional amount to clip the distribution tails by, in percent.

wd                 Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see wbt_wd() for details.

verbose_mode     Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details.

compress_rasters

          Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details.

command_only      Return command that would be executed by system() rather than running tool. Default: FALSE.

## Value

Returns the tool text outputs.

---

| | |
|---|---|
| wbt_equal_to | *Equal to* |

---

## Description

Performs a equal-to comparison operation on two rasters or a raster and a constant value.

## Usage

```
wbt_equal_to(
  input1,
  input2,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input1 | Input raster file or constant value. |
| input2 | Input raster file or constant value. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

wbt_erase                    *Erase*

### Description

Removes all the features, or parts of features, that overlap with the features of the erase vector polygon.

### Usage

```
wbt_erase(
  input,
  erase,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input vector file path. See wbt_file_path() for details. |
| erase | Input erase polygon vector file. |
| output | Output vector file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_erase_polygon_from_lidar

*Erase polygon from lidar*

## Description

Erases (cuts out) a vector polygon or polygons from a LiDAR point cloud.

## Usage

```
wbt_erase_polygon_from_lidar(
  input,
  polygons,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input LiDAR file. |
| polygons | Input vector polygons file. |
| output | Output LiDAR file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_erase_polygon_from_raster

*Erase polygon from raster*

---

### Description

Erases (cuts out) a vector polygon from a raster.

### Usage

```
wbt_erase_polygon_from_raster(
  input,
  polygons,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| polygons | Input vector polygons file. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_euclidean_allocation

*Euclidean allocation*

## Description

Assigns grid cells in the output raster the value of the nearest target cell in the input image, measured by the Shih and Wu (2004) Euclidean distance transform.

## Usage

```
wbt_euclidean_allocation(
  input,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_euclidean_distance

*Euclidean distance*

---

### Description

Calculates the Shih and Wu (2004) Euclidean distance transform.

### Usage

```
wbt_euclidean_distance(
  input,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_evaluate_training_sites

*Evaluate training sites*

### Description

This tool can be used to inspect the overlap in spectral signatures of training sites for various classes.

### Usage

```
wbt_evaluate_training_sites(
  inputs,
  polys,
  field,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| inputs | Name of the input band images. |
| polys | Name of the input training site polygons shapefile. |
| field | Name of the attribute containing class name data. |
| output | Name of the output report file (*.html). |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

---

wbt_exp *Exp*

---

### Description

Returns the exponential (base e) of values in a raster.

### Usage

```
wbt_exp(
  input,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

| wbt_exp2 | *Exp2* |
|----------|--------|

## Description

Returns the exponential (base 2) of values in a raster.

## Usage

```
wbt_exp2(
  input,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

wbt_export_table_to_csv

*Export table to csv*

## Description

Exports an attribute table to a CSV text file.

## Usage

```
wbt_export_table_to_csv(
  input,
  output,
  headers = TRUE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input vector file path. See wbt_file_path() for details. |
| output | Output csv file. |
| headers | Export field names as file header?. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

wbt_exposure_towards_wind_flux

*Exposure towards wind flux*

### Description

Evaluates hydrologic connectivity within a DEM.

### Usage

```
wbt_exposure_towards_wind_flux(
  dem,
  output,
  azimuth = "",
  max_dist = "",
  zfactor = "",
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| dem | Name of the input DEM raster file. |
| output | Name of the output raster file. |
| azimuth | Wind azimuth, in degrees. |
| max_dist | Optional maximum search distance. Minimum value is 5 x cell size. |
| zfactor | Optional multiplier for when the vertical and horizontal units are not the same. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

---

wbt_extend_vector_lines

*Extend vector lines*

---

### Description

Extends vector lines by a specified distance.

### Usage

```
wbt_extend_vector_lines(
  input,
  output,
  dist,
  extend = "both ends",
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input vector polyline file. |
| output | Output vector polyline file. |
| dist | The distance to extend. |
| extend | Extend direction, 'both ends' (default), 'line start', 'line end'. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_extract_nodes          *Extract nodes*

## Description

Converts vector lines or polygons into vertex points.

## Usage

```
wbt_extract_nodes(
  input,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input vector lines or polygon file. |
| output | Output vector points file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_extract_raster_values_at_points
*Extract raster values at points*

---

### Description

Extracts the values of raster(s) at vector point locations.

### Usage

```
wbt_extract_raster_values_at_points(
  inputs,
  points,
  out_text = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| inputs | Input raster file paths, concatenated with ", " or "; ". See wbt_file_path() for details. |
| points | Input vector points file. |
| out_text | Output point values as text? Otherwise, the only output is to to the points file's attribute table. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

## Description

Extracts stream grid cells from a flow accumulation raster.

## Usage

```
wbt_extract_streams(
  flow_accum,
  output,
  threshold,
  zero_background = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| flow_accum | Input raster D8 flow accumulation file. |
| output | Output raster file. |
| threshold | Threshold in flow accumulation values for channelization. |
| zero_background | Flag indicating whether a background value of zero should be used. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

wbt_extract_valleys      *Extract valleys*

### Description

Identifies potential valley bottom grid cells based on local topolography alone.

### Usage

```
wbt_extract_valleys(
  dem,
  output,
  variant = "LQ",
  line_thin = TRUE,
  filter = 5,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| output | Output raster file. |
| variant | Options include 'LQ' (lower quartile), 'JandR' (Johnston and Rosenfeld), and 'PandD' (Peucker and Douglas); default is 'LQ'. |
| line_thin | Optional flag indicating whether post-processing line-thinning should be performed. |
| filter | Optional argument (only used when variant='lq') providing the filter size, in grid cells, used for lq-filtering (default is 5). |
| wd | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

---

wbt_farthest_channel_head

*Farthest channel head*

---

### Description

Calculates the distance to the furthest upstream channel head for each stream cell.

### Usage

```
wbt_farthest_channel_head(
  d8_pntr,
  streams,
  output,
  esri_pntr = FALSE,
  zero_background = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| d8_pntr | Input raster D8 pointer file. |
| streams | Input raster streams file. |
| output | Output raster file. |
| esri_pntr | D8 pointer uses the ESRI style scheme. |
| zero_background | |
| | Flag indicating whether a background value of zero should be used. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_fast_almost_gaussian_filter
*Fast almost gaussian filter*

### Description

Performs a fast approximate Gaussian filter on an image.

### Usage

```
wbt_fast_almost_gaussian_filter(
  input,
  output,
  sigma = 1.8,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| output | Output raster file. |
| sigma | Standard deviation distance in pixels. |
| wd | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_fd8_flow_accumulation

*Fd8 flow accumulation*

## Description

Calculates an FD8 flow accumulation raster from an input DEM.

## Usage

```
wbt_fd8_flow_accumulation(
  dem,
  output,
  out_type = "specific contributing area",
  exponent = 1.1,
  threshold = NULL,
  log = FALSE,
  clip = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| output | Output raster file. |
| out_type | Output type; one of 'cells', 'specific contributing area' (default), and 'catchment area'. |
| exponent | Optional exponent parameter; default is 1.1. |
| threshold | Optional convergence threshold parameter, in grid cells; default is infinity. |
| log | Optional flag to request the output be log-transformed. |
| clip | Optional flag to request clipping the display max by 1 percent. |
| wd | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

**Value**

Returns the tool text outputs.

---

wbt_fd8_pointer                *Fd8 pointer*

---

**Description**

Calculates an FD8 flow pointer raster from an input DEM.

**Usage**

```
wbt_fd8_pointer(
  dem,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

**Arguments**

| | |
|---|---|
| dem | Input raster DEM file. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

**Value**

Returns the tool text outputs.

wbt_feature_preserving_smoothing

*Feature preserving smoothing*

### Description

Reduces short-scale variation in an input DEM using a modified Sun et al. (2007) algorithm.

### Usage

```
wbt_feature_preserving_smoothing(
  dem,
  output,
  filter = 11,
  norm_diff = 15,
  num_iter = 3,
  max_diff = 0.5,
  zfactor = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| output | Output raster file. |
| filter | Size of the filter kernel. |
| norm_diff | Maximum difference in normal vectors, in degrees. |
| num_iter | Number of iterations. |
| max_diff | Maximum allowable absolute elevation change (optional). |
| zfactor | Optional multiplier for when the vertical and horizontal units are not the same. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_fetch_analysis        *Fetch analysis*

---

## Description

Performs an analysis of fetch or upwind distance to an obstacle.

## Usage

```
wbt_fetch_analysis(
  dem,
  output,
  azimuth = 0,
  hgt_inc = 0.05,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| output | Output raster file. |
| azimuth | Wind azimuth in degrees in degrees. |
| hgt_inc | Height increment value. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

| wbt_file_path | *Prepare File Paths for WhiteboxTools Commands* |

## Description

Performs path expansion with `path.expand()` and shell quotes with `shQuote()` the input paths.

## Usage

```
wbt_file_path(x, shell_quote = TRUE, delimiter = ",", check_exists = FALSE)
```

## Arguments

| | |
|---|---|
| x | character or `terra` object. Vector of file paths or strings of file paths for passing as arguments to WhiteboxTools. If the object is of class `SpatRaster`, `SpatRasterCollection`, `SpatVector` or `SpatVectorProxy` the sources are extracted with `terra::sources()` |
| shell_quote | logical. Shell quotes around result? Default: TRUE |
| delimiter | character. Either `","` (default) or `";"` allowed by WhiteboxTools. |
| check_exists | logical. Check if file(s) in x exist? Useful for input values. Default: FALSE |

## Details

If an input vector contains `";"` or `","` this is considered, path expansion is performed on the substrings. If the input vector has length greater than 1, the vector is concatenated with `","` or `";"` to create a single output string.

## Value

character. Length 1. A safe input string for use in WhiteboxTools commands, with paths expanded and concatenated, if necessary, and optionally shell quoted.

## Examples

```
wbt_file_path("./abc.tif")

wbt_file_path("./abc.tif;./def.tif")

wbt_file_path("./abc.tif,./def.tif")

wbt_file_path(c("./abc.tif", "./def.tif"))

wbt_file_path("~/abc.tif", shell_quote = FALSE)

wbt_file_path(c("~/abc.tif", "~/def.tif"))
```

wbt_fill_burn                    *Fill burn*

### Description

Burns streams into a DEM using the FillBurn (Saunders, 1999) method.

### Usage

```
wbt_fill_burn(
  dem,
  streams,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| streams | Input vector streams file. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_fill_depressions      *Fill depressions*

### Description

Fills all of the depressions in a DEM. Depression breaching should be preferred in most cases.

### Usage

```
wbt_fill_depressions(
  dem,
  output,
  fix_flats = TRUE,
  flat_increment = NULL,
  max_depth = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| output | Output raster file. |
| fix_flats | Optional flag indicating whether flat areas should have a small gradient applied. |
| flat_increment | Optional elevation increment applied to flat areas. |
| max_depth | Optional maximum depression depth to fill. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_fill_depressions_planchon_and_darboux

*Fill depressions planchon and darboux*

#### Description

Fills all of the depressions in a DEM using the Planchon and Darboux (2002) method.

#### Usage

```
wbt_fill_depressions_planchon_and_darboux(
  dem,
  output,
  fix_flats = TRUE,
  flat_increment = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

#### Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| output | Output raster file. |
| fix_flats | Optional flag indicating whether flat areas should have a small gradient applied. |
| flat_increment | Optional elevation increment applied to flat areas. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

#### Value

Returns the tool text outputs.

wbt_fill_depressions_wang_and_liu
*Fill depressions wang and liu*

### Description

Fills all of the depressions in a DEM using the Wang and Liu (2006) method. Depression breaching should be preferred in most cases.

### Usage

```
wbt_fill_depressions_wang_and_liu(
  dem,
  output,
  fix_flats = TRUE,
  flat_increment = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| output | Output raster file. |
| fix_flats | Optional flag indicating whether flat areas should have a small gradient applied. |
| flat_increment | Optional elevation increment applied to flat areas. |
| wd | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_fill_missing_data    *Fill missing data*

### Description

Fills NoData holes in a DEM.

### Usage

```
wbt_fill_missing_data(
  input,
  output,
  filter = 11,
  weight = 2,
  no_edges = TRUE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| output | Output raster file. |
| filter | Filter size (cells). |
| weight | IDW weight value. |
| no_edges | Optional flag indicating whether to exclude NoData cells in edge regions. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_fill_single_cell_pits

*Fill single cell pits*

## Description

Raises pit cells to the elevation of their lowest neighbour.

## Usage

```
wbt_fill_single_cell_pits(
  dem,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

dem              Input raster DEM file.

output           Output raster file.

wd               Changes the working directory. Default: NULL will use the value in Whitebox-
                 Tools settings, see wbt_wd() for details.

verbose_mode     Sets verbose mode. If verbose mode is FALSE, tools will not print output mes-
                 sages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose()
                 for details.

compress_rasters
                 Sets the flag used by 'WhiteboxTools' to determine whether to use compression
                 for output rasters. Default: NULL will use the value in WhiteboxTools settings,
                 see wbt_compress_rasters() for details.

command_only     Return command that would be executed by system() rather than running tool.
                 Default: FALSE.

## Value

Returns the tool text outputs.

wbt_filter_lidar               *Filter lidar*

## Description

Filters points within a LiDAR point cloud based on point properties.

## Usage

```
wbt_filter_lidar(
  input,
  output = NULL,
  statement = "",
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Name of the input LiDAR points. |
| output | Name of the output LiDAR points. |
| statement | Filter statement e.g. x < 5000.0 && y > 100.0 && is_late && !is_noise. This statement must be a valid Rust statement. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

```
wbt_filter_lidar_classes
```
*Filter lidar classes*

## Description

Removes points in a LAS file with certain specified class values.

## Usage

```
wbt_filter_lidar_classes(
  input,
  output,
  exclude_cls = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| `input` | Input LiDAR file. |
| `output` | Output LiDAR file. |
| `exclude_cls` | Optional exclude classes from interpolation; Valid class values range from 0 to 18, based on LAS specifications. Example, –exclude_cls='3,4,5,6,7,18'. |
| `wd` | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see `wbt_wd()` for details. |
| `verbose_mode` | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| `compress_rasters` | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| `command_only` | Return command that would be executed by `system()` rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

```
wbt_filter_lidar_scan_angles
```
*Filter lidar scan angles*

### Description

Removes points in a LAS file with scan angles greater than a threshold.

### Usage

```
wbt_filter_lidar_scan_angles(
  input,
  output,
  threshold,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input LiDAR file. |
| output | Output LiDAR file. |
| threshold | Scan angle threshold. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

---

wbt_filter_raster_features_by_area
*Filter raster features by area*

---

## Description

Removes small-area features from a raster.

## Usage

```
wbt_filter_raster_features_by_area(
  input,
  output,
  threshold,
  background = "zero",
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| output | Output raster file. |
| threshold | Remove features with fewer grid cells than this threshold value. |
| background | Background value. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

```
wbt_find_flightline_edge_points
```
                              *Find flightline edge points*

---

## Description

Identifies points along a flightline's edge in a LAS file.

## Usage

```
wbt_find_flightline_edge_points(
  input,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input LiDAR file. |
| output | Output file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

wbt_find_lowest_or_highest_points
*Find lowest or highest points*

## Description

Locates the lowest and/or highest valued cells in a raster.

## Usage

```
wbt_find_lowest_or_highest_points(
  input,
  output,
  out_type = "lowest",
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| output | Output vector points file. |
| out_type | Output type; one of 'area' (default) and 'volume'. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

| | |
|---|---|
| wbt_find_main_stem | *Find main stem* |

### Description

Finds the main stem, based on stream lengths, of each stream network.

### Usage

```
wbt_find_main_stem(
  d8_pntr,
  streams,
  output,
  esri_pntr = FALSE,
  zero_background = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| d8_pntr | Input raster D8 pointer file. |
| streams | Input raster streams file. |
| output | Output raster file. |
| esri_pntr | D8 pointer uses the ESRI style scheme. |
| zero_background | |
| | Flag indicating whether a background value of zero should be used. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_find_no_flow_cells

*Find no flow cells*

## Description

Finds grid cells with no downslope neighbours.

## Usage

```
wbt_find_no_flow_cells(
  dem,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

```
wbt_find_parallel_flow
```
*Find parallel flow*

### Description

Finds areas of parallel flow in D8 flow direction rasters.

### Usage

```
wbt_find_parallel_flow(
  d8_pntr,
  streams,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| d8_pntr | Input D8 pointer raster file. |
| streams | Input raster streams file. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_find_patch_or_class_edge_cells

*Find patch or class edge cells*

## Description

Finds all cells located on the edge of patch or class features.

## Usage

```
wbt_find_patch_or_class_edge_cells(
  input,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

wbt_find_ridges *Find ridges*

## Description

Identifies potential ridge and peak grid cells.

## Usage

```
wbt_find_ridges(
  dem,
  output,
  line_thin = TRUE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| output | Output raster file. |
| line_thin | Optional flag indicating whether post-processing line-thinning should be performed. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

wbt_fix_dangling_arcs    *Fix dangling arcs*

## Description

This tool fixes undershot and overshot arcs, two common topological errors, in an input vector lines file.

## Usage

```
wbt_fix_dangling_arcs(
  input,
  output,
  dist = "",
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Name of the input lines vector file. |
| output | Name of the output lines vector file. |
| dist | Snap distance, in xy units (metres). |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_flatten_lakes          *Flatten lakes*

---

### Description

Flattens lake polygons in a raster DEM.

### Usage

```
wbt_flatten_lakes(
  dem,
  lakes,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| lakes | Input lakes vector polygons file. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

## wbt_flightline_overlap

*Flightline overlap*

### Description

Reads a LiDAR (LAS) point file and outputs a raster containing the number of overlapping flight-lines in each grid cell.

### Usage

```
wbt_flightline_overlap(
  input,
  output = NULL,
  resolution = 1,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input LiDAR file. |
| output | Output file. |
| resolution | Output raster's grid resolution. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

---

wbt_flip_image                *Flip image*

---

### Description

Reflects an image in the vertical or horizontal axis.

### Usage

```
wbt_flip_image(
  input,
  output,
  direction = "vertical",
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| output | Output raster file. |
| direction | Direction of reflection; options include 'v' (vertical), 'h' (horizontal), and 'b' (both). |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_flood_order          *Flood order*

## Description

Assigns each DEM grid cell its order in the sequence of inundations that are encountered during a search starting from the edges, moving inward at increasing elevations.

## Usage

```
wbt_flood_order(
  dem,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_floor                          *Floor*

---

### Description

Returns the largest (closest to positive infinity) value that is less than or equal to the values in a raster.

### Usage

```
wbt_floor(
  input,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_flow_accumulation_full_workflow

*Flow accumulation full workflow*

**Description**

Resolves all of the depressions in a DEM, outputting a breached DEM, an aspect-aligned non-divergent flow pointer, and a flow accumulation raster.

**Usage**

```
wbt_flow_accumulation_full_workflow(
  dem,
  out_dem,
  out_pntr,
  out_accum,
  out_type = "Specific Contributing Area",
  log = FALSE,
  clip = FALSE,
  esri_pntr = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

**Arguments**

| | |
|---|---|
| dem | Input raster DEM file. |
| out_dem | Output raster DEM file. |
| out_pntr | Output raster flow pointer file. |
| out_accum | Output raster flow accumulation file. |
| out_type | Output type; one of 'cells', 'sca' (default), and 'ca'. |
| log | Optional flag to request the output be log-transformed. |
| clip | Optional flag to request clipping the display max by 1 percent. |
| esri_pntr | D8 pointer uses the ESRI style scheme. |
| wd | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |

command_only      Return command that would be executed by system() rather than running tool.
                  Default: FALSE.

## Value

Returns the tool text outputs.

---

wbt_flow_length_diff      *Flow length diff*

---

## Description

Calculates the local maximum absolute difference in downslope flowpath length, useful in mapping
drainage divides and ridges.

## Usage

```
wbt_flow_length_diff(
  d8_pntr,
  output,
  esri_pntr = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

d8_pntr           Input D8 pointer raster file.

output            Output raster file.

esri_pntr         D8 pointer uses the ESRI style scheme.

wd                Changes the working directory. Default: NULL will use the value in Whitebox-
                  Tools settings, see wbt_wd() for details.

verbose_mode      Sets verbose mode. If verbose mode is FALSE, tools will not print output mes-
                  sages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose()
                  for details.

compress_rasters

                  Sets the flag used by 'WhiteboxTools' to determine whether to use compression
                  for output rasters. Default: NULL will use the value in WhiteboxTools settings,
                  see wbt_compress_rasters() for details.

command_only      Return command that would be executed by system() rather than running tool.
                  Default: FALSE.

## Value

Returns the tool text outputs.

wbt_gamma_correction    *Gamma correction*

## Description

Performs a gamma correction on an input images.

## Usage

```
wbt_gamma_correction(
  input,
  output,
  gamma = 0.5,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input raster file path. See `wbt_file_path()` for details. |
| output | Output raster file. |
| gamma | Gamma value. |
| wd | Changes the working directory. Default: `NULL` will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| verbose_mode | Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| command_only | Return command that would be executed by `system()` rather than running tool. Default: `FALSE`. |

## Value

Returns the tool text outputs.

---

`wbt_gaussian_contrast_stretch`

*Gaussian contrast stretch*

---

#### Description

Performs a Gaussian contrast stretch on input images.

#### Usage

```
wbt_gaussian_contrast_stretch(
  input,
  output,
  num_tones = 256,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

#### Arguments

| | |
|---|---|
| `input` | Input raster file path. See `wbt_file_path()` for details. |
| `output` | Output raster file. |
| `num_tones` | Number of tones in the output image. |
| `wd` | Changes the working directory. Default: `NULL` will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| `verbose_mode` | Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| `compress_rasters` | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| `command_only` | Return command that would be executed by `system()` rather than running tool. Default: `FALSE`. |

#### Value

Returns the tool text outputs.

wbt_gaussian_curvature

*Gaussian curvature*

### Description

Calculates a mean curvature raster from an input DEM.

### Usage

```
wbt_gaussian_curvature(
  dem,
  output,
  log = FALSE,
  zfactor = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| output | Output raster file. |
| log | Display output values using a log-scale. |
| zfactor | Optional multiplier for when the vertical and horizontal units are not the same. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

---

wbt_gaussian_filter          *Gaussian filter*

---

**Description**

Performs a Gaussian filter on an image.

**Usage**

```
wbt_gaussian_filter(
  input,
  output,
  sigma = 0.75,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

**Arguments**

input              Input raster file path. See wbt_file_path() for details.

output             Output raster file.

sigma              Standard deviation distance in pixels.

wd                 Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details.

verbose_mode       Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details.

compress_rasters
                   Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details.

command_only       Return command that would be executed by system() rather than running tool. Default: FALSE.

**Value**

Returns the tool text outputs.

wbt_gaussian_scale_space

*Gaussian scale space*

### Description

Uses the fast Gaussian approximation algorithm to produce scaled land-surface parameter measurements from an input DEM.

### Usage

```
wbt_gaussian_scale_space(
  dem,
  output,
  output_zscore,
  output_scale,
  points = NULL,
  sigma = 0.5,
  step = 0.5,
  num_steps = 10,
  lsp = "Slope",
  z_factor = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| dem | Name of the input DEM raster file. |
| output | Name of the output land-surface parameter raster file. |
| output_zscore | Name of the output z-score raster file. |
| output_scale | Name of the output scale raster file. |
| points | Name of the input vector points shapefile. |
| sigma | Initial sigma value (cells). |
| step | Step size as any positive non-zero integer. |
| num_steps | Number of steps. |
| lsp | Output land-surface parameter; one of 'AnisotropyLTP', 'Aspect', 'DiffMeanElev', 'Eastness', 'Elevation', 'Hillshade', 'MeanCurvature', 'Northness', 'PlanCurvature', 'ProfileCurvature', 'Ruggedness', 'Slope', 'TanCurvature', 'TotalCurvature'. |
| z_factor | Optional multiplier for when the vertical and horizontal units are not the same. |

| | |
|---|---|
| wd | Changes the working directory. Default: `NULL` will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| verbose_mode | Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| command_only | Return command that would be executed by `system()` rather than running tool. Default: `FALSE`. |

## Value

Returns the tool text outputs.

---

wbt_generalize_classified_raster

*Generalize classified raster*

---

## Description

Generalizes a raster containing class or object features by removing small features.

## Usage

```
wbt_generalize_classified_raster(
  input,
  output,
  min_size = 4,
  method = "longest",
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Name of the input raster image file. |
| output | Name of the output raster file. |
| min_size | Minimum feature size, in grid cells. |
| method | Grouping method; one of 'longest' (default), 'largest', and 'nearest'. |
| wd | Changes the working directory. Default: `NULL` will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |

verbose_mode    Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see `wbt_verbose()` for details.

compress_rasters

           Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details.

command_only    Return command that would be executed by `system()` rather than running tool. Default: FALSE.

## Value

Returns the tool text outputs.

---

wbt_generalize_with_similarity

*Generalize with similarity*

---

## Description

Generalizes a raster containing class or object features by removing small features using similarity criteria of neighbouring features.

## Usage

```
wbt_generalize_with_similarity(
  input,
  similarity,
  output,
  min_size = 4,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Name of the input raster image file. |
| similarity | Names of the input similarity images. |
| output | Name of the output raster file. |
| min_size | Minimum feature size, in grid cells. |
| wd | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see `wbt_wd()` for details. |

verbose_mode    Sets verbose mode. If verbose mode is FALSE, tools will not print output mes-
                sages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose()
                for details.

compress_rasters

                Sets the flag used by 'WhiteboxTools' to determine whether to use compression
                for output rasters. Default: NULL will use the value in WhiteboxTools settings,
                see wbt_compress_rasters() for details.

command_only    Return command that would be executed by system() rather than running tool.
                Default: FALSE.

## Value

Returns the tool text outputs.

---

wbt_generating_function

*Generating function*

---

## Description

This tool calculates generating function from an input DEM.

## Usage

```
wbt_generating_function(
  dem,
  output,
  log = FALSE,
  zfactor = 1,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

dem             Name of the input raster DEM file.

output          Name of the output raster image file.

log             Display output values using a log-scale.

zfactor         Z conversion factor.

wd              Changes the working directory. Default: NULL will use the value in Whitebox-
                Tools settings, see wbt_wd() for details.

verbose_mode    Sets verbose mode. If verbose mode is FALSE, tools will not print output mes-
                sages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose()
                for details.

compress_rasters

> Sets the flag used by 'WhiteboxTools' to determine whether to use compression
> for output rasters. Default: `NULL` will use the value in WhiteboxTools settings,
> see `wbt_compress_rasters()` for details.

command_only     Return command that would be executed by `system()` rather than running tool.
                 Default: `FALSE`.

## Value

Returns the tool text outputs.

---

wbt_geomorphons                 *Geomorphons*

---

## Description

Computes geomorphon patterns.

## Usage

```
wbt_geomorphons(
  dem,
  output,
  search = 50,
  threshold = 0,
  fdist = 0,
  skip = 0,
  forms = TRUE,
  residuals = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

dem              Input raster DEM file.

output           Output raster file.

search           Look up distance (in cells).

threshold        Flatness threshold for the classification function (in degrees).

fdist            Distance (in cells) to begin reducing the flatness threshold to avoid problems
                 with pseudo-flat lines-of-sight.

skip             Distance (in cells) to begin calculating lines-of-sight.

forms            Classify geomorphons into 10 common land morphologies, else output ternary
                 pattern.

residuals              Convert elevation to residuals of a linear model.

wd                     Changes the working directory. Default: `NULL` will use the value in Whitebox-
                       Tools settings, see `wbt_wd()` for details.

verbose_mode           Sets verbose mode. If verbose mode is `FALSE`, tools will not print output mes-
                       sages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()`
                       for details.

compress_rasters

                       Sets the flag used by 'WhiteboxTools' to determine whether to use compression
                       for output rasters. Default: `NULL` will use the value in WhiteboxTools settings,
                       see `wbt_compress_rasters()` for details.

command_only           Return command that would be executed by `system()` rather than running tool.
                       Default: `FALSE`.

## Value

Returns the tool text outputs.

---

wbt_greater_than              *Greater than*

---

## Description

Performs a greater-than comparison operation on two rasters or a raster and a constant value.

## Usage

```
wbt_greater_than(
  input1,
  input2,
  output,
  incl_equals = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

input1                 Input raster file or constant value.

input2                 Input raster file or constant value.

output                 Output raster file.

incl_equals            Perform a greater-than-or-equal-to operation.

wd                     Changes the working directory. Default: `NULL` will use the value in Whitebox-
                       Tools settings, see `wbt_wd()` for details.

| | |
|---|---|
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_hack_stream_order    *Hack stream order*

---

## Description

Assigns the Hack stream order to each tributary in a stream network.

## Usage

```
wbt_hack_stream_order(
  d8_pntr,
  streams,
  output,
  esri_pntr = FALSE,
  zero_background = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| d8_pntr | Input raster D8 pointer file. |
| streams | Input raster streams file. |
| output | Output raster file. |
| esri_pntr | D8 pointer uses the ESRI style scheme. |
| zero_background | |
| | Flag indicating whether a background value of zero should be used. |
| wd | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see wbt_wd() for details. |

| verbose_mode | Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| command_only | Return command that would be executed by `system()` rather than running tool. Default: `FALSE`. |

## Value

Returns the tool text outputs.

---

wbt_heat_map                              *Heat map*

---

## Description

Calculates a heat map, or kernel density estimation (KDE), for an input point set.

## Usage

```
wbt_heat_map(
  input,
  output,
  weight_field = NULL,
  bandwidth = "",
  kernel = "quartic",
  cell_size = "",
  base = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| input | Name of the input points shapefile. |
| output | Name of the output raster image file. |
| weight_field | Optional name of the attribute containing point weight. |
| bandwidth | Bandwidth (metres). |
| kernel | Kernel type; one of 'uniform', 'triangular', 'epanechnikov', 'quartic', 'triweight', 'tricube', 'gaussian', 'cosine', 'logistic', 'sigmoid', 'silverman'. |

cell_size Optionally specified cell size of output raster, in metres. Not used when base raster is specified.

base Optionally specified input base raster file. Not used when a cell size is specified.

wd Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details.

verbose_mode Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details.

compress_rasters

Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details.

command_only Return command that would be executed by system() rather than running tool. Default: FALSE.

## Value

Returns the tool text outputs.

---

wbt_height_above_ground

*Height above ground*

---

## Description

Normalizes a LiDAR point cloud, providing the height above the nearest ground-classified point.

## Usage

```
wbt_height_above_ground(
  input,
  output = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

input Input LiDAR file (including extension).

output Output lidar file (including extension).

wd Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details.

| | |
|---|---|
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_help                                 *Help description for 'WhiteboxTools'*

---

## Description

Help description for 'WhiteboxTools'

## Usage

```
wbt_help()
```

## Value

Returns the help description for 'WhiteboxTools' as an R character vector.

## Examples

```
## Not run:
wbt_help()

## End(Not run)
```

wbt_highest_position     *Highest position*

## Description

Identifies the stack position of the maximum value within a raster stack on a cell-by-cell basis.

## Usage

```
wbt_highest_position(
  inputs,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| inputs | Input raster file paths, concatenated with `","` or `";"`. See `wbt_file_path()` for details. |
| output | Output raster file. |
| wd | Changes the working directory. Default: `NULL` will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| verbose_mode | Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| command_only | Return command that would be executed by `system()` rather than running tool. Default: `FALSE`. |

## Value

Returns the tool text outputs.

---

wbt_high_pass_bilateral_filter
*High pass bilateral filter*

---

### Description

Performs a high-pass bilateral filter, by differencing an input image by the bilateral filter by Tomasi and Manduchi (1998).

### Usage

```
wbt_high_pass_bilateral_filter(
  input,
  output,
  sigma_dist = 0.75,
  sigma_int = 1,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| output | Output raster file. |
| sigma_dist | Standard deviation in distance in pixels. |
| sigma_int | Standard deviation in intensity in pixels. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

---

wbt_high_pass_filter    *High pass filter*

---

## Description

Performs a high-pass filter on an input image.

## Usage

```
wbt_high_pass_filter(
  input,
  output,
  filterx = 11,
  filtery = 11,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| output | Output raster file. |
| filterx | Size of the filter kernel in the x-direction. |
| filtery | Size of the filter kernel in the y-direction. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

wbt_high_pass_median_filter
*High pass median filter*

### Description

Performs a high pass median filter on an input image.

### Usage

```
wbt_high_pass_median_filter(
  input,
  output,
  filterx = 11,
  filtery = 11,
  sig_digits = 2,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| output | Output raster file. |
| filterx | Size of the filter kernel in the x-direction. |
| filtery | Size of the filter kernel in the y-direction. |
| sig_digits | Number of significant digits. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

| wbt_hillshade | *Hillshade* |
|---|---|

## Description

Calculates a hillshade raster from an input DEM.

## Usage

```
wbt_hillshade(
  dem,
  output,
  azimuth = 315,
  altitude = 30,
  zfactor = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| output | Output raster file. |
| azimuth | Illumination source azimuth in degrees. |
| altitude | Illumination source altitude in degrees. |
| zfactor | Optional multiplier for when the vertical and horizontal units are not the same. |
| wd | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_hillslopes                  *Hillslopes*

---

### Description

Identifies the individual hillslopes draining to each link in a stream network.

### Usage

```
wbt_hillslopes(
  d8_pntr,
  streams,
  output,
  esri_pntr = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| d8_pntr | Input raster D8 pointer file. |
| streams | Input raster streams file. |
| output | Output raster file. |
| esri_pntr | D8 pointer uses the ESRI style scheme. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

---

```
wbt_histogram_equalization
```
*Histogram equalization*

---

### Description

Performs a histogram equalization contrast enhancement on an image.

### Usage

```
wbt_histogram_equalization(
  input,
  output,
  num_tones = 256,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input raster file path. See `wbt_file_path()` for details. |
| output | Output raster file. |
| num_tones | Number of tones in the output image. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| command_only | Return command that would be executed by `system()` rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_histogram_matching

*Histogram matching*

### Description

Alters the statistical distribution of a raster image matching it to a specified PDF.

### Usage

```
wbt_histogram_matching(
  input,
  histo_file,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| histo_file | Input reference probability distribution function (pdf) text file. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_histogram_matching_two_images

*Histogram matching two images*

## Description

Alters the cumulative distribution function of a raster image to that of another image.

## Usage

```
wbt_histogram_matching_two_images(
  input1,
  input2,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input1 | Input raster file to modify. |
| input2 | Input reference raster file. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

wbt_hole_proportion																*Hole proportion*

### Description

Calculates the proportion of the total area of a polygon's holes relative to the area of the polygon's hull.

### Usage

```
wbt_hole_proportion(
  input,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input vector polygon file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

---

wbt_horizontal_excess_curvature

*Horizontal excess curvature*

---

## Description

This tool calculates horizontal excess curvature from an input DEM.

## Usage

```
wbt_horizontal_excess_curvature(
  dem,
  output,
  log = FALSE,
  zfactor = 1,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| dem | Name of the input raster DEM file. |
| output | Name of the output raster image file. |
| log | Display output values using a log-scale. |
| zfactor | Z conversion factor. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_horizon_angle          *Horizon angle*

---

### Description

Calculates horizon angle (maximum upwind slope) for each grid cell in an input DEM.

### Usage

```
wbt_horizon_angle(
  dem,
  output,
  azimuth = 0,
  max_dist = 100,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| output | Output raster file. |
| azimuth | Azimuth, in degrees. |
| max_dist | Optional maximum search distance (unspecified if none; in xy units). Minimum value is 5 x cell size. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_horton_stream_order

*Horton stream order*

## Description

Assigns the Horton stream order to each tributary in a stream network.

## Usage

```
wbt_horton_stream_order(
  d8_pntr,
  streams,
  output,
  esri_pntr = FALSE,
  zero_background = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| d8_pntr | Input raster D8 pointer file. |
| streams | Input raster streams file. |
| output | Output raster file. |
| esri_pntr | D8 pointer uses the ESRI style scheme. |
| zero_background | |
| | Flag indicating whether a background value of zero should be used. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

wbt_hydrologic_connectivity

*Hydrologic connectivity*

### Description

This tool evaluates hydrologic connectivity within a DEM.

### Usage

```
wbt_hydrologic_connectivity(
  dem,
  output1,
  output2,
  exponent = 1,
  threshold = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| dem | Name of the input DEM raster file; must be depressionless. |
| output1 | Name of the output downslope unsaturated length (DUL) file. |
| output2 | Name of the output upslope disconnected saturated area (UDSA) file. |
| exponent | Optional exponent parameter; default is 1.0. |
| threshold | Optional convergence threshold parameter, in grid cells; default is infinity. |
| wd | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_hypsometrically_tinted_hillshade
*Hypsometrically tinted hillshade*

## Description

Creates an colour shaded relief image from an input DEM.

## Usage

```
wbt_hypsometrically_tinted_hillshade(
  dem,
  output,
  altitude = 45,
  hs_weight = 0.5,
  brightness = 0.5,
  atmospheric = 0,
  palette = "atlas",
  reverse = FALSE,
  zfactor = NULL,
  full_mode = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| output | Output raster file. |
| altitude | Illumination source altitude in degrees. |
| hs_weight | Weight given to hillshade relative to relief (0.0-1.0). |
| brightness | Brightness factor (0.0-1.0). |
| atmospheric | Atmospheric effects weight (0.0-1.0). |
| palette | Options include 'atlas', 'high_relief', 'arid', 'soft', 'muted', 'purple', 'viridis', 'gn_yl', 'pi_y_g', 'bl_yl_rd', and 'deep'. |
| reverse | Optional flag indicating whether to use reverse the palette. |
| zfactor | Optional multiplier for when the vertical and horizontal units are not the same. |
| full_mode | Optional flag indicating whether to use full 360-degrees of illumination sources. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |

| | |
|---|---|
| verbose_mode | Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| command_only | Return command that would be executed by `system()` rather than running tool. Default: `FALSE`. |

## Value

Returns the tool text outputs.

---

wbt_hypsometric_analysis

*Hypsometric analysis*

---

## Description

Calculates a hypsometric curve for one or more DEMs.

## Usage

```
wbt_hypsometric_analysis(
  inputs,
  output,
  watershed = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| inputs | Input DEM files. |
| output | Output HTML file (default name will be based on input file if unspecified). |
| watershed | Input watershed files (optional). |
| wd | Changes the working directory. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_wd()` for details. |
| verbose_mode | Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |

compress_rasters

> Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details.

command_only     Return command that would be executed by `system()` rather than running tool. Default: `FALSE`.

## Value

Returns the tool text outputs.

---

`wbt_idw_interpolation`    *Idw interpolation*

---

### Description

Interpolates vector points into a raster surface using an inverse-distance weighted scheme.

### Usage

```
wbt_idw_interpolation(
  input,
  field,
  output,
  use_z = FALSE,
  weight = 2,
  radius = NULL,
  min_points = NULL,
  cell_size = NULL,
  base = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input vector Points file. |
| field | Input field name in attribute table. |
| output | Output raster file. |
| use_z | Use z-coordinate instead of field?. |
| weight | IDW weight value. |
| radius | Search Radius in map units. |
| min_points | Minimum number of points. |

| cell_size | Optionally specified cell size of output raster. Not used when base raster is specified. |
|---|---|
| base | Optionally specified input base raster file. Not used when a cell size is specified. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_ihs_to_rgb          *Ihs to rgb*

---

## Description

Converts intensity, hue, and saturation (IHS) images into red, green, and blue (RGB) images.

## Usage

```
wbt_ihs_to_rgb(
  intensity,
  hue,
  saturation,
  red = NULL,
  green = NULL,
  blue = NULL,
  output = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| `intensity` | Input intensity file. |
| `hue` | Input hue file. |
| `saturation` | Input saturation file. |
| `red` | Output red band file. Optionally specified if colour-composite not specified. |
| `green` | Output green band file. Optionally specified if colour-composite not specified. |
| `blue` | Output blue band file. Optionally specified if colour-composite not specified. |
| `output` | Output colour-composite file. Only used if individual bands are not specified. |
| `wd` | Changes the working directory. Default: `NULL` will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| `verbose_mode` | Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| `compress_rasters` | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| `command_only` | Return command that would be executed by `system()` rather than running tool. Default: `FALSE`. |

## Value

Returns the tool text outputs.

---

`wbt_image_autocorrelation`

*Image autocorrelation*

---

## Description

Performs Moran's I analysis on two or more input images.

## Usage

```
wbt_image_autocorrelation(
  inputs,
  output,
  contiguity = "Rook",
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| `inputs` | Input raster file paths, concatenated with `","` or `";"`. See `wbt_file_path()` for details. |
| `output` | Output HTML file (default name will be based on input file if unspecified). |
| `contiguity` | Contiguity type. |
| `wd` | Changes the working directory. Default: `NULL` will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| `verbose_mode` | Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| `compress_rasters` | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| `command_only` | Return command that would be executed by `system()` rather than running tool. Default: `FALSE`. |

## Value

Returns the tool text outputs.

---

`wbt_image_correlation`   *Image correlation*

---

## Description

Performs image correlation on two or more input images.

## Usage

```
wbt_image_correlation(
  inputs,
  output = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| `inputs` | Input raster file paths, concatenated with `","` or `";"`. See `wbt_file_path()` for details. |
| `output` | Output HTML file (default name will be based on input file if unspecified). |

| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
|---|---|
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_image_correlation_neighbourhood_analysis

*Image correlation neighbourhood analysis*

---

## Description

Performs image correlation on two input images neighbourhood search windows.

## Usage

```
wbt_image_correlation_neighbourhood_analysis(
  input1,
  input2,
  output1,
  output2,
  filter = 11,
  stat = "pearson",
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| input1 | Input raster file path. See wbt_file_path() for details. |
|---|---|
| input2 | Input raster file path. See wbt_file_path() for details. |
| output1 | Output correlation (r-value or rho) raster file. |
| output2 | Output significance (p-value) raster file. |

| | |
|---|---|
| filter | Size of the filter kernel. |
| stat | Correlation type; one of 'pearson' (default) and 'spearman'. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| command_only | Return command that would be executed by `system()` rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_image_regression     *Image regression*

---

## Description

Performs image regression analysis on two input images.

## Usage

```
wbt_image_regression(
  input1,
  input2,
  output,
  out_residuals = NULL,
  standardize = FALSE,
  scattergram = FALSE,
  num_samples = 1000,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input1 | Input raster file (independent variable, X). |
| input2 | Input raster file (dependent variable, Y). |
| output | Output HTML file for regression summary report. |

| | |
|---|---|
| out_residuals | Output raster regression residual file. |
| standardize | Optional flag indicating whether to standardize the residuals map. |
| scattergram | Optional flag indicating whether to output a scattergram. |
| num_samples | Number of samples used to create scattergram. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_image_segmentation

*Image segmentation*

---

## Description

Performs a region-growing based segmentation on a set of multi-spectral images.

## Usage

```
wbt_image_segmentation(
  inputs,
  output,
  threshold = 0.5,
  steps = 10,
  min_area = 4,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| `inputs` | Names of the input band images. |
| `output` | Name of the output raster file. |
| `threshold` | Distance threshold, in z-scores. |
| `steps` | Number of steps. |
| `min_area` | Minimum object area, in grid cells (1-8). |
| `wd` | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| `verbose_mode` | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| `compress_rasters` | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| `command_only` | Return command that would be executed by `system()` rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

| `wbt_image_slider` | *Image slider* |
|---|---|

---

## Description

This tool creates an image slider from two input images.

## Usage

```
wbt_image_slider(
  input1,
  input2,
  output,
  palette1 = "grey",
  reverse1 = FALSE,
  label1 = "",
  palette2 = "grey",
  reverse2 = FALSE,
  label2 = "",
  height = 600,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| `input1` | Name of the left input image file. |
| `input2` | Name of the right input image file. |
| `output` | Name of the output HTML file (*.html). |
| `palette1` | Left image palette; options are 'grey', 'atlas', 'high_relief', 'arid', 'soft', 'muted', 'purple', 'viridi', 'gn_yl', 'pi_y_g', 'bl_yl_rd', 'deep', and 'rgb'. |
| `reverse1` | Reverse left image palette?. |
| `label1` | Left image label (leave blank for none). |
| `palette2` | Right image palette; options are 'grey', 'atlas', 'high_relief', 'arid', 'soft', 'muted', 'purple', 'viridi', 'gn_yl', 'pi_y_g', 'bl_yl_rd', 'deep', and 'rgb'. |
| `reverse2` | Reverse right image palette?. |
| `label2` | Right image label (leave blank for none). |
| `height` | Image height, in pixels. |
| `wd` | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see `wbt_wd()` for details. |
| `verbose_mode` | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| `compress_rasters` | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| `command_only` | Return command that would be executed by `system()` rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

`wbt_image_stack_profile`

*Image stack profile*

---

## Description

Plots an image stack profile (i.e. signature) for a set of points and multispectral images.

## Usage

```
wbt_image_stack_profile(
  inputs,
  points,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| inputs | Input multispectral image files. |
| points | Input vector points file. |
| output | Output HTML file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_impoundment_size_index

*Impoundment size index*

---

## Description

Calculates the impoundment size resulting from damming a DEM.

## Usage

```
wbt_impoundment_size_index(
  dem,
  damlength,
  out_mean = NULL,
  out_max = NULL,
  out_volume = NULL,
  out_area = NULL,
  out_dam_height = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| damlength | Maximum length of the dam. |
| out_mean | Output mean flooded depth file. |
| out_max | Output maximum flooded depth file. |
| out_volume | Output flooded volume file. |
| out_area | Output flooded area file. |
| out_dam_height | Output dam height file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

| | |
|---|---|
| wbt_increment | *Increment* |

### Description

Increases the values of each grid cell in an input raster by 1.0. (see also InPlaceAdd).

### Usage

```
wbt_increment(
  input,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

```
wbt_individual_tree_detection
```
*Individual tree detection*

## Description

Identifies points in a LiDAR point cloud that are associated with the tops of individual trees.

## Usage

```
wbt_individual_tree_detection(
  input,
  output = NULL,
  min_search_radius = 1,
  min_height = 0,
  max_search_radius = "",
  max_height = "",
  only_use_veg = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Name of the input LiDAR file. |
| output | Name of the output vector points file. |
| min_search_radius | |
| | Minimum search radius (m). |
| min_height | Minimum height (m). |
| max_search_radius | |
| | Maximum search radius (m). |
| max_height | Maximum height (m). |
| only_use_veg | Only use veg. class points?. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

**Value**

Returns the tool text outputs.

---

wbt_init                                   *Initialize 'WhiteboxTools'*

---

**Description**

wbt_init(): Check if a suitable 'WhiteboxTools' executable is present. Search default path in package directory or set it manually with exe_path.

wbt_options(): Get/set package options

- whitebox.exe_path - character. Path to executable file. The default value is the package installation directory, subdirectory "WBT", followed by whitebox_tools.exe or whitebox_tools. Set the whitebox.exe_path option using wbt_init() exe_path argument

- whitebox.wd - character. Path to WhiteboxTools working directory. Used as --wd argument for tools that support it when wd is not specified elsewhere.

- whitebox.verbose - logical. Should standard output from calls to executable be cat() out for readability? When whitebox.verbose=FALSE no output is produced. Set the value of whitebox.verbose with wbt_verbose() verbose argument. Default is result of interactive() if R package options are unset.

- whitebox.compress_rasters - logical. Should raster output from WhiteboxTools be compressed? Default: NULL uses existing WhiteboxTools settings. Set the value of whitebox.compress_rasters with wbt_compress_rasters() compress_rasters argument.

- whitebox.max_procs - integer. Maximum number of processes for tools that run in parallel or partially parallelize. Default: -1 uses all of the available cores.

wbt_exe_path(): Get the file path of the 'WhiteboxTools' executable.

wbt_runner_path(): Get the file path of the 'WhiteboxTools Runner' executable.

wbt_default_path(): Get the default file path of the 'WhiteboxTools' executable.

wbt_data_dir(): Get the directory where 'WhiteboxTools' data are stored.

wbt_wd(): Get or set the 'WhiteboxTools' working directory. Default: "" (unset) is your R working directory if no other options are set.

wbt_verbose(): Check verbose options for 'WhiteboxTools'

wbt_compress_rasters(): Check raster compression option for 'WhiteboxTools'. Default behavior is based on WhiteboxTools settings.json, package options (if set). Raster compression settings can be overridden in any wbt_*() function call by passing the compress_rasters argument directly.

wbt_max_procs(): Check maximum number of processes for for tools that run in parallel or partially parallelize. Default: -1 uses all of the available cores.

## Usage

```
wbt_init(
  exe_path = wbt_exe_path(shell_quote = FALSE),
  ...,
  check_version = TRUE
)

wbt_options(
  exe_path = NULL,
  wd = NULL,
  verbose = NULL,
  compress_rasters = NULL,
  max_procs = NULL
)

wbt_exe_path(exe_path = NULL, shell_quote = TRUE)

wbt_runner_path(shell_quote = TRUE)

wbt_default_path()

wbt_data_dir()

wbt_wd(wd = NULL)

wbt_verbose(verbose = NULL)

wbt_compress_rasters(compress_rasters = NULL)

wbt_max_procs(max_procs = NULL)
```

## Arguments

| | |
|---|---|
| exe_path | Optional: User-supplied path to 'WhiteboxTools' executable. Default: NULL |
| ... | additional arguments to wbt_options() |
| check_version | Check version of 'WhiteboxTools' installed against version R package was built for? Default: TRUE |
| wd | character; Default: NULL; if set the package option whitebox.wd is set specified path (if directory exists) |
| verbose | logical. Default: NULL; if TRUE or FALSE, set the package option whitebox.verbose to specified value. Tool verbosity settings can be overridden in any wbt_*() function call by passing the verbose_mode argument directly. |
| compress_rasters | |
| | logical. Default: NULL; if TRUE or FALSE, set the package option whitebox.compress_rasters to specified value. |
| max_procs | Default: NULL; if integer, set the package option whitebox.max_procs to specified value |

shell_quote          Return shQuote() result?

## Details

wbt_exe_path(): Checks system environment variable R_WHITEBOX_EXE_PATH and package option whitebox.exe_path. Set your desired path with either Sys.setenv(R_WHITEBOX_EXE_PATH = "C:/path/to/whitebox_tools.exe") or options(whitebox.exe_path = "C:/path/to/whitebox_tools.exe"). The default, backwards-compatible path is returned by wbt_default_path()

wbt_runner_path(): Returns a path to 'WhiteboxTools Runner' including a platform-specific executable (with or without .exe extension)

wbt_default_path(): Returns a path to 'WhiteboxTools' executable including a platform-specific executable (with or without .exe extension)

wbt_data_dir(): Uses platform-specific user data directory from tools::R_user_dir(package = "whitebox", which = "data") on R 4.0+. On R<4 returns the original default find.package("whitebox").

wbt_wd(): Before you set the working directory in a session the default output will be in your current R working directory unless otherwise specified. You can change working directory at any time by setting the wd argument to wbt_wd() and running a tool. Note that once you have set a working directory, the directory needs to be set somewhere to "replace" the old value; just dropping the flag will not change the working directory back to the R working directory. To "unset" the option in the R package you can use wbt_wd("") which removes the --wd flag from commands and sets the working_directory value in the WhiteboxTools *settings.json* to "".

## Value

wbt_init(): logical; TRUE if binary file is found at exe_path

wbt_options(): an invisible list containing current whitebox.exe_path, whitebox.verbose, whitebox.compress_rasters, and whitebox.max_procs options

Returns the file path of 'WhiteboxTools' executable.

wbt_wd(): character; when working directory is unset, will not add --wd= arguments to calls and should be the same as using getwd(). See Details.

wbt_verbose(): logical; returns the result of option "whitebox.verbose_mode", if unset defaults to result of interactive().

wbt_compress_rasters(): logical; returns the result of option "whitebox.compress_rasters", if unset defaults to NA.

wbt_max_procs(): integer; defaults to NA_integer_

## See Also

[install_whitebox()](#) [whitebox](#)

## Examples

```
## Not run:
## wbt_init():

# set path to binary as an argument
# wbt_init(exe_path = "not/a/valid/path/whitebox_tools.exe")
```

```
## End(Not run)
## Not run:

## wbt_options():

# set multiple options (e.g. exe_path and verbose) with wbt_options()
wbt_options(exe_path = "not/a/valid/path/whitebox_tools.exe", verbose = TRUE)


## End(Not run)
## Not run:
wbt_exe_path()

## End(Not run)
## Not run:

## wbt_wd():

# no working directory set
wbt_wd(wd = "")

# set WBT working directory to R working directory
wbt_wd(wd = getwd())

## End(Not run)
## Not run:

## wbt_verbose():

wbt_verbose(verbose = TRUE)

## End(Not run)
## Not run:

## wbt_compress_rasters():

wbt_compress_rasters(compress_rasters = TRUE)

## End(Not run)
## Not run:

## wbt_max_procs():

wbt_max_procs(max_procs = 2)

## End(Not run)
```

wbt_insert_dams          *Insert dams*

**Description**

Calculates the impoundment size resulting from damming a DEM.

**Usage**

```
wbt_insert_dams(
  dem,
  dam_pts,
  output,
  damlength,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

**Arguments**

| | |
|---|---|
| dem | Input raster DEM file. |
| dam_pts | Input vector dam points file. |
| output | Output file. |
| damlength | Maximum length of the dam. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

**Value**

Returns the tool text outputs.

---

wbt_install          *Download and Install 'WhiteboxTools'*

---

**Description**

This function downloads the 'WhiteboxTools' binary if needed. Pre-compiled binaries are only available for download for 64-bit Linux (default compiled with glibc on Ubuntu 22.04; use `platform="linux_musl"` for musl/earlier versions of glibc), Windows and Mac OS (ARM and Intel) platforms. If you need WhiteboxTools for another platform follow the instructions to build from source: `https://github.com/jblindsay/whitebox-tools`

**Usage**

```
wbt_install(
  pkg_dir = wbt_data_dir(),
  platform = NULL,
  force = FALSE,
  remove = FALSE
)

install_whitebox(
  pkg_dir = wbt_data_dir(),
  platform = NULL,
  force = FALSE,
  remove = FALSE
)

wbt_install_extension(
  extension = c("GeneralToolsetExtension", "AgricultureToolset",
    "DemAndSpatialHydrologyToolset", "LidarAndRemoteSensingToolset"),
  platform = NULL,
  destdir = dirname(wbt_exe_path(shell_quote = FALSE))
)
```

**Arguments**

| | |
|---|---|
| pkg_dir | default install path is to whitebox package "WBT" folder |
| platform | character. Optional: suffix used for alternate platform names. On Linux, you can choose "linux_amd64" (default; Linux) or "linux_musl" for older glibc versions. On macOS Darwin you can choose "darwin_amd64" (default; macOS) or "darwin_m_series" for Apple M series hardware. Note that for `wbt_install_extension()` on the Apple M series use "MacOS_ARM". Only one Windows binary is available: "win_amd64" (default; Windows). |
| force | logical. Force install? Default FALSE. When remove=TRUE passed to `unlink()` to change permissions to allow removal of files/directories. |
| remove | logical. Remove contents of "WBT" folder from pkg_dir? Default: FALSE |
| extension | Extension name |
| destdir | Directory to create /plugins/ directory for extracting extensions |

**Details**

'WhiteboxTools' and all of its extensions can be uninstalled by passing the remove=TRUE argument.

## Value

Prints out the location of the WhiteboxTools binary, if found. NULL otherwise.

## Examples

```
## Not run:
install_whitebox()

## End(Not run)
```

---

wbt_install_wb_extension
                              *Install wb extension*

---

## Description

Use to install a Whitebox extension product.

## Usage

```
wbt_install_wb_extension(
  install_extension = "General Toolset Extension",
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

install_extension

                Name of the extension product to install. Options include: 'General Toolset Extension', 'DEM & Spatial Hydrology Extension', 'Lidar & Remote Sensing Extension', and 'Agriculture Extension'.

wd                Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details.

verbose_mode    Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details.

compress_rasters

                Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details.

command_only    Return command that would be executed by system() rather than running tool. Default: FALSE.

## Value

Returns the tool text outputs.

---

wbt_integer_division    *Integer division*

---

## Description

Performs an integer division operation on two rasters or a raster and a constant value.

## Usage

```
wbt_integer_division(
  input1,
  input2,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input1 | Input raster file or constant value. |
| input2 | Input raster file or constant value. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_integral_image          *Integral image*

---

### Description

Transforms an input image (summed area table) into its integral image equivalent.

### Usage

```
wbt_integral_image(
  input,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input raster file path. See `wbt_file_path()` for details. |
| output | Output raster file. |
| wd | Changes the working directory. Default: `NULL` will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| verbose_mode | Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| command_only | Return command that would be executed by `system()` rather than running tool. Default: `FALSE`. |

### Value

Returns the tool text outputs.

---

wbt_intersect                *Intersect*

---

## Description

Identifies the parts of features in common between two input vector layers.

## Usage

```
wbt_intersect(
  input,
  overlay,
  output,
  snap = 0,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input vector file path. See wbt_file_path() for details. |
| overlay | Input overlay vector file. |
| output | Output vector file. |
| snap | Snap tolerance. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

wbt_inverse_principal_component_analysis
*Inverse principal component analysis*

### Description

This tool performs an inverse principal component analysis on a series of input component images.

### Usage

```
wbt_inverse_principal_component_analysis(
  inputs,
  report,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| inputs | Name of the input PCA component images. |
| report | Name of the PCA report file (*.html). |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

| wbt_in_place_add | *In place add* |
|---|---|

## Description

Performs an in-place addition operation (input1 += input2).

## Usage

```
wbt_in_place_add(
  input1,
  input2,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input1 | Input raster file path. See wbt_file_path() for details. |
| input2 | Input raster file or constant value. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_in_place_divide          *In place divide*

---

### Description

Performs an in-place division operation (input1 /= input2).

### Usage

```
wbt_in_place_divide(
  input1,
  input2,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input1 | Input raster file path. See wbt_file_path() for details. |
| input2 | Input raster file or constant value. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_in_place_multiply *In place multiply*

## Description

Performs an in-place multiplication operation (input1 *= input2).

## Usage

```
wbt_in_place_multiply(
  input1,
  input2,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input1 | Input raster file path. See wbt_file_path() for details. |
| input2 | Input raster file or constant value. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_in_place_subtract   *In place subtract*

---

### Description

Performs an in-place subtraction operation (input1 -= input2).

### Usage

```
wbt_in_place_subtract(
  input1,
  input2,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input1 | Input raster file path. See wbt_file_path() for details. |
| input2 | Input raster file or constant value. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

| | |
|---|---|
| wbt_isobasins | *Isobasins* |

## Description

Divides a landscape into nearly equal sized drainage basins (i.e. watersheds).

## Usage

```
wbt_isobasins(
  dem,
  output,
  size,
  connections = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| output | Output raster file. |
| size | Target basin size, in grid cells. |
| connections | Output upstream-downstream flow connections among basins?. |
| wd | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_is_no_data          *Is no data*

---

### Description

Identifies NoData valued pixels in an image.

### Usage

```
wbt_is_no_data(
  input,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_jenson_snap_pour_points

*Jenson snap pour points*

#### Description

Moves outlet points used to specify points of interest in a watershedding operation to the nearest stream cell.

#### Usage

```
wbt_jenson_snap_pour_points(
  pour_pts,
  streams,
  output,
  snap_dist,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

#### Arguments

| | |
|---|---|
| pour_pts | Input vector pour points (outlet) file. |
| streams | Input raster streams file. |
| output | Output vector file. |
| snap_dist | Maximum snap distance in map units. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

#### Value

Returns the tool text outputs.

| wbt_join_tables | *Join tables* |
|---|---|

### Description

Merge a vector's attribute table with another table based on a common field.

### Usage

```
wbt_join_tables(
  input1,
  pkey,
  input2,
  fkey,
  import_field = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input1 | Input primary vector file (i.e. the table to be modified). |
| pkey | Primary key field. |
| input2 | Input foreign vector file (i.e. source of data to be imported). |
| fkey | Foreign key field. |
| import_field | Imported field (all fields will be imported if not specified). |
| wd | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

## Description

Performs a kappa index of agreement (KIA) analysis on two categorical raster files.

## Usage

```
wbt_kappa_index(
  input1,
  input2,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input1 | Input classification raster file. |
| input2 | Input reference raster file. |
| output | Output HTML file. |
| wd | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_knn_classification

*Knn classification*

---

### Description

Performs a supervised k-nearest neighbour classification using training site polygons/points and predictor rasters.

### Usage

```
wbt_knn_classification(
  inputs,
  training,
  field,
  scaling = "Normalize",
  output = NULL,
  k = 5,
  clip = TRUE,
  test_proportion = 0.2,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| inputs | Names of the input predictor rasters. |
| training | Name of the input training site polygons/points shapefile. |
| field | Name of the attribute containing class name data. |
| scaling | Scaling method for predictors. Options include 'None', 'Normalize', and 'Standardize'. |
| output | Name of the output raster file. |
| k | k-parameter, which determines the number of nearest neighbours used. |
| clip | Perform training data clipping to remove outlier pixels?. |
| test_proportion | |
| | The proportion of the dataset to include in the test split; default is 0.2. |
| wd | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |

compress_rasters

>Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details.

command_only    Return command that would be executed by `system()` rather than running tool. Default: `FALSE`.

## Value

Returns the tool text outputs.

---

wbt_knn_regression        *Knn regression*

---

## Description

Performs a supervised k-nearest neighbour regression using training site points and predictor rasters.

## Usage

```
wbt_knn_regression(
  inputs,
  training,
  field,
  scaling = "Normalize",
  output = NULL,
  k = 5,
  weight = TRUE,
  test_proportion = 0.2,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| inputs | Names of the input predictor rasters. |
| training | Name of the input training site points Shapefile. |
| field | Name of the attribute containing response variable name data. |
| scaling | Scaling method for predictors. Options include 'None', 'Normalize', and 'Standardize'. |
| output | Name of the output raster file. |
| k | k-parameter, which determines the number of nearest neighbours used. |
| weight | Use distance weighting?. |

test_proportion

> The proportion of the dataset to include in the test split; default is 0.2.

wd                    Changes the working directory. Default: NULL will use the value in Whitebox-
                      Tools settings, see wbt_wd() for details.

verbose_mode          Sets verbose mode. If verbose mode is FALSE, tools will not print output mes-
                      sages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose()
                      for details.

compress_rasters

> Sets the flag used by 'WhiteboxTools' to determine whether to use compression
> for output rasters. Default: NULL will use the value in WhiteboxTools settings,
> see wbt_compress_rasters() for details.

command_only          Return command that would be executed by system() rather than running tool.
                      Default: FALSE.

## Value

Returns the tool text outputs.

---

wbt_ks_test_for_normality

*Ks test for normality*

---

## Description

Evaluates whether the values in a raster are normally distributed.

## Usage

```
wbt_ks_test_for_normality(
  input,
  output,
  num_samples = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

input                 Input raster file path. See wbt_file_path() for details.

output                Output HTML file.

num_samples           Number of samples. Leave blank to use whole image.

wd                    Changes the working directory. Default: NULL will use the value in Whitebox-
                      Tools settings, see wbt_wd() for details.

verbose_mode     Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details.

compress_rasters

                Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details.

command_only     Return command that would be executed by system() rather than running tool. Default: FALSE.

## Value

Returns the tool text outputs.

---

wbt_k_means_clustering

*K means clustering*

---

## Description

Performs a k-means clustering operation on a multi-spectral dataset.

## Usage

```
wbt_k_means_clustering(
  inputs,
  output,
  classes,
  out_html = NULL,
  max_iterations = 10,
  class_change = 2,
  initialize = "diagonal",
  min_class_size = 10,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

inputs       Input raster file paths, concatenated with "," or ";". See wbt_file_path() for details.

output       Output raster file.

classes       Number of classes.

out_html       Output HTML report file.

254 wbt_k_nearest_mean_filter

| | |
|---|---|
| max_iterations | Maximum number of iterations. |
| class_change | Minimum percent of cells changed between iterations before completion. |
| initialize | How to initialize cluster centres?. |
| min_class_size | Minimum class size, in pixels. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_k_nearest_mean_filter

*K nearest mean filter*

---

## Description

A k-nearest mean filter is a type of edge-preserving smoothing filter.

## Usage

```
wbt_k_nearest_mean_filter(
  input,
  output,
  filterx = 11,
  filtery = 11,
  k = 5,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| `input` | Input raster file path. See `wbt_file_path()` for details. |
| `output` | Output raster file. |
| `filterx` | Size of the filter kernel in the x-direction. |
| `filtery` | Size of the filter kernel in the y-direction. |
| `k` | k-value in pixels; this is the number of nearest-valued neighbours to use. |
| `wd` | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see `wbt_wd()` for details. |
| `verbose_mode` | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| `compress_rasters` | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| `command_only` | Return command that would be executed by `system()` rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

`wbt_laplacian_filter`    *Laplacian filter*

---

## Description

Performs a Laplacian filter on an image.

## Usage

```
wbt_laplacian_filter(
  input,
  output,
  variant = "3x3(1)",
  clip = 0,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| `input` | Input raster file path. See `wbt_file_path()` for details. |
| `output` | Output raster file. |
| `variant` | Optional variant value. Options include 3x3(1), 3x3(2), 3x3(3), 3x3(4), 5x5(1), and 5x5(2) (default is 3x3(1)). |
| `clip` | Optional amount to clip the distribution tails by, in percent. |
| `wd` | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| `verbose_mode` | Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| `compress_rasters` | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| `command_only` | Return command that would be executed by `system()` rather than running tool. Default: `FALSE`. |

## Value

Returns the tool text outputs.

---

`wbt_laplacian_of_gaussian_filter`

*Laplacian of gaussian filter*

---

## Description

Performs a Laplacian-of-Gaussian (LoG) filter on an image.

## Usage

```
wbt_laplacian_of_gaussian_filter(
  input,
  output,
  sigma = 0.75,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| `input` | Input raster file path. See wbt_file_path() for details. |
| `output` | Output raster file. |
| `sigma` | Standard deviation in pixels. |
| `wd` | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| `verbose_mode` | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| `compress_rasters` | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| `command_only` | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

| `wbt_las_to_ascii` | *Las to ascii* |
|---|---|

---

## Description

Converts one or more LAS files into ASCII text files.

## Usage

```
wbt_las_to_ascii(
  inputs,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| `inputs` | Input LiDAR files. |
| `wd` | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| `verbose_mode` | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |

compress_rasters

        Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details.

command_only      Return command that would be executed by system() rather than running tool. Default: FALSE.

## Value

Returns the tool text outputs.

---

wbt_las_to_laz        *Las to laz*

---

## Description

This tool converts one or more LAS files into the LAZ format.

## Usage

```
wbt_las_to_laz(
  input,
  output = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

input           Name of the input LAS files (leave blank to use all LAS files in WorkingDirectory.

output         Output LAZ file (including extension).

wd              Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details.

verbose_mode      Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details.

compress_rasters

        Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details.

command_only      Return command that would be executed by system() rather than running tool. Default: FALSE.

## Value

Returns the tool text outputs.

---

```
wbt_las_to_multipoint_shapefile
```
*Las to multipoint shapefile*

---

### Description

Converts one or more LAS files into MultipointZ vector Shapefiles. When the input parameter is not specified, the tool grids all LAS files contained within the working directory.

### Usage

```
wbt_las_to_multipoint_shapefile(
  input,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| `input` | Input LiDAR file. |
| `wd` | Changes the working directory. Default: `NULL` will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| `verbose_mode` | Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| `compress_rasters` | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| `command_only` | Return command that would be executed by `system()` rather than running tool. Default: `FALSE`. |

### Value

Returns the tool text outputs.

---

wbt_las_to_shapefile        *Las to shapefile*

---

### Description

Converts one or more LAS files into a vector Shapefile of POINT ShapeType.

### Usage

```
wbt_las_to_shapefile(
  input,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input LiDAR file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

---

wbt_las_to_zlidar        *Las to zlidar*

---

### Description

Converts one or more LAS files into the zlidar compressed LiDAR data format.

## Usage

```
wbt_las_to_zlidar(
  inputs = NULL,
  outdir = NULL,
  compress = "brotli",
  level = 5,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| inputs | Input LAS files. |
| outdir | Output directory into which zlidar files are created. If unspecified, it is assumed to be the same as the inputs. |
| compress | Compression method, including 'brotli' and 'deflate'. |
| level | Compression level (1-9). |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_launch_runner          *Launch 'WhiteboxTools Runner' GUI*

---

## Description

wbt_launch_runner(): Launch the 'WhiteboxTools Runner' GUI at wbt_runner_path()

## Usage

```
wbt_launch_runner(clear_app_state = FALSE)
```

## Arguments

clear_app_state

> Clear application state memory? Default: FALSE

## Details

Opens the 'WhiteboxTools Runner' GUI included with WhiteboxTools Open Core v2.3.0 or higher.

## See Also

[wbt_runner_path()](wbt_runner_path())

---

wbt_launch_wb_runner      *Launch wb runner*

---

## Description

Opens the Whitebox Runner application.

## Usage

```
wbt_launch_wb_runner(
  clear_app_state = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

clear_app_state

> Clear the application state memory?.

| | |
|---|---|
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |

compress_rasters

> Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details.

| | |
|---|---|
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

wbt_layer_footprint *Layer footprint*

## Description

Creates a vector polygon footprint of the area covered by a raster grid or vector layer.

## Usage

```
wbt_layer_footprint(
  input,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input raster or vector file. |
| output | Output vector polygon file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

wbt_laz_to_las                     *Laz to las*

### Description

This tool converts one or more LAZ files into the LAS format.

### Usage

```
wbt_laz_to_las(
  input,
  output = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

input               Name of the input LAZ files (leave blank to use all LAZ files in WorkingDirectory.

output              Output LAS file (including extension).

wd                  Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see wbt_wd() for details.

verbose_mode        Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details.

compress_rasters
                    Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details.

command_only        Return command that would be executed by system() rather than running tool. Default: FALSE.

### Value

Returns the tool text outputs.

---

`wbt_lee_sigma_filter`       *Lee sigma filter*

---

## Description

Performs a Lee (Sigma) smoothing filter on an image.

## Usage

```
wbt_lee_sigma_filter(
  input,
  output,
  filterx = 11,
  filtery = 11,
  sigma = 10,
  m = 5,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input raster file path. See `wbt_file_path()` for details. |
| output | Output raster file. |
| filterx | Size of the filter kernel in the x-direction. |
| filtery | Size of the filter kernel in the y-direction. |
| sigma | Sigma value should be related to the standard deviation of the distribution of image speckle noise. |
| m | M-threshold value the minimum allowable number of pixels within the intensity range. |
| wd | Changes the working directory. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_wd()` for details. |
| verbose_mode | Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| command_only | Return command that would be executed by `system()` rather than running tool. Default: `FALSE`. |

**Value**

Returns the tool text outputs.

---

wbt_length_of_upstream_channels

*Length of upstream channels*

---

**Description**

Calculates the total length of channels upstream.

**Usage**

```
wbt_length_of_upstream_channels(
  d8_pntr,
  streams,
  output,
  esri_pntr = FALSE,
  zero_background = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

**Arguments**

| | |
|---|---|
| d8_pntr | Input raster D8 pointer file. |
| streams | Input raster streams file. |
| output | Output raster file. |
| esri_pntr | D8 pointer uses the ESRI style scheme. |
| zero_background | |
| | Flag indicating whether a background value of zero should be used. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

| wbt_less_than | *Less than* |
|---|---|

---

## Description

Performs a less-than comparison operation on two rasters or a raster and a constant value.

## Usage

```
wbt_less_than(
  input1,
  input2,
  output,
  incl_equals = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input1 | Input raster file or constant value. |
| input2 | Input raster file or constant value. |
| output | Output raster file. |
| incl_equals | Perform a less-than-or-equal-to operation. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

| wbt_license | *License information for 'WhiteboxTools'* |
|---|---|

### Description

License information for 'WhiteboxTools'

### Usage

```
wbt_license()
```

### Value

Returns the license information for WhiteboxTools as an R character vector.

### Examples

```
## Not run:
wbt_license()

## End(Not run)
```

wbt_lidar_block_maximum

*Lidar block maximum*

### Description

Creates a block-maximum raster from an input LAS file. When the input/output parameters are not specified, the tool grids all LAS files contained within the working directory.

### Usage

```
wbt_lidar_block_maximum(
  input,
  output = NULL,
  resolution = 1,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input LiDAR file. |
| output | Output file. |
| resolution | Output raster's grid resolution. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_lidar_block_minimum

*Lidar block minimum*

---

## Description

Creates a block-minimum raster from an input LAS file. When the input/output parameters are not specified, the tool grids all LAS files contained within the working directory.

## Usage

```
wbt_lidar_block_minimum(
  input,
  output = NULL,
  resolution = 1,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input LiDAR file. |
| output | Output file. |
| resolution | Output raster's grid resolution. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| command_only | Return command that would be executed by `system()` rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_lidar_classify_subset

*Lidar classify subset*

---

## Description

Classifies the values in one LiDAR point cloud that correspond with points in a subset cloud.

## Usage

```
wbt_lidar_classify_subset(
  base,
  subset,
  output,
  subset_class,
  nonsubset_class = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| `base` | Input base LiDAR file. |
| `subset` | Input subset LiDAR file. |
| `output` | Output LiDAR file. |
| `subset_class` | Subset point class value (must be 0-18; see LAS specifications). |
| `nonsubset_class` | |
| | Non-subset point class value (must be 0-18; see LAS specifications). |
| `wd` | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| `verbose_mode` | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| `compress_rasters` | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| `command_only` | Return command that would be executed by `system()` rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_lidar_colourize          *Lidar colourize*

---

## Description

Adds the red-green-blue colour fields of a LiDAR (LAS) file based on an input image.

## Usage

```
wbt_lidar_colourize(
  in_lidar,
  in_image,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| `in_lidar` | Input LiDAR file. |
| `in_image` | Input colour image file. |
| `output` | Output LiDAR file. |
| `wd` | Changes the working directory. Default: `NULL` will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| `verbose_mode` | Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| `compress_rasters` | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| `command_only` | Return command that would be executed by `system()` rather than running tool. Default: `FALSE`. |

## Value

Returns the tool text outputs.

---

`wbt_lidar_contour`        *Lidar contour*

---

## Description

This tool creates a vector contour coverage from an input LiDAR point file.

## Usage

```
wbt_lidar_contour(
  input,
  output = NULL,
  interval = 10,
  base = 0,
  smooth = 5,
  parameter = "elevation",
  returns = "all",
  exclude_cls = NULL,
  minz = NULL,
  maxz = NULL,
  max_triangle_edge_length = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| `input` | Name of the input LiDAR points. |
| `output` | Name of the output vector lines file. |
| `interval` | Contour interval. |
| `base` | Base contour. |
| `smooth` | Smoothing filter size (in num. points), e.g. 3, 5, 7, 9, 11. |
| `parameter` | Interpolation parameter; options are 'elevation' (default), 'intensity', 'user_data'. |
| `returns` | Point return types to include; options are 'all' (default), 'last', 'first'. |
| `exclude_cls` | Optional exclude classes from interpolation; Valid class values range from 0 to 18, based on LAS specifications. Example, –exclude_cls='3,4,5,6,7,18'. |
| `minz` | Optional minimum elevation for inclusion in interpolation. |
| `maxz` | Optional maximum elevation for inclusion in interpolation. |
| `max_triangle_edge_length` | Optional maximum triangle edge length; triangles larger than this size will not be gridded. |
| `wd` | Changes the working directory. Default: `NULL` will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| `verbose_mode` | Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| `compress_rasters` | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| `command_only` | Return command that would be executed by `system()` rather than running tool. Default: `FALSE`. |

## Value

Returns the tool text outputs.

---

`wbt_lidar_digital_surface_model`

*Lidar digital surface model*

---

## Description

Creates a top-surface digital surface model (DSM) from a LiDAR point cloud.

**Usage**

```
wbt_lidar_digital_surface_model(
  input,
  output = NULL,
  resolution = 1,
  radius = 0.5,
  minz = NULL,
  maxz = NULL,
  max_triangle_edge_length = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

**Arguments**

| | |
|---|---|
| input | Input LiDAR file (including extension). |
| output | Output raster file (including extension). |
| resolution | Output raster's grid resolution. |
| radius | Search Radius. |
| minz | Optional minimum elevation for inclusion in interpolation. |
| maxz | Optional maximum elevation for inclusion in interpolation. |
| max_triangle_edge_length | |
| | Optional maximum triangle edge length; triangles larger than this size will not be gridded. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

**Value**

Returns the tool text outputs.

wbt_lidar_eigenvalue_features

*Lidar eigenvalue features*

### Description

Calculate eigenvalue-based metrics from a LiDAR point cloud.

### Usage

```
wbt_lidar_eigenvalue_features(
  input,
  num_neighbours = NULL,
  radius = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Name of the input LiDAR points. |
| num_neighbours | Number of neighbours used in search. |
| radius | Search distance used in neighbourhood search. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_lidar_elevation_slice

*Lidar elevation slice*

### Description

Outputs all of the points within a LiDAR (LAS) point file that lie between a specified elevation range.

### Usage

```
wbt_lidar_elevation_slice(
  input,
  output,
  minz = NULL,
  maxz = NULL,
  cls = FALSE,
  inclassval = 2,
  outclassval = 1,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input LiDAR file. |
| output | Output LiDAR file. |
| minz | Minimum elevation value (optional). |
| maxz | Maximum elevation value (optional). |
| cls | Optional boolean flag indicating whether points outside the range should be retained in output but reclassified. |
| inclassval | Optional parameter specifying the class value assigned to points within the slice. |
| outclassval | Optional parameter specifying the class value assigned to points within the slice. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_lidar_ground_point_filter

*Lidar ground point filter*

---

## Description

Identifies ground points within LiDAR dataset using a slope-based method.

## Usage

```
wbt_lidar_ground_point_filter(
  input,
  output,
  radius = 2,
  min_neighbours = 0,
  slope_threshold = 45,
  height_threshold = 1,
  classify = TRUE,
  slope_norm = TRUE,
  height_above_ground = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input LiDAR file. |
| output | Output LiDAR file. |
| radius | Search Radius. |
| min_neighbours | The minimum number of neighbouring points within search areas. If fewer points than this threshold are identified during the fixed-radius search, a subsequent kNN search is performed to identify the k number of neighbours. |
| slope_threshold | |
| | Maximum inter-point slope to be considered an off-terrain point. |
| height_threshold | |
| | Inter-point height difference to be considered an off-terrain point. |
| classify | Classify points as ground (2) or off-ground (1). |
| slope_norm | Perform initial ground slope normalization?. |
| height_above_ground | |
| | Transform output to height above average ground elevation?. |

wd              Changes the working directory. Default: `NULL` will use the value in Whitebox-
                Tools settings, see `wbt_wd()` for details.

verbose_mode    Sets verbose mode. If verbose mode is `FALSE`, tools will not print output mes-
                sages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()`
                for details.

compress_rasters

                Sets the flag used by 'WhiteboxTools' to determine whether to use compression
                for output rasters. Default: `NULL` will use the value in WhiteboxTools settings,
                see `wbt_compress_rasters()` for details.

command_only    Return command that would be executed by `system()` rather than running tool.
                Default: `FALSE`.

## Value

Returns the tool text outputs.

---

`wbt_lidar_hex_binning`     *Lidar hex binning*

---

## Description

Hex-bins a set of LiDAR points.

## Usage

```
wbt_lidar_hex_binning(
  input,
  output,
  width,
  orientation = "horizontal",
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

input           Input base file.

output          Output vector polygon file.

width           The grid cell width.

orientation     Grid Orientation, 'horizontal' or 'vertical'.

wd              Changes the working directory. Default: `NULL` will use the value in Whitebox-
                Tools settings, see `wbt_wd()` for details.

| | |
|---|---|
| verbose_mode | Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| command_only | Return command that would be executed by `system()` rather than running tool. Default: `FALSE`. |

## Value

Returns the tool text outputs.

---

wbt_lidar_hillshade    *Lidar hillshade*

---

## Description

Calculates a hillshade value for points within a LAS file and stores these data in the RGB field.

## Usage

```
wbt_lidar_hillshade(
  input,
  output,
  azimuth = 315,
  altitude = 30,
  radius = 1,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input LiDAR file. |
| output | Output file. |
| azimuth | Illumination source azimuth in degrees. |
| altitude | Illumination source altitude in degrees. |
| radius | Search Radius. |
| wd | Changes the working directory. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_wd()` for details. |

| verbose_mode | Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| command_only | Return command that would be executed by `system()` rather than running tool. Default: `FALSE`. |

## Value

Returns the tool text outputs.

---

wbt_lidar_histogram          *Lidar histogram*

---

## Description

Creates a histogram of LiDAR data.

## Usage

```
wbt_lidar_histogram(
  input,
  output,
  parameter = "elevation",
  clip = 1,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| input | Input LiDAR file. |
| output | Output HTML file (default name will be based on input file if unspecified). |
| parameter | Parameter; options are 'elevation' (default), 'intensity', 'scan angle', 'class', 'time'. |
| clip | Amount to clip distribution tails (in percent). |
| wd | Changes the working directory. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_wd()` for details. |
| verbose_mode | Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |

compress_rasters

> Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details.

command_only    Return command that would be executed by system() rather than running tool. Default: FALSE.

## Value

Returns the tool text outputs.

---

wbt_lidar_idw_interpolation

*Lidar idw interpolation*

---

## Description

Interpolates LAS files using an inverse-distance weighted (IDW) scheme. When the input/output parameters are not specified, the tool interpolates all LAS files contained within the working directory.

## Usage

```
wbt_lidar_idw_interpolation(
  input,
  output = NULL,
  parameter = "elevation",
  returns = "all",
  resolution = 1,
  weight = 1,
  radius = 2.5,
  exclude_cls = NULL,
  minz = NULL,
  maxz = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

input           Input LiDAR file (including extension).

output          Output raster file (including extension).

parameter       Interpolation parameter; options are 'elevation' (default), 'intensity', 'class', 'return_number', 'number_of_returns', 'scan angle', 'rgb', 'user data'.

| returns | Point return types to include; options are 'all' (default), 'last', 'first'. |
|---|---|
| resolution | Output raster's grid resolution. |
| weight | IDW weight value. |
| radius | Search Radius. |
| exclude_cls | Optional exclude classes from interpolation; Valid class values range from 0 to 18, based on LAS specifications. Example, –exclude_cls='3,4,5,6,7,18'. |
| minz | Optional minimum elevation for inclusion in interpolation. |
| maxz | Optional maximum elevation for inclusion in interpolation. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

| wbt_lidar_info | *Lidar info* |
|---|---|

---

## Description

Prints information about a LiDAR (LAS) dataset, including header, point return frequency, and classification data and information about the variable length records (VLRs) and geokeys.

## Usage

```
wbt_lidar_info(
  input,
  output,
  density = TRUE,
  vlr = TRUE,
  geokeys = TRUE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| `input` | Input LiDAR file. |
| `output` | Output HTML file for summary report. |
| `density` | Flag indicating whether or not to calculate the average point density and nominal point spacing. |
| `vlr` | Flag indicating whether or not to print the variable length records (VLRs). |
| `geokeys` | Flag indicating whether or not to print the geokeys. |
| `wd` | Changes the working directory. Default: `NULL` will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| `verbose_mode` | Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| `compress_rasters` | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| `command_only` | Return command that would be executed by `system()` rather than running tool. Default: `FALSE`. |

## Value

Returns the tool text outputs.

---

| `wbt_lidar_join` | *Lidar join* |
|---|---|

---

## Description

Joins multiple LiDAR (LAS) files into a single LAS file.

## Usage

```
wbt_lidar_join(
  inputs,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| `inputs` | Input LiDAR files. |
| `output` | Output LiDAR file. |
| `wd` | Changes the working directory. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_wd()` for details. |
| `verbose_mode` | Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| `compress_rasters` | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| `command_only` | Return command that would be executed by `system()` rather than running tool. Default: `FALSE`. |

## Value

Returns the tool text outputs.

---

`wbt_lidar_kappa_index` *Lidar kappa index*

---

## Description

Performs a kappa index of agreement (KIA) analysis on the classifications of two LAS files.

## Usage

```
wbt_lidar_kappa_index(
  input1,
  input2,
  output,
  class_accuracy,
  resolution = 1,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| `input1` | Input LiDAR classification file. |
| `input2` | Input LiDAR reference file. |
| `output` | Output HTML file. |

| class_accuracy | Output classification accuracy raster file. |
|---|---|
| resolution | Output raster's grid resolution. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| command_only | Return command that would be executed by `system()` rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

`wbt_lidar_nearest_neighbour_gridding`
*Lidar nearest neighbour gridding*

---

## Description

Grids LiDAR files using nearest-neighbour scheme. When the input/output parameters are not specified, the tool grids all LAS files contained within the working directory.

## Usage

```
wbt_lidar_nearest_neighbour_gridding(
  input,
  output = NULL,
  parameter = "elevation",
  returns = "all",
  resolution = 1,
  radius = 2.5,
  exclude_cls = NULL,
  minz = NULL,
  maxz = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input LiDAR file (including extension). |
| output | Output raster file (including extension). |
| parameter | Interpolation parameter; options are 'elevation' (default), 'intensity', 'class', 'return_number', 'number_of_returns', 'scan angle', 'rgb', 'user data', 'time'. |
| returns | Point return types to include; options are 'all' (default), 'last', 'first'. |
| resolution | Output raster's grid resolution. |
| radius | Search Radius. |
| exclude_cls | Optional exclude classes from interpolation; Valid class values range from 0 to 18, based on LAS specifications. Example, –exclude_cls='3,4,5,6,7,18'. |
| minz | Optional minimum elevation for inclusion in interpolation. |
| maxz | Optional maximum elevation for inclusion in interpolation. |
| wd | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_lidar_point_density

*Lidar point density*

---

## Description

Calculates the spatial pattern of point density for a LiDAR data set. When the input/output parameters are not specified, the tool grids all LAS files contained within the working directory.

## Usage

```
wbt_lidar_point_density(
  input,
  output = NULL,
  returns = "all",
  resolution = 1,
  radius = 2.5,
  exclude_cls = NULL,
  minz = NULL,
  maxz = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input LiDAR file (including extension). |
| output | Output raster file (including extension). |
| returns | Point return types to include; options are 'all' (default), 'last', 'first'. |
| resolution | Output raster's grid resolution. |
| radius | Search radius. |
| exclude_cls | Optional exclude classes from interpolation; Valid class values range from 0 to 18, based on LAS specifications. Example, –exclude_cls='3,4,5,6,7,18'. |
| minz | Optional minimum elevation for inclusion in interpolation. |
| maxz | Optional maximum elevation for inclusion in interpolation. |
| wd | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

wbt_lidar_point_return_analysis

*Lidar point return analysis*

### Description

This tool performs a quality control check on the return values of points in a LiDAR file.

### Usage

```
wbt_lidar_point_return_analysis(
  input,
  output = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Name of the input LiDAR points. |
| output | Name of the output LiDAR points. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_lidar_point_stats *Lidar point stats*

## Description

Creates several rasters summarizing the distribution of LAS point data. When the input/output parameters are not specified, the tool works on all LAS files contained within the working directory.

## Usage

```
wbt_lidar_point_stats(
  input,
  resolution = 1,
  num_points = TRUE,
  num_pulses = FALSE,
  avg_points_per_pulse = TRUE,
  z_range = FALSE,
  intensity_range = FALSE,
  predom_class = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input LiDAR file. |
| resolution | Output raster's grid resolution. |
| num_points | Flag indicating whether or not to output the number of points (returns) raster. |
| num_pulses | Flag indicating whether or not to output the number of pulses raster. |
| avg_points_per_pulse | |
| | Flag indicating whether or not to output the average number of points (returns) per pulse raster. |
| z_range | Flag indicating whether or not to output the elevation range raster. |
| intensity_range | |
| | Flag indicating whether or not to output the intensity range raster. |
| predom_class | Flag indicating whether or not to output the predominant classification raster. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |

compress_rasters

        Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details.

command_only    Return command that would be executed by `system()` rather than running tool. Default: `FALSE`.

## Value

Returns the tool text outputs.

---

wbt_lidar_ransac_planes

*Lidar ransac planes*

---

## Description

Performs a RANSAC analysis to identify points within a LiDAR point cloud that belong to linear planes.

## Usage

```
wbt_lidar_ransac_planes(
  input,
  output,
  radius = 2,
  num_iter = 50,
  num_samples = 5,
  threshold = 0.35,
  model_size = 8,
  max_slope = 80,
  classify = FALSE,
  last_returns = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input LiDAR file. |
| output | Output LiDAR file. |
| radius | Search Radius. |
| num_iter | Number of iterations. |
| num_samples | Number of sample points on which to build the model. |

| | |
|---|---|
| threshold | Threshold used to determine inlier points. |
| model_size | Acceptable model size. |
| max_slope | Maximum planar slope. |
| classify | Classify points as ground (2) or off-ground (1). |
| last_returns | Only include last- and only-return points. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_lidar_rbf_interpolation

*Lidar rbf interpolation*

---

## Description

Interpolates LAS files using a radial basis function (RBF) scheme. When the input/output parameters are not specified, the tool interpolates all LAS files contained within the working directory.

## Usage

```
wbt_lidar_rbf_interpolation(
  input,
  output = NULL,
  parameter = "elevation",
  returns = "all",
  resolution = 1,
  num_points = 20,
  exclude_cls = NULL,
  minz = NULL,
  maxz = NULL,
  func_type = "ThinPlateSpline",
  poly_order = "none",
  weight = 5,
```

```
    wd = NULL,
    verbose_mode = NULL,
    compress_rasters = NULL,
    command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| `input` | Input LiDAR file (including extension). |
| `output` | Output raster file (including extension). |
| `parameter` | Interpolation parameter; options are 'elevation' (default), 'intensity', 'class', 'return_number', 'number_of_returns', 'scan angle', 'rgb', 'user data'. |
| `returns` | Point return types to include; options are 'all' (default), 'last', 'first'. |
| `resolution` | Output raster's grid resolution. |
| `num_points` | Number of points. |
| `exclude_cls` | Optional exclude classes from interpolation; Valid class values range from 0 to 18, based on LAS specifications. Example, –exclude_cls='3,4,5,6,7,18'. |
| `minz` | Optional minimum elevation for inclusion in interpolation. |
| `maxz` | Optional maximum elevation for inclusion in interpolation. |
| `func_type` | Radial basis function type; options are 'ThinPlateSpline' (default), 'PolyHarmonic', 'Gaussian', 'MultiQuadric', 'InverseMultiQuadric'. |
| `poly_order` | Polynomial order; options are 'none' (default), 'constant', 'affine'. |
| `weight` | Weight parameter used in basis function. |
| `wd` | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see `wbt_wd()` for details. |
| `verbose_mode` | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| `compress_rasters` | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| `command_only` | Return command that would be executed by `system()` rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

wbt_lidar_remove_duplicates

*Lidar remove duplicates*

## Description

Removes duplicate points from a LiDAR data set.

## Usage

```
wbt_lidar_remove_duplicates(
  input,
  output,
  include_z = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input LiDAR file. |
| output | Output LiDAR file. |
| include_z | Include z-values in point comparison?. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

wbt_lidar_remove_outliers
                                                *Lidar remove outliers*

#### Description

Removes outliers (high and low points) in a LiDAR point cloud.

#### Usage

```
wbt_lidar_remove_outliers(
  input,
  output,
  radius = 2,
  elev_diff = 50,
  use_median = FALSE,
  classify = TRUE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

#### Arguments

| | |
|---|---|
| input | Input LiDAR file. |
| output | Output LiDAR file. |
| radius | Search Radius. |
| elev_diff | Max. elevation difference. |
| use_median | Optional flag indicating whether to use the difference from median elevation rather than mean. |
| classify | Classify points as ground (2) or off-ground (1). |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_lidar_rooftop_analysis

*Lidar rooftop analysis*

---

## Description

Identifies roof segments in a LiDAR point cloud.

## Usage

```
wbt_lidar_rooftop_analysis(
  buildings,
  output,
  input = NULL,
  radius = 2,
  num_iter = 50,
  num_samples = 10,
  threshold = 0.15,
  model_size = 15,
  max_slope = 65,
  norm_diff = 10,
  azimuth = 180,
  altitude = 30,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| buildings | Input vector build footprint polygons file. |
| output | Output vector polygon file. |
| input | Input LiDAR file. |
| radius | Search Radius. |
| num_iter | Number of iterations. |
| num_samples | Number of sample points on which to build the model. |
| threshold | Threshold used to determine inlier points (in elevation units). |
| model_size | Acceptable model size, in points. |
| max_slope | Maximum planar slope, in degrees. |
| norm_diff | Maximum difference in normal vectors, in degrees. |

| | |
|---|---|
| azimuth | Illumination source azimuth, in degrees. |
| altitude | Illumination source altitude in degrees. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| command_only | Return command that would be executed by `system()` rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

---

wbt_lidar_segmentation

*Lidar segmentation*

---

### Description

Segments a LiDAR point cloud based on differences in the orientation of fitted planar surfaces and point proximity.

### Usage

```
wbt_lidar_segmentation(
  input,
  output,
  radius = 2,
  num_iter = 50,
  num_samples = 10,
  threshold = 0.15,
  model_size = 15,
  max_slope = 80,
  norm_diff = 10,
  maxzdiff = 1,
  classes = FALSE,
  ground = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| `input` | Input LiDAR file. |
| `output` | Output LiDAR file. |
| `radius` | Search Radius. |
| `num_iter` | Number of iterations. |
| `num_samples` | Number of sample points on which to build the model. |
| `threshold` | Threshold used to determine inlier points. |
| `model_size` | Acceptable model size. |
| `max_slope` | Maximum planar slope. |
| `norm_diff` | Maximum difference in normal vectors, in degrees. |
| `maxzdiff` | Maximum difference in elevation (z units) between neighbouring points of the same segment. |
| `classes` | Segments don't cross class boundaries. |
| `ground` | Classify the largest segment as ground points?. |
| `wd` | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| `verbose_mode` | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| `compress_rasters` | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| `command_only` | Return command that would be executed by `system()` rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_lidar_segmentation_based_filter

*Lidar segmentation based filter*

---

## Description

Identifies ground points within LiDAR point clouds using a segmentation based approach.

**Usage**

```
wbt_lidar_segmentation_based_filter(
  input,
  output,
  radius = 5,
  norm_diff = 2,
  maxzdiff = 1,
  classify = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

**Arguments**

| | |
|---|---|
| input | Input LiDAR file. |
| output | Output file. |
| radius | Search Radius. |
| norm_diff | Maximum difference in normal vectors, in degrees. |
| maxzdiff | Maximum difference in elevation (z units) between neighbouring points of the same segment. |
| classify | Classify points as ground (2) or off-ground (1). |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

**Value**

Returns the tool text outputs.

wbt_lidar_shift *Lidar shift*

## Description

Shifts the x,y,z coordinates of a LiDAR file.

## Usage

```
wbt_lidar_shift(
  input,
  output,
  x_shift = "",
  y_shift = "",
  z_shift = "",
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Name of the input LiDAR points. |
| output | Name of the output LiDAR points. |
| x_shift | x-shift value, blank for none. |
| y_shift | y-shift value, blank for none. |
| z_shift | z-shift value, blank for none. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

wbt_lidar_sibson_interpolation

*Lidar sibson interpolation*

## Description

This tool interpolates one or more LiDAR tiles using Sibson's natural neighbour method.

## Usage

```
wbt_lidar_sibson_interpolation(
  input,
  output = NULL,
  parameter = "elevation",
  returns = "all",
  resolution = 1,
  exclude_cls = NULL,
  minz = NULL,
  maxz = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Name of the input LiDAR points (leave blank to use all files in WorkingDirectory. |
| output | Output raster file (including extension). |
| parameter | Interpolation parameter; options are 'elevation' (default), 'intensity', 'class', 'return_number', 'number_of_returns', 'scan angle', 'user_data'. |
| returns | Point return types to include; options are 'all' (default), 'last', 'first'. |
| resolution | Output raster's grid resolution. |
| exclude_cls | Optional exclude classes from interpolation; Valid class values range from 0 to 18, based on LAS specifications. Example, –exclude_cls='3,4,5,6,7,18'. |
| minz | Optional minimum elevation for inclusion in interpolation. |
| maxz | Optional maximum elevation for inclusion in interpolation. |
| wd | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |

compress_rasters

> Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details.

command_only    Return command that would be executed by `system()` rather than running tool. Default: `FALSE`.

## Value

Returns the tool text outputs.

---

wbt_lidar_sort_by_time

*Lidar sort by time*

---

## Description

This tool sorts the points in a LiDAR file by the GPS time.

## Usage

```
wbt_lidar_sort_by_time(
  input,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

input           Name of the input LiDAR points.

output          Name of the output LiDAR points.

wd              Changes the working directory. Default: `NULL` will use the value in Whitebox-Tools settings, see `wbt_wd()` for details.

verbose_mode    Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details.

compress_rasters

> Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details.

command_only    Return command that would be executed by `system()` rather than running tool. Default: `FALSE`.

## Value

Returns the tool text outputs.

---

wbt_lidar_thin                    *Lidar thin*

---

## Description

Thins a LiDAR point cloud, reducing point density.

## Usage

```
wbt_lidar_thin(
  input,
  output,
  resolution = 2,
  method = "lowest",
  save_filtered = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input LiDAR file. |
| output | Output LiDAR file. |
| resolution | The size of the square area used to evaluate nearby points in the LiDAR data. |
| method | Point selection method; options are 'first', 'last', 'lowest' (default), 'highest', 'nearest'. |
| save_filtered | Save filtered points to separate file?. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

wbt_lidar_thin_high_density

*Lidar thin high density*

## Description

Thins points from high density areas within a LiDAR point cloud.

## Usage

```
wbt_lidar_thin_high_density(
  input,
  output,
  density,
  resolution = 1,
  save_filtered = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input LiDAR file. |
| output | Output LiDAR file. |
| density | Max. point density (points / m^3). |
| resolution | Output raster's grid resolution. |
| save_filtered | Save filtered points to separate file?. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

| wbt_lidar_tile | *Lidar tile* |
|---|---|

## Description

Tiles a LiDAR LAS file into multiple LAS files.

## Usage

```
wbt_lidar_tile(
  input,
  width = 1000,
  height = 1000,
  origin_x = 0,
  origin_y = 0,
  min_points = 2,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input LiDAR file. |
| width | Width of tiles in the X dimension; default 1000.0. |
| height | Height of tiles in the Y dimension. |
| origin_x | Origin point X coordinate for tile grid. |
| origin_y | Origin point Y coordinate for tile grid. |
| min_points | Minimum number of points contained in a tile for it to be saved. |
| wd | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

## wbt_lidar_tile_footprint

*Lidar tile footprint*

### Description

Creates a vector polygon of the convex hull of a LiDAR point cloud. When the input/output parameters are not specified, the tool works with all LAS files contained within the working directory.

### Usage

```
wbt_lidar_tile_footprint(
  input,
  output,
  hull = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input LiDAR file. |
| output | Output vector polygon file. |
| hull | Identify the convex hull around points. |
| wd | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see `wbt_wd()` for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| command_only | Return command that would be executed by `system()` rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

---

wbt_lidar_tin_gridding

*Lidar tin gridding*

---

### Description

Creates a raster grid based on a Delaunay triangular irregular network (TIN) fitted to LiDAR points.

### Usage

```
wbt_lidar_tin_gridding(
  input,
  output = NULL,
  parameter = "elevation",
  returns = "all",
  resolution = 1,
  exclude_cls = "7,18",
  minz = NULL,
  maxz = NULL,
  max_triangle_edge_length = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input LiDAR file (including extension). |
| output | Output raster file (including extension). |
| parameter | Interpolation parameter; options are 'elevation' (default), 'intensity', 'class', 'return_number', 'number_of_returns', 'scan angle', 'rgb', 'user data'. |
| returns | Point return types to include; options are 'all' (default), 'last', 'first'. |
| resolution | Output raster's grid resolution. |
| exclude_cls | Optional exclude classes from interpolation; Valid class values range from 0 to 18, based on LAS specifications. Example, –exclude_cls='3,4,5,6,7,18'. |
| minz | Optional minimum elevation for inclusion in interpolation. |
| maxz | Optional maximum elevation for inclusion in interpolation. |
| max_triangle_edge_length | |
| | Optional maximum triangle edge length; triangles larger than this size will not be gridded. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |

| | |
|---|---|
| verbose_mode | Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| command_only | Return command that would be executed by `system()` rather than running tool. Default: `FALSE`. |

## Value

Returns the tool text outputs.

---

wbt_lidar_tophat_transform

*Lidar tophat transform*

---

## Description

Performs a white top-hat transform on a Lidar dataset; as an estimate of height above ground, this is useful for modelling the vegetation canopy.

## Usage

```
wbt_lidar_tophat_transform(
  input,
  output,
  radius = 1,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input LiDAR file. |
| output | Output LiDAR file. |
| radius | Search Radius. |
| wd | Changes the working directory. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_wd()` for details. |
| verbose_mode | Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |

compress_rasters

>Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details.

command_only    Return command that would be executed by system() rather than running tool. Default: FALSE.

## Value

Returns the tool text outputs.

---

wbt_linearity_index        *Linearity index*

---

## Description

Calculates the linearity index for vector polygons.

## Usage

```
wbt_linearity_index(
  input,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

input           Input vector polygon file.

wd              Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details.

verbose_mode    Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details.

compress_rasters

>Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details.

command_only    Return command that would be executed by system() rather than running tool. Default: FALSE.

## Value

Returns the tool text outputs.

wbt_lines_to_polygons  *Lines to polygons*

## Description

Converts vector polylines to polygons.

## Usage

```
wbt_lines_to_polygons(
  input,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input vector line file. |
| output | Output vector polygon file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_line_detection_filter
                                            *Line detection filter*

---

### Description

Performs a line-detection filter on an image.

### Usage

```
wbt_line_detection_filter(
  input,
  output,
  variant = "vertical",
  absvals = FALSE,
  clip = 0,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| output | Output raster file. |
| variant | Optional variant value. Options include 'v' (vertical), 'h' (horizontal), '45', and '135' (default is 'v'). |
| absvals | Optional flag indicating whether outputs should be absolute values. |
| clip | Optional amount to clip the distribution tails by, in percent. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

## wbt_line_intersections

*Line intersections*

### Description

Identifies points where the features of two vector line layers intersect.

### Usage

```
wbt_line_intersections(
  input1,
  input2,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input1 | Input vector polyline file. |
| input2 | Input vector polyline file. |
| output | Output vector point file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

---

wbt_line_thinning          *Line thinning*

---

### Description

Performs line thinning a on Boolean raster image; intended to be used with the RemoveSpurs tool.

### Usage

```
wbt_line_thinning(
  input,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

---

wbt_list_tools *All available tools in 'WhiteboxTools'*

---

### Description

All available tools in 'WhiteboxTools'

### Usage

```
wbt_list_tools(keywords = "''")
```

### Arguments

keywords        Keywords may be used to search available tools. Default "''" returns all available tools.

### Value

Return all available tools in WhiteboxTools that contain the keywords.

### Examples

```
## Not run:
wbt_list_tools("lidar")

## End(Not run)
```

---

wbt_list_unique_values

*List unique values*

---

### Description

Lists the unique values contained in a field within a vector's attribute table.

### Usage

```
wbt_list_unique_values(
  input,
  field,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input vector file path. See `wbt_file_path()` for details. |
| field | Input field name in attribute table. |
| output | Output HTML file (default name will be based on input file if unspecified). |
| wd | Changes the working directory. Default: `NULL` will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| verbose_mode | Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| command_only | Return command that would be executed by `system()` rather than running tool. Default: `FALSE`. |

## Value

Returns the tool text outputs.

---

wbt_list_unique_values_raster

*List unique values raster*

---

## Description

Lists the unique values contained in a field within a vector's attribute table.

## Usage

```
wbt_list_unique_values_raster(
  input,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input vector file path. See `wbt_file_path()` for details. |
| wd | Changes the working directory. Default: `NULL` will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |

| | |
|---|---|
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

| | |
|---|---|
| wbt_ln | *Ln* |

---

## Description

Returns the natural logarithm of values in a raster.

## Usage

```
wbt_ln(
  input,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

**Value**

Returns the tool text outputs.

---

wbt_local_hypsometric_analysis

*Local hypsometric analysis*

---

**Description**

This tool calculates a local, neighbourhood-based hypsometric integral raster.

**Usage**

```
wbt_local_hypsometric_analysis(
  input,
  out_mag,
  out_scale,
  min_scale = 4,
  step = 1,
  num_steps = 10,
  step_nonlinearity = 1,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

**Arguments**

| | |
|---|---|
| input | Name of the input raster DEM file. |
| out_mag | Name of the openness output raster file. |
| out_scale | Name of the openness output raster file. |
| min_scale | Minimum search neighbourhood radius in grid cells. |
| step | Step size as any positive non-zero integer. |
| num_steps | Number of steps. |
| step_nonlinearity | |
| | Step nonlinearity factor (1.0-2.0 is typical). |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |

compress_rasters

        Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details.

command_only     Return command that would be executed by `system()` rather than running tool. Default: `FALSE`.

## Value

Returns the tool text outputs.

---

wbt_local_quadratic_regression

*Local quadratic regression*

---

## Description

An implementation of the constrained quadratic regression algorithm using a flexible window size described in Wood (1996).

## Usage

```
wbt_local_quadratic_regression(
  dem,
  output,
  filter = 3,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

dem            Name of the input DEM raster file.

output         Name of the output raster file.

filter          Edge length of the filter kernel.

wd              Changes the working directory. Default: `NULL` will use the value in Whitebox-Tools settings, see `wbt_wd()` for details.

verbose_mode   Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details.

compress_rasters

        Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details.

command_only     Return command that would be executed by `system()` rather than running tool. Default: `FALSE`.

## Value

Returns the tool text outputs.

---

| wbt_log10 | *Log10* |
|---|---|

---

## Description

Returns the base-10 logarithm of values in a raster.

## Usage

```
wbt_log10(
  input,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

| | |
|---|---|
| wbt_log2 | *Log2* |

## Description

Returns the base-2 logarithm of values in a raster.

## Usage

```
wbt_log2(
  input,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

```
wbt_logistic_regression
```
*Logistic regression*

---

### Description

Performs a logistic regression analysis using training site polygons/points and predictor rasters.

### Usage

```
wbt_logistic_regression(
  inputs,
  training,
  field,
  scaling = "Normalize",
  output = NULL,
  test_proportion = 0.2,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| inputs | Names of the input predictor rasters. |
| training | Name of the input training site polygons/points shapefile. |
| field | Name of the attribute containing class data. |
| scaling | Scaling method for predictors. Options include 'None', 'Normalize', and 'Standardize'. |
| output | Name of the output raster file. |
| test_proportion | |
| | The proportion of the dataset to include in the test split; default is 0.2. |
| wd | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

**Value**

Returns the tool text outputs.

---

wbt_longest_flowpath     *Longest flowpath*

---

**Description**

Delineates the longest flowpaths for a group of subbasins or watersheds.

**Usage**

```
wbt_longest_flowpath(
  dem,
  basins,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

**Arguments**

| | |
|---|---|
| dem | Input raster DEM file. |
| basins | Input raster basins file. |
| output | Output vector file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

**Value**

Returns the tool text outputs.

---

wbt_long_profile          *Long profile*

---

### Description

Plots the stream longitudinal profiles for one or more rivers.

### Usage

```
wbt_long_profile(
  d8_pntr,
  streams,
  dem,
  output,
  esri_pntr = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| d8_pntr | Input raster D8 pointer file. |
| streams | Input raster streams file. |
| dem | Input raster DEM file. |
| output | Output HTML file. |
| esri_pntr | D8 pointer uses the ESRI style scheme. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_long_profile_from_points

*Long profile from points*

## Description

Plots the longitudinal profiles from flow-paths initiating from a set of vector points.

## Usage

```
wbt_long_profile_from_points(
  d8_pntr,
  points,
  dem,
  output,
  esri_pntr = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| d8_pntr | Input raster D8 pointer file. |
| points | Input vector points file. |
| dem | Input raster DEM file. |
| output | Output HTML file. |
| esri_pntr | D8 pointer uses the ESRI style scheme. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

wbt_lowest_position          *Lowest position*

---

## Description

Identifies the stack position of the minimum value within a raster stack on a cell-by-cell basis.

## Usage

```
wbt_lowest_position(
  inputs,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| inputs | Input raster file paths, concatenated with ``","`` or ``";"``. See ``wbt_file_path()`` for details. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see ``wbt_wd()`` for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see ``wbt_verbose()`` for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see ``wbt_compress_rasters()`` for details. |
| command_only | Return command that would be executed by ``system()`` rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

wbt_low_points_on_headwater_divides

*Low points on headwater divides*

### Description

This tool locates saddle points along ridges within a digital elevation model (DEM).

### Usage

```
wbt_low_points_on_headwater_divides(
  dem,
  streams,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| dem | Name of the input DEM raster file. |
| streams | Name of the input stream channel raster file. |
| output | Name of the output vector file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_majority_filter  *Majority filter*

---

### Description

Assigns each cell in the output grid the most frequently occurring value (mode) in a moving window centred on each grid cell in the input raster.

### Usage

```
wbt_majority_filter(
  input,
  output,
  filterx = 11,
  filtery = 11,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| output | Output raster file. |
| filterx | Size of the filter kernel in the x-direction. |
| filtery | Size of the filter kernel in the y-direction. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_map_off_terrain_objects

*Map off terrain objects*

## Description

Maps off-terrain objects in a digital elevation model (DEM).

## Usage

```
wbt_map_off_terrain_objects(
  dem,
  output,
  max_slope = 40,
  min_size = 1,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| output | Output raster file. |
| max_slope | Maximum inter-cell absolute slope. |
| min_size | Minimum feature size, in grid cells. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

wbt_max                          *Max*

### Description

Performs a MAX operation on two rasters or a raster and a constant value.

### Usage

```
wbt_max(
  input1,
  input2,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input1 | Input raster file or constant value. |
| input2 | Input raster file or constant value. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

---

`wbt_maximal_curvature` *Maximal curvature*

---

### Description

Calculates a mean curvature raster from an input DEM.

### Usage

```
wbt_maximal_curvature(
  dem,
  output,
  log = FALSE,
  zfactor = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| output | Output raster file. |
| log | Display output values using a log-scale. |
| zfactor | Optional multiplier for when the vertical and horizontal units are not the same. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| command_only | Return command that would be executed by `system()` rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

---

wbt_maximum_filter          *Maximum filter*

---

### Description

Assigns each cell in the output grid the maximum value in a moving window centred on each grid cell in the input raster.

### Usage

```
wbt_maximum_filter(
  input,
  output,
  filterx = 11,
  filtery = 11,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| output | Output raster file. |
| filterx | Size of the filter kernel in the x-direction. |
| filtery | Size of the filter kernel in the y-direction. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_max_absolute_overlay

*Max absolute overlay*

## Description

Evaluates the maximum absolute value for each grid cell from a stack of input rasters.

## Usage

```
wbt_max_absolute_overlay(
  inputs,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| inputs | Input raster file paths, concatenated with ",″ or ";″. See wbt_file_path() for details. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_max_anisotropy_dev

*Max anisotropy dev*

---

### Description

Calculates the maximum anisotropy (directionality) in elevation deviation over a range of spatial scales.

### Usage

```
wbt_max_anisotropy_dev(
  dem,
  out_mag,
  out_scale,
  max_scale,
  min_scale = 3,
  step = 2,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| out_mag | Output raster DEVmax magnitude file. |
| out_scale | Output raster DEVmax scale file. |
| max_scale | Maximum search neighbourhood radius in grid cells. |
| min_scale | Minimum search neighbourhood radius in grid cells. |
| step | Step size as any positive non-zero integer. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_max_anisotropy_dev_signature

*Max anisotropy dev signature*

---

## Description

Calculates the anisotropy in deviation from mean for points over a range of spatial scales.

## Usage

```
wbt_max_anisotropy_dev_signature(
  dem,
  points,
  output,
  max_scale,
  min_scale = 1,
  step = 1,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| points | Input vector points file. |
| output | Output HTML file. |
| max_scale | Maximum search neighbourhood radius in grid cells. |
| min_scale | Minimum search neighbourhood radius in grid cells. |
| step | Step size as any positive non-zero integer. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

**Value**

Returns the tool text outputs.

---

wbt_max_branch_length    *Max branch length*

---

**Description**

Lindsay and Seibert's (2013) branch length index is used to map drainage divides or ridge lines.

**Usage**

```
wbt_max_branch_length(
  dem,
  output,
  log = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

**Arguments**

| | |
|---|---|
| dem | Input raster DEM file. |
| output | Output raster file. |
| log | Optional flag to request the output be log-transformed. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

**Value**

Returns the tool text outputs.

wbt_max_difference_from_mean

*Max difference from mean*

## Description

Calculates the maximum difference from mean elevation over a range of spatial scales.

## Usage

```
wbt_max_difference_from_mean(
  dem,
  out_mag,
  out_scale,
  min_scale,
  max_scale,
  step = 1,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| out_mag | Output raster DIFFmax magnitude file. |
| out_scale | Output raster DIFFmax scale file. |
| min_scale | Minimum search neighbourhood radius in grid cells. |
| max_scale | Maximum search neighbourhood radius in grid cells. |
| step | Step size as any positive non-zero integer. |
| wd | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

```
wbt_max_downslope_elev_change
```
                              *Max downslope elev change*

### Description

Calculates the maximum downslope change in elevation between a grid cell and its eight downslope neighbors.

### Usage

```
wbt_max_downslope_elev_change(
  dem,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

```
wbt_max_elevation_deviation
```
*Max elevation deviation*

## Description

Calculates the maximum elevation deviation over a range of spatial scales.

## Usage

```
wbt_max_elevation_deviation(
  dem,
  out_mag,
  out_scale,
  min_scale,
  max_scale,
  step = 1,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| out_mag | Output raster DEVmax magnitude file. |
| out_scale | Output raster DEVmax scale file. |
| min_scale | Minimum search neighbourhood radius in grid cells. |
| max_scale | Maximum search neighbourhood radius in grid cells. |
| step | Step size as any positive non-zero integer. |
| wd | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

wbt_max_elev_dev_signature

*Max elev dev signature*

#### Description

Calculates the maximum elevation deviation over a range of spatial scales and for a set of points.

#### Usage

```
wbt_max_elev_dev_signature(
  dem,
  points,
  output,
  min_scale,
  max_scale,
  step = 10,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

#### Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| points | Input vector points file. |
| output | Output HTML file. |
| min_scale | Minimum search neighbourhood radius in grid cells. |
| max_scale | Maximum search neighbourhood radius in grid cells. |
| step | Step size as any positive non-zero integer. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

#### Value

Returns the tool text outputs.

wbt_max_overlay          *Max overlay*

---

## Description

Evaluates the maximum value for each grid cell from a stack of input rasters.

## Usage

```
wbt_max_overlay(
  inputs,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

inputs          Input raster file paths, concatenated with `","` or `";"`. See `wbt_file_path()` for details.

output          Output raster file.

wd              Changes the working directory. Default: `NULL` will use the value in Whitebox-Tools settings, see `wbt_wd()` for details.

verbose_mode    Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details.

compress_rasters

                Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details.

command_only    Return command that would be executed by `system()` rather than running tool. Default: `FALSE`.

## Value

Returns the tool text outputs.

---

wbt_max_upslope_elev_change

*Max upslope elev change*

---

### Description

Calculates the maximum upslope change in elevation between a grid cell and its eight downslope neighbors.

### Usage

```
wbt_max_upslope_elev_change(
  dem,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_max_upslope_flowpath_length

*Max upslope flowpath length*

## Description

Measures the maximum length of all upslope flowpaths draining each grid cell.

## Usage

```
wbt_max_upslope_flowpath_length(
  dem,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

wbt_max_upslope_value     *Max upslope value*

---

### Description

Calculates the maximum upslope value from an input values raster along flowpaths.

### Usage

```
wbt_max_upslope_value(
  dem,
  values,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| dem | Input DEM; it must be depressionless. |
| values | Name of the input values raster file. |
| output | Name of the output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_md_inf_flow_accumulation

*Md inf flow accumulation*

### Description

Calculates an FD8 flow accumulation raster from an input DEM.

### Usage

```
wbt_md_inf_flow_accumulation(
  dem,
  output,
  out_type = "specific contributing area",
  exponent = 1.1,
  threshold = NULL,
  log = FALSE,
  clip = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| output | Output raster file. |
| out_type | Output type; one of 'cells', 'specific contributing area' (default), and 'catchment area'. |
| exponent | Optional exponent parameter; default is 1.1. |
| threshold | Optional convergence threshold parameter, in grid cells; default is infinity. |
| log | Optional flag to request the output be log-transformed. |
| clip | Optional flag to request clipping the display max by 1 percent. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

**Value**

Returns the tool text outputs.

---

  wbt_mean_curvature          *Mean curvature*

---

**Description**

Calculates a mean curvature raster from an input DEM.

**Usage**

```
wbt_mean_curvature(
  dem,
  output,
  log = FALSE,
  zfactor = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

**Arguments**

| | |
|---|---|
| dem | Input raster DEM file. |
| output | Output raster file. |
| log | Display output values using a log-scale. |
| zfactor | Optional multiplier for when the vertical and horizontal units are not the same. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

**Value**

Returns the tool text outputs.

| wbt_mean_filter | *Mean filter* |
|---|---|

### Description

Performs a mean filter (low-pass filter) on an input image.

### Usage

```
wbt_mean_filter(
  input,
  output,
  filterx = 3,
  filtery = 3,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| output | Output raster file. |
| filterx | Size of the filter kernel in the x-direction. |
| filtery | Size of the filter kernel in the y-direction. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

--------------------------------------------------------------------------------

wbt_median_filter          *Median filter*

--------------------------------------------------------------------------------

### Description

Performs a median filter on an input image.

### Usage

```
wbt_median_filter(
  input,
  output,
  filterx = 11,
  filtery = 11,
  sig_digits = 2,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| output | Output raster file. |
| filterx | Size of the filter kernel in the x-direction. |
| filtery | Size of the filter kernel in the y-direction. |
| sig_digits | Number of significant digits. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

---

wbt_medoid                    *Medoid*

---

### Description

Calculates the medoid for a series of vector features contained in a shapefile.

### Usage

```
wbt_medoid(
  input,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input vector file path. See wbt_file_path() for details. |
| output | Output vector file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

---

```
wbt_merge_line_segments
```
*Merge line segments*

---

### Description

Merges vector line segments into larger features.

### Usage

```
wbt_merge_line_segments(
  input,
  output,
  snap = 0,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input vector file path. See `wbt_file_path()` for details. |
| output | Output vector file. |
| snap | Snap tolerance. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| command_only | Return command that would be executed by `system()` rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

---

wbt_merge_table_with_csv

*Merge table with csv*

---

### Description

Merge a vector's attribute table with a table contained within a CSV text file.

### Usage

```
wbt_merge_table_with_csv(
  input,
  pkey,
  csv,
  fkey,
  import_field = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input primary vector file (i.e. the table to be modified). |
| pkey | Primary key field. |
| csv | Input CSV file (i.e. source of data to be imported). |
| fkey | Foreign key field. |
| import_field | Imported field (all fields will be imported if not specified). |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_merge_vectors          *Merge vectors*

### Description

Combines two or more input vectors of the same ShapeType creating a single, new output vector.

### Usage

```
wbt_merge_vectors(
  inputs,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| inputs | Input vector file paths, concatenated with ``","`` or ``";"``. See wbt_file_path() for details. |
| output | Output vector file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

---

wbt_min *Min*

---

### Description

Performs a MIN operation on two rasters or a raster and a constant value.

### Usage

```
wbt_min(
  input1,
  input2,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input1 | Input raster file or constant value. |
| input2 | Input raster file or constant value. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

---

`wbt_minimal_curvature`    *Minimal curvature*

---

## Description

Calculates a mean curvature raster from an input DEM.

## Usage

```
wbt_minimal_curvature(
  dem,
  output,
  log = FALSE,
  zfactor = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| output | Output raster file. |
| log | Display output values using a log-scale. |
| zfactor | Optional multiplier for when the vertical and horizontal units are not the same. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| command_only | Return command that would be executed by `system()` rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_minimum_bounding_box

*Minimum bounding box*

---

## Description

Creates a vector minimum bounding rectangle around vector features.

## Usage

```
wbt_minimum_bounding_box(
  input,
  output,
  criterion = "area",
  features = TRUE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input vector file path. See wbt_file_path() for details. |
| output | Output vector polygon file. |
| criterion | Minimization criterion; options include 'area' (default), 'length', 'width', and 'perimeter'. |
| features | Find the minimum bounding rectangles around each individual vector feature. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

```
wbt_minimum_bounding_circle
```
*Minimum bounding circle*

---

### Description

Delineates the minimum bounding circle (i.e. smallest enclosing circle) for a group of vectors.

### Usage

```
wbt_minimum_bounding_circle(
  input,
  output,
  features = TRUE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input vector file path. See `wbt_file_path()` for details. |
| output | Output vector polygon file. |
| features | Find the minimum bounding circle around each individual vector feature. |
| wd | Changes the working directory. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_wd()` for details. |
| verbose_mode | Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| command_only | Return command that would be executed by `system()` rather than running tool. Default: `FALSE`. |

### Value

Returns the tool text outputs.

wbt_minimum_bounding_envelope

*Minimum bounding envelope*

### Description

Creates a vector axis-aligned minimum bounding rectangle (envelope) around vector features.

### Usage

```
wbt_minimum_bounding_envelope(
  input,
  output,
  features = TRUE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input vector file path. See `wbt_file_path()` for details. |
| output | Output vector polygon file. |
| features | Find the minimum bounding envelop around each individual vector feature. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| command_only | Return command that would be executed by `system()` rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_minimum_convex_hull

*Minimum convex hull*

### Description

Creates a vector convex polygon around vector features.

### Usage

```
wbt_minimum_convex_hull(
  input,
  output,
  features = TRUE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input vector file path. See wbt_file_path() for details. |
| output | Output vector polygon file. |
| features | Find the hulls around each vector feature. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

---

`wbt_minimum_filter`     *Minimum filter*

---

### Description

Assigns each cell in the output grid the minimum value in a moving window centred on each grid cell in the input raster.

### Usage

```
wbt_minimum_filter(
  input,
  output,
  filterx = 11,
  filtery = 11,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input raster file path. See `wbt_file_path()` for details. |
| output | Output raster file. |
| filterx | Size of the filter kernel in the x-direction. |
| filtery | Size of the filter kernel in the y-direction. |
| wd | Changes the working directory. Default: `NULL` will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| verbose_mode | Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| command_only | Return command that would be executed by `system()` rather than running tool. Default: `FALSE`. |

### Value

Returns the tool text outputs.

---

wbt_min_absolute_overlay

*Min absolute overlay*

---

### Description

Evaluates the minimum absolute value for each grid cell from a stack of input rasters.

### Usage

```
wbt_min_absolute_overlay(
  inputs,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| inputs | Input raster file paths, concatenated with ",″ or ";″. See wbt_file_path() for details. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

---

```
wbt_min_dist_classification
```
*Min dist classification*

---

### Description

Performs a supervised minimum-distance classification using training site polygons and multi-spectral images.

### Usage

```
wbt_min_dist_classification(
  inputs,
  polys,
  field,
  output,
  threshold = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| inputs | Names of the input band images. |
| polys | Name of the input training site polygons shapefile. |
| field | Name of the attribute containing class name data. |
| output | Name of the output raster file. |
| threshold | Distance threshold, in z-scores; blank for none. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| command_only | Return command that would be executed by `system()` rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

```
wbt_min_downslope_elev_change
```
*Min downslope elev change*

## Description

Calculates the minimum downslope change in elevation between a grid cell and its eight downslope neighbors.

## Usage

```
wbt_min_downslope_elev_change(
  dem,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

wbt_min_max_contrast_stretch

*Min max contrast stretch*

### Description

Performs a min-max contrast stretch on an input greytone image.

### Usage

```
wbt_min_max_contrast_stretch(
  input,
  output,
  min_val,
  max_val,
  num_tones = 256,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| output | Output raster file. |
| min_val | Lower tail clip value. |
| max_val | Upper tail clip value. |
| num_tones | Number of tones in the output image. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_min_overlay          *Min overlay*

## Description

Evaluates the minimum value for each grid cell from a stack of input rasters.

## Usage

```
wbt_min_overlay(
  inputs,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| inputs | Input raster file paths, concatenated with `","` or `";"`. See `wbt_file_path()` for details. |
| output | Output raster file. |
| wd | Changes the working directory. Default: `NULL` will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| verbose_mode | Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| command_only | Return command that would be executed by `system()` rather than running tool. Default: `FALSE`. |

## Value

Returns the tool text outputs.

wbt_modified_k_means_clustering

*Modified k means clustering*

## Description

Performs a modified k-means clustering operation on a multi-spectral dataset.

## Usage

```
wbt_modified_k_means_clustering(
  inputs,
  output,
  out_html = NULL,
  start_clusters = 1000,
  merge_dist = NULL,
  max_iterations = 10,
  class_change = 2,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| inputs | Input raster file paths, concatenated with ", " or "; ". See wbt_file_path() for details. |
| output | Output raster file. |
| out_html | Output HTML report file. |
| start_clusters | Initial number of clusters. |
| merge_dist | Cluster merger distance. |
| max_iterations | Maximum number of iterations. |
| class_change | Minimum percent of cells changed between iterations before completion. |
| wd | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_modify_lidar            *Modify lidar*

---

## Description

Modify points within a LiDAR point cloud based on point properties.

## Usage

```
wbt_modify_lidar(
  input,
  output = NULL,
  statement = "",
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Name of the input LiDAR points. |
| output | Name of the output LiDAR points. |
| statement | Modify statement e.g. x += 5000.0. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

wbt_modify_no_data_value

*Modify no data value*

## Description

Modifies nodata values in a raster.

## Usage

```
wbt_modify_no_data_value(
  input,
  new_value = "-32768.0",
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| new_value | New NoData value. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_modulo                    *Modulo*

---

### Description

Performs a modulo operation on two rasters or a raster and a constant value.

### Usage

```
wbt_modulo(
  input1,
  input2,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input1 | Input raster file or constant value. |
| input2 | Input raster file or constant value. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

| | |
|---|---|
| wbt_mosaic | *Mosaic* |

## Description

Mosaics two or more images together.

## Usage

```
wbt_mosaic(
  output,
  inputs = NULL,
  method = "nn",
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| output | Output raster file. |
| inputs | Input raster file paths, concatenated with ", " or "; ". See wbt_file_path() for details. |
| method | Resampling method; options include 'nn' (nearest neighbour), 'bilinear', and 'cc' (cubic convolution). |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_mosaic_with_feathering

*Mosaic with feathering*

---

**Description**

Mosaics two images together using a feathering technique in overlapping areas to reduce edge-effects.

**Usage**

```
wbt_mosaic_with_feathering(
  input1,
  input2,
  output,
  method = "cc",
  weight = 4,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

**Arguments**

| | |
|---|---|
| input1 | Input raster file to modify. |
| input2 | Input reference raster file. |
| output | Output raster file. |
| method | Resampling method; options include 'nn' (nearest neighbour), 'bilinear', and 'cc' (cubic convolution). |
| weight | . |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

**Value**

Returns the tool text outputs.

wbt_multidirectional_hillshade

*Multidirectional hillshade*

## Description

Calculates a multi-direction hillshade raster from an input DEM.

## Usage

```
wbt_multidirectional_hillshade(
  dem,
  output,
  altitude = 45,
  zfactor = NULL,
  full_mode = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| output | Output raster file. |
| altitude | Illumination source altitude in degrees. |
| zfactor | Optional multiplier for when the vertical and horizontal units are not the same. |
| full_mode | Optional flag indicating whether to use full 360-degrees of illumination sources. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_multiply                    *Multiply*

---

### Description

Performs a multiplication operation on two rasters or a raster and a constant value.

### Usage

```
wbt_multiply(
  input1,
  input2,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input1 | Input raster file or constant value. |
| input2 | Input raster file or constant value. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_multiply_overlay     *Multiply overlay*

### Description

Calculates the sum for each grid cell from a group of raster images.

### Usage

```
wbt_multiply_overlay(
  inputs,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| inputs | Input raster file paths, concatenated with `","` or `";"`. See `wbt_file_path()` for details. |
| output | Output raster file. |
| wd | Changes the working directory. Default: `NULL` will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| verbose_mode | Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| compress_rasters | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| command_only | Return command that would be executed by `system()` rather than running tool. Default: `FALSE`. |

### Value

Returns the tool text outputs.

wbt_multiscale_curvatures

*Multiscale curvatures*

### Description

This tool calculates several multiscale curvatures and curvature-based indices from an input DEM.

### Usage

```
wbt_multiscale_curvatures(
  dem,
  out_mag,
  curv_type = "ProfileCurv",
  out_scale = NULL,
  min_scale = 0,
  step = 1,
  num_steps = 1,
  step_nonlinearity = 1,
  log = TRUE,
  standardize = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| dem | Name of the input raster DEM file. |
| out_mag | Output raster magnitude file. |
| curv_type | Curvature type. |
| out_scale | Output raster scale file. |
| min_scale | Minimum search neighbourhood radius in grid cells. |
| step | Step size as any positive non-zero integer. |
| num_steps | Number of steps. |
| step_nonlinearity | |
| | Step nonlinearity factor (1.0-2.0 is typical). |
| log | Display output values using a log-scale. |
| standardize | Should each scale be standardized to z-scores?. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |

compress_rasters

> Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details.

command_only      Return command that would be executed by system() rather than running tool. Default: FALSE.

### Value

Returns the tool text outputs.

---

wbt_multiscale_elevation_percentile

*Multiscale elevation percentile*

---

### Description

Calculates surface roughness over a range of spatial scales.

### Usage

```
wbt_multiscale_elevation_percentile(
  dem,
  out_mag,
  out_scale,
  sig_digits = 3,
  min_scale = 4,
  step = 1,
  num_steps = 10,
  step_nonlinearity = 1,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

dem      Input raster DEM file.

out_mag      Output raster roughness magnitude file.

out_scale      Output raster roughness scale file.

sig_digits      Number of significant digits.

min_scale      Minimum search neighbourhood radius in grid cells.

step      Step size as any positive non-zero integer.

num_steps      Number of steps.

step_nonlinearity

                Step nonlinearity factor (1.0-2.0 is typical).

wd               Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details.

verbose_mode     Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details.

compress_rasters

                Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details.

command_only     Return command that would be executed by system() rather than running tool. Default: FALSE.

## Value

Returns the tool text outputs.

---

wbt_multiscale_roughness

*Multiscale roughness*

---

## Description

Calculates surface roughness over a range of spatial scales.

## Usage

```
wbt_multiscale_roughness(
  dem,
  out_mag,
  out_scale,
  max_scale,
  min_scale = 1,
  step = 1,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

dem             Input raster DEM file.

out_mag         Output raster roughness magnitude file.

out_scale      Output raster roughness scale file.

max_scale          Maximum search neighbourhood radius in grid cells.

min_scale          Minimum search neighbourhood radius in grid cells.

step               Step size as any positive non-zero integer.

wd                 Changes the working directory. Default: NULL will use the value in Whitebox-
                   Tools settings, see wbt_wd() for details.

verbose_mode       Sets verbose mode. If verbose mode is FALSE, tools will not print output mes-
                   sages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose()
                   for details.

compress_rasters
                   Sets the flag used by 'WhiteboxTools' to determine whether to use compression
                   for output rasters. Default: NULL will use the value in WhiteboxTools settings,
                   see wbt_compress_rasters() for details.

command_only       Return command that would be executed by system() rather than running tool.
                   Default: FALSE.

## Value

Returns the tool text outputs.

---

wbt_multiscale_roughness_signature

*Multiscale roughness signature*

---

## Description

Calculates the surface roughness for points over a range of spatial scales.

## Usage

```
wbt_multiscale_roughness_signature(
  dem,
  points,
  output,
  max_scale,
  min_scale = 1,
  step = 1,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| points | Input vector points file. |
| output | Output HTML file. |
| max_scale | Maximum search neighbourhood radius in grid cells. |
| min_scale | Minimum search neighbourhood radius in grid cells. |
| step | Step size as any positive non-zero integer. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_multiscale_std_dev_normals

*Multiscale std dev normals*

---

## Description

Calculates surface roughness over a range of spatial scales.

## Usage

```
wbt_multiscale_std_dev_normals(
  dem,
  out_mag,
  out_scale,
  min_scale = 1,
  step = 1,
  num_steps = 10,
  step_nonlinearity = 1,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| out_mag | Output raster roughness magnitude file. |
| out_scale | Output raster roughness scale file. |
| min_scale | Minimum search neighbourhood radius in grid cells. |
| step | Step size as any positive non-zero integer. |
| num_steps | Number of steps. |
| step_nonlinearity | |
| | Step nonlinearity factor (1.0-2.0 is typical). |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_multiscale_std_dev_normals_signature
*Multiscale std dev normals signature*

---

## Description

Calculates the surface roughness for points over a range of spatial scales.

## Usage

```
wbt_multiscale_std_dev_normals_signature(
  dem,
  points,
  output,
  min_scale = 1,
  step = 1,
  num_steps = 10,
  step_nonlinearity = 1,
  wd = NULL,
```

```
    verbose_mode = NULL,
    compress_rasters = NULL,
    command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| points | Input vector points file. |
| output | Output HTML file. |
| min_scale | Minimum search neighbourhood radius in grid cells. |
| step | Step size as any positive non-zero integer. |
| num_steps | Number of steps. |
| step_nonlinearity | |
| | Step nonlinearity factor (1.0-2.0 is typical). |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_multiscale_topographic_position_image
                        *Multiscale topographic position image*

---

## Description

Creates a multiscale topographic position image from three DEVmax rasters of differing spatial scale ranges.

**Usage**

```
wbt_multiscale_topographic_position_image(
  local,
  meso,
  broad,
  output,
  hillshade = NULL,
  lightness = 1.2,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

**Arguments**

| | |
|---|---|
| local | Input local-scale topographic position (DEVmax) raster file. |
| meso | Input meso-scale topographic position (DEVmax) raster file. |
| broad | Input broad-scale topographic position (DEVmax) raster file. |
| output | Output raster file. |
| hillshade | Input optional hillshade raster file. Note: a multi-directional (360-degree option) hillshade tends to work best in this application. |
| lightness | Image lightness value (default is 1.2). |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

**Value**

Returns the tool text outputs.

```
wbt_multi_part_to_single_part
```
                              *Multi part to single part*

### Description

Converts a vector file containing multi-part features into a vector containing only single-part features.

### Usage

```
wbt_multi_part_to_single_part(
  input,
  output,
  exclude_holes = TRUE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input vector line or polygon file. |
| output | Output vector line or polygon file. |
| exclude_holes | Exclude hole parts from the feature splitting? (holes will continue to belong to their features in output.). |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

---

wbt_narrowness_index     *Narrowness index*

---

## Description

Calculates the narrowness of raster polygons.

## Usage

```
wbt_narrowness_index(
  input,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input raster file path. See `wbt_file_path()` for details. |
| output | Output raster file. |
| wd | Changes the working directory. Default: `NULL` will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| verbose_mode | Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| command_only | Return command that would be executed by `system()` rather than running tool. Default: `FALSE`. |

## Value

Returns the tool text outputs.

---

wbt_natural_neighbour_interpolation
*Natural neighbour interpolation*

---

### Description

Creates a raster grid based on Sibson's natural neighbour method.

### Usage

```
wbt_natural_neighbour_interpolation(
  input,
  output,
  field = NULL,
  use_z = FALSE,
  cell_size = NULL,
  base = NULL,
  clip = TRUE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input vector points file. |
| output | Output raster file. |
| field | Input field name in attribute table. |
| use_z | Use the 'z' dimension of the Shapefile's geometry instead of an attribute field?. |
| cell_size | Optionally specified cell size of output raster. Not used when base raster is specified. |
| base | Optionally specified input base raster file. Not used when a cell size is specified. |
| clip | Clip the data to the convex hull of the points?. |
| wd | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

```
wbt_nearest_neighbour_gridding
```
*Nearest neighbour gridding*

---

## Description

Creates a raster grid based on a set of vector points and assigns grid values using the nearest neighbour.

## Usage

```
wbt_nearest_neighbour_gridding(
  input,
  field,
  output,
  use_z = FALSE,
  cell_size = NULL,
  base = NULL,
  max_dist = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input vector Points file. |
| field | Input field name in attribute table. |
| output | Output raster file. |
| use_z | Use z-coordinate instead of field?. |
| cell_size | Optionally specified cell size of output raster. Not used when base raster is specified. |
| base | Optionally specified input base raster file. Not used when a cell size is specified. |
| max_dist | Maximum search distance (optional). |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |

compress_rasters

      Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details.

command_only     Return command that would be executed by `system()` rather than running tool. Default: `FALSE`.

## Value

Returns the tool text outputs.

---

wbt_negate               *Negate*

---

## Description

Changes the sign of values in a raster or the 0-1 values of a Boolean raster.

## Usage

```
wbt_negate(
  input,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

input          Input raster file path. See `wbt_file_path()` for details.

output        Output raster file.

wd              Changes the working directory. Default: `NULL` will use the value in Whitebox-Tools settings, see `wbt_wd()` for details.

verbose_mode    Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details.

compress_rasters

      Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details.

command_only     Return command that would be executed by `system()` rather than running tool. Default: `FALSE`.

## Value

Returns the tool text outputs.

wbt_new_raster_from_base

*New raster from base*

## Description

Creates a new raster using a base image.

## Usage

```
wbt_new_raster_from_base(
  base,
  output,
  value = "nodata",
  data_type = "float",
  cell_size = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| base | Input base raster file. |
| output | Output raster file. |
| value | Constant value to fill raster with; either 'nodata' or numeric value. |
| data_type | Output raster data type; options include 'double' (64-bit), 'float' (32-bit), and 'integer' (signed 16-bit) (default is 'float'). |
| cell_size | Optionally specified cell size of output raster. Not used when base raster is specified. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_normalized_difference_index

*Normalized difference index*

---

### Description

Calculate a normalized-difference index (NDI) from two bands of multispectral image data.

### Usage

```
wbt_normalized_difference_index(
  input1,
  input2,
  output,
  clip = 0,
  correction = 0,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input1 | Input image 1 (e.g. near-infrared band). |
| input2 | Input image 2 (e.g. red band). |
| output | Output raster file. |
| clip | Optional amount to clip the distribution tails by, in percent. |
| correction | Optional adjustment value (e.g. 1, or 0.16 for the optimal soil adjusted vegetation index, OSAVI). |
| wd | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_normalize_lidar    *Normalize lidar*

### Description

Normalizes a LiDAR point cloud.

### Usage

```
wbt_normalize_lidar(
  input,
  output,
  dtm,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Name of the input LiDAR file. |
| output | Name of the output LiDAR file. |
| dtm | Name of the input digital terrain model (DTM) raster file. |
| wd | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_normal_vectors          *Normal vectors*

### Description

Calculates normal vectors for points within a LAS file and stores these data (XYZ vector components) in the RGB field.

### Usage

```
wbt_normal_vectors(
  input,
  output,
  radius = 1,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input LiDAR file. |
| output | Output LiDAR file. |
| radius | Search Radius. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

---

wbt_not                        *Not*

---

## Description

Performs a logical NOT operator on two Boolean raster images.

## Usage

```
wbt_not(
  input1,
  input2,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input1 | Input raster file path. See `wbt_file_path()` for details. |
| input2 | Input raster file path. See `wbt_file_path()` for details. |
| output | Output raster file. |
| wd | Changes the working directory. Default: `NULL` will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| verbose_mode | Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| command_only | Return command that would be executed by `system()` rather than running tool. Default: `FALSE`. |

## Value

Returns the tool text outputs.

---

wbt_not_equal_to          *Not equal to*

---

### Description

Performs a not-equal-to comparison operation on two rasters or a raster and a constant value.

### Usage

```
wbt_not_equal_to(
  input1,
  input2,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input1 | Input raster file or constant value. |
| input2 | Input raster file or constant value. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_num_downslope_neighbours

*Num downslope neighbours*

## Description

Calculates the number of downslope neighbours to each grid cell in a DEM.

## Usage

```
wbt_num_downslope_neighbours(
  dem,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

wbt_num_inflowing_neighbours

*Num inflowing neighbours*

## Description

Computes the number of inflowing neighbours to each cell in an input DEM based on the D8 algorithm.

## Usage

```
wbt_num_inflowing_neighbours(
  dem,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

dem                Input raster DEM file.

output             Output raster file.

wd                 Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details.

verbose_mode       Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details.

compress_rasters

                   Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details.

command_only       Return command that would be executed by system() rather than running tool. Default: FALSE.

## Value

Returns the tool text outputs.

wbt_num_upslope_neighbours

*Num upslope neighbours*

## Description

Calculates the number of upslope neighbours to each grid cell in a DEM.

## Usage

```
wbt_num_upslope_neighbours(
  dem,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

wbt_olympic_filter          *Olympic filter*

## Description

Performs an olympic smoothing filter on an image.

## Usage

```
wbt_olympic_filter(
  input,
  output,
  filterx = 11,
  filtery = 11,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| output | Output raster file. |
| filterx | Size of the filter kernel in the x-direction. |
| filtery | Size of the filter kernel in the y-direction. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_opening                    *Opening*

---

## Description

An opening is a mathematical morphology operation involving a dilation (max filter) of an erosion (min filter) set.

## Usage

```
wbt_opening(
  input,
  output,
  filterx = 11,
  filtery = 11,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| output | Output raster file. |
| filterx | Size of the filter kernel in the x-direction. |
| filtery | Size of the filter kernel in the y-direction. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_openness                    *Openness*

---

## Description

This tool calculates the topographic openness index from an input DEM.

## Usage

```
wbt_openness(
  input,
  pos_output,
  neg_output,
  dist = 20,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Name of the input raster DEM file. |
| pos_output | Name of the positive openness output raster file. |
| neg_output | Name of the negative openness output raster file. |
| dist | Search distance, in grid cells. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_or *Or*

---

### Description

Performs a logical OR operator on two Boolean raster images.

### Usage

```
wbt_or(
  input1,
  input2,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

input1          Input raster file path. See `wbt_file_path()` for details.

input2          Input raster file path. See `wbt_file_path()` for details.

output          Output raster file.

wd              Changes the working directory. Default: `NULL` will use the value in Whitebox-Tools settings, see `wbt_wd()` for details.

verbose_mode    Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details.

compress_rasters

Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details.

command_only    Return command that would be executed by `system()` rather than running tool. Default: `FALSE`.

### Value

Returns the tool text outputs.

wbt_paired_sample_t_test

*Paired sample t test*

### Description

Performs a 2-sample K-S test for significant differences on two input rasters.

### Usage

```
wbt_paired_sample_t_test(
  input1,
  input2,
  output,
  num_samples = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input1 | First input raster file. |
| input2 | Second input raster file. |
| output | Output HTML file. |
| num_samples | Number of samples. Leave blank to use whole image. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_panchromatic_sharpening

*Panchromatic sharpening*

## Description

Increases the spatial resolution of image data by combining multispectral bands with panchromatic data.

## Usage

```
wbt_panchromatic_sharpening(
  pan,
  output,
  red = NULL,
  green = NULL,
  blue = NULL,
  composite = NULL,
  method = "brovey",
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| pan | Input panchromatic band file. |
| output | Output colour composite file. |
| red | Input red band image file. Optionally specified if colour-composite not specified. |
| green | Input green band image file. Optionally specified if colour-composite not specified. |
| blue | Input blue band image file. Optionally specified if colour-composite not specified. |
| composite | Input colour-composite image file. Only used if individual bands are not specified. |
| method | Options include 'brovey' (default) and 'ihs'. |
| wd | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |

compress_rasters

                Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details.

command_only      Return command that would be executed by `system()` rather than running tool. Default: FALSE.

## Value

Returns the tool text outputs.

---

wbt_parallelepiped_classification
*Parallelepiped classification*

---

## Description

Performs a supervised parallelepiped classification using training site polygons and multi-spectral images.

## Usage

```
wbt_parallelepiped_classification(
  inputs,
  polys,
  field,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

inputs            Name of the input band images.

polys              Name of the input training site polygons shapefile.

field              Name of the attribute containing class name data.

output            Name of the output raster file.

wd                Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see `wbt_wd()` for details.

verbose_mode      Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see `wbt_verbose()` for details.

compress_rasters

> Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details.

command_only    Return command that would be executed by system() rather than running tool. Default: FALSE.

### Value

Returns the tool text outputs.

---

wbt_patch_orientation    *Patch orientation*

---

### Description

Calculates the orientation of vector polygons.

### Usage

```
wbt_patch_orientation(
  input,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

input           Input vector polygon file.

wd              Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details.

verbose_mode    Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details.

compress_rasters

> Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details.

command_only    Return command that would be executed by system() rather than running tool. Default: FALSE.

### Value

Returns the tool text outputs.

---

wbt_pennock_landform_class

*Pennock landform class*

---

### Description

Classifies hillslope zones based on slope, profile curvature, and plan curvature.

### Usage

```
wbt_pennock_landform_class(
  dem,
  output,
  slope = 3,
  prof = 0.1,
  plan = 0,
  zfactor = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| output | Output raster file. |
| slope | Slope threshold value, in degrees (default is 3.0). |
| prof | Profile curvature threshold value (default is 0.1). |
| plan | Plan curvature threshold value (default is 0.0). |
| zfactor | Optional multiplier for when the vertical and horizontal units are not the same. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_percentage_contrast_stretch

*Percentage contrast stretch*

### Description

Performs a percentage linear contrast stretch on input images.

### Usage

```
wbt_percentage_contrast_stretch(
  input,
  output,
  clip = 1,
  tail = "both",
  num_tones = 256,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| output | Output raster file. |
| clip | Optional amount to clip the distribution tails by, in percent. |
| tail | Specified which tails to clip; options include 'upper', 'lower', and 'both' (default is 'both'). |
| num_tones | Number of tones in the output image. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

---

wbt_percentile_filter    *Percentile filter*

---

### Description

Performs a percentile filter on an input image.

### Usage

```
wbt_percentile_filter(
  input,
  output,
  filterx = 11,
  filtery = 11,
  sig_digits = 2,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| output | Output raster file. |
| filterx | Size of the filter kernel in the x-direction. |
| filtery | Size of the filter kernel in the y-direction. |
| sig_digits | Number of significant digits. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_percent_elev_range

*Percent elev range*

### Description

Calculates percent of elevation range from a DEM.

### Usage

```
wbt_percent_elev_range(
  dem,
  output,
  filterx = 3,
  filtery = 3,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| output | Output raster file. |
| filterx | Size of the filter kernel in the x-direction. |
| filtery | Size of the filter kernel in the y-direction. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_percent_equal_to     *Percent equal to*

### Description

Calculates the percentage of a raster stack that have cell values equal to an input on a cell-by-cell basis.

### Usage

```
wbt_percent_equal_to(
  inputs,
  comparison,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| inputs | Input raster file paths, concatenated with ",″ or ″;″. See wbt_file_path() for details. |
| comparison | Input comparison raster file. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

---

```
wbt_percent_greater_than
```
*Percent greater than*

---

### Description

Calculates the percentage of a raster stack that have cell values greater than an input on a cell-by-cell basis.

### Usage

```
wbt_percent_greater_than(
  inputs,
  comparison,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| inputs | Input raster file paths, concatenated with ",", or ";". See wbt_file_path() for details. |
| comparison | Input comparison raster file. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

---

`wbt_percent_less_than`   *Percent less than*

---

### Description

Calculates the percentage of a raster stack that have cell values less than an input on a cell-by-cell basis.

### Usage

```
wbt_percent_less_than(
  inputs,
  comparison,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| `inputs` | Input raster file paths, concatenated with `","` or `";"`. See `wbt_file_path()` for details. |
| `comparison` | Input comparison raster file. |
| `output` | Output raster file. |
| `wd` | Changes the working directory. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_wd()` for details. |
| `verbose_mode` | Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| `compress_rasters` | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| `command_only` | Return command that would be executed by `system()` rather than running tool. Default: `FALSE`. |

### Value

Returns the tool text outputs.

---

wbt_perimeter_area_ratio

*Perimeter area ratio*

---

## Description

Calculates the perimeter-area ratio of vector polygons.

## Usage

```
wbt_perimeter_area_ratio(
  input,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input vector polygon file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_phi_coefficient *Phi coefficient*

---

## Description

This tool performs a binary classification accuracy assessment.

## Usage

```
wbt_phi_coefficient(
  input1,
  input2,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input1 | Name of the first input raster image file. |
| input2 | Name of the second input raster image file. |
| output | Name of the output HTML file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_pick_from_list          *Pick from list*

---

## Description

Outputs the value from a raster stack specified by a position raster.

## Usage

```
wbt_pick_from_list(
  inputs,
  pos_input,
  output,
```

```
    wd = NULL,
    verbose_mode = NULL,
    compress_rasters = NULL,
    command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| `inputs` | Input raster file paths, concatenated with `","` or `";"`. See `wbt_file_path()` for details. |
| `pos_input` | Input position raster file. |
| `output` | Output raster file. |
| `wd` | Changes the working directory. Default: `NULL` will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| `verbose_mode` | Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| `compress_rasters` | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| `command_only` | Return command that would be executed by `system()` rather than running tool. Default: `FALSE`. |

## Value

Returns the tool text outputs.

---

`wbt_piecewise_contrast_stretch`

*Piecewise contrast stretch*

---

## Description

Performs a piecewise contrast stretch on an input image.

## Usage

```
wbt_piecewise_contrast_stretch(
  input,
  output,
  FUN = "",
  greytones = 1024,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| `input` | Name of the input raster image file. |
| `output` | Name of the output raster image file. |
| `FUN` | Piecewise break-points e.g. '(50, 0.1); (150, 0.8); (255; 1.0). |
| `greytones` | Number of greytones in the output image. |
| `wd` | Changes the working directory. Default: `NULL` will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| `verbose_mode` | Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| `compress_rasters` | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| `command_only` | Return command that would be executed by `system()` rather than running tool. Default: `FALSE`. |

## Value

Returns the tool text outputs.

---

`wbt_plan_curvature`          *Plan curvature*

---

## Description

Calculates a plan (contour) curvature raster from an input DEM.

## Usage

```
wbt_plan_curvature(
  dem,
  output,
  log = FALSE,
  zfactor = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| output | Output raster file. |
| log | Display output values using a log-scale. |
| zfactor | Optional multiplier for when the vertical and horizontal units are not the same. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| command_only | Return command that would be executed by `system()` rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

| | |
|---|---|
| wbt_polygonize | *Polygonize* |

---

## Description

Creates a polygon layer from two or more intersecting line features contained in one or more input vector line files.

## Usage

```
wbt_polygonize(
  inputs,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| `inputs` | Input vector polyline file. |
| `output` | Output vector polygon file. |
| `wd` | Changes the working directory. Default: `NULL` will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| `verbose_mode` | Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| `compress_rasters` | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| `command_only` | Return command that would be executed by `system()` rather than running tool. Default: `FALSE`. |

## Value

Returns the tool text outputs.

---

`wbt_polygons_to_lines`    *Polygons to lines*

---

## Description

Converts vector polygons to polylines.

## Usage

```
wbt_polygons_to_lines(
  input,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| `input` | Input vector polygon file. |
| `output` | Output vector lines file. |
| `wd` | Changes the working directory. Default: `NULL` will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |

| | |
|---|---|
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_polygon_area                   *Polygon area*

---

## Description

Calculates the area of vector polygons.

## Usage

```
wbt_polygon_area(
  input,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input vector polygon file. |
| wd | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

**Value**

Returns the tool text outputs.

---

`wbt_polygon_long_axis`   *Polygon long axis*

---

**Description**

Used to map the long axis of polygon features.

**Usage**

```
wbt_polygon_long_axis(
  input,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

**Arguments**

| | |
|---|---|
| `input` | Input vector polygons file. |
| `output` | Output vector polyline file. |
| `wd` | Changes the working directory. Default: `NULL` will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| `verbose_mode` | Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| `compress_rasters` | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| `command_only` | Return command that would be executed by `system()` rather than running tool. Default: `FALSE`. |

**Value**

Returns the tool text outputs.

---

wbt_polygon_perimeter    *Polygon perimeter*

---

### Description

Calculates the perimeter of vector polygons.

### Usage

```
wbt_polygon_perimeter(
  input,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input vector polygon file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

---

wbt_polygon_short_axis

*Polygon short axis*

---

### Description

Used to map the short axis of polygon features.

**Usage**

```
wbt_polygon_short_axis(
  input,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

**Arguments**

| | |
|---|---|
| input | Input vector polygons file. |
| output | Output vector polyline file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

**Value**

Returns the tool text outputs.

---

wbt_power                          *Power*

---

**Description**

Raises the values in grid cells of one rasters, or a constant value, by values in another raster or constant value.

**Usage**

```
wbt_power(
  input1,
  input2,
  output,
  wd = NULL,
  verbose_mode = NULL,
```

```
    compress_rasters = NULL,
    command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input1 | Input raster file or constant value. |
| input2 | Input raster file or constant value. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_prewitt_filter       *Prewitt filter*

---

## Description

Performs a Prewitt edge-detection filter on an image.

## Usage

```
wbt_prewitt_filter(
  input,
  output,
  clip = 0,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| output | Output raster file. |
| clip | Optional amount to clip the distribution tails by, in percent. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_principal_component_analysis

*Principal component analysis*

---

## Description

Performs a principal component analysis (PCA) on a multi-spectral dataset.

## Usage

```
wbt_principal_component_analysis(
  inputs,
  output,
  num_comp = NULL,
  standardized = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| `inputs` | Input raster file paths, concatenated with `","` or `";"`. See `wbt_file_path()` for details. |
| `output` | Output HTML report file. |
| `num_comp` | Number of component images to output; <= to num. input images. |
| `standardized` | Perform standardized PCA?. |
| `wd` | Changes the working directory. Default: `NULL` will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| `verbose_mode` | Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| `compress_rasters` | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| `command_only` | Return command that would be executed by `system()` rather than running tool. Default: `FALSE`. |

## Value

Returns the tool text outputs.

---

`wbt_print_geo_tiff_tags`

*Print geo tiff tags*

---

## Description

Prints the tags within a GeoTIFF.

## Usage

```
wbt_print_geo_tiff_tags(
  input,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| `input` | Input GeoTIFF file. |
| `wd` | Changes the working directory. Default: `NULL` will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| `verbose_mode` | Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| `compress_rasters` | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| `command_only` | Return command that would be executed by `system()` rather than running tool. Default: `FALSE`. |

## Value

Returns the tool text outputs.

---

| `wbt_profile` | *Profile* |
|---|---|

---

## Description

Plots profiles from digital surface models.

## Usage

```
wbt_profile(
  lines,
  surface,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| `lines` | Input vector line file. |
| `surface` | Input raster surface file. |
| `output` | Output HTML file. |
| `wd` | Changes the working directory. Default: `NULL` will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |

verbose_mode    Sets verbose mode. If verbose mode is `FALSE`, tools will not print output mes-
                sages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()`
                for details.

compress_rasters

                Sets the flag used by 'WhiteboxTools' to determine whether to use compression
                for output rasters. Default: `NULL` will use the value in WhiteboxTools settings,
                see `wbt_compress_rasters()` for details.

command_only    Return command that would be executed by `system()` rather than running tool.
                Default: `FALSE`.

## Value

Returns the tool text outputs.

---

wbt_profile_curvature    *Profile curvature*

---

## Description

Calculates a profile curvature raster from an input DEM.

## Usage

```
wbt_profile_curvature(
  dem,
  output,
  log = FALSE,
  zfactor = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

dem             Input raster DEM file.

output          Output raster file.

log             Display output values using a log-scale.

zfactor         Optional multiplier for when the vertical and horizontal units are not the same.

wd              Changes the working directory. Default: `NULL` will use the value in Whitebox-
                Tools settings, see `wbt_wd()` for details.

verbose_mode    Sets verbose mode. If verbose mode is `FALSE`, tools will not print output mes-
                sages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()`
                for details.

compress_rasters

        Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details.

command_only    Return command that would be executed by `system()` rather than running tool. Default: `FALSE`.

## Value

Returns the tool text outputs.

---

wbt_qin_flow_accumulation

*Qin flow accumulation*

---

## Description

Calculates Qin et al. (2007) flow accumulation.

## Usage

```
wbt_qin_flow_accumulation(
  dem,
  output,
  out_type = "specific contributing area",
  exponent = 10,
  max_slope = 45,
  threshold = NULL,
  log = FALSE,
  clip = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| dem | Name of the input DEM raster file; must be depressionless. |
| output | Name of the output raster file. |
| out_type | Output type; one of 'cells', 'specific contributing area' (default), and 'catchment area'. |
| exponent | Optional upper-bound exponent parameter; default is 10.0. |
| max_slope | Optional upper-bound slope parameter, in degrees (0-90); default is 45.0. |
| threshold | Optional convergence threshold parameter, in grid cells; default is infinity. |

| log | Log-transform the output values?. |
|---|---|
| clip | Optional flag to request clipping the display max by 1 percent. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

| wbt_quantiles | *Quantiles* |
|---|---|

---

## Description

Transforms raster values into quantiles.

## Usage

```
wbt_quantiles(
  input,
  output,
  num_quantiles = 5,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| input | Input raster file path. See wbt_file_path() for details. |
|---|---|
| output | Output raster file. |
| num_quantiles | Number of quantiles. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |

| | |
|---|---|
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_quinn_flow_accumulation

*Quinn flow accumulation*

---

## Description

Calculates Quinn et al. (1995) flow accumulation.

## Usage

```
wbt_quinn_flow_accumulation(
  dem,
  output,
  out_type = "specific contributing area",
  exponent = 1,
  threshold = NULL,
  log = FALSE,
  clip = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| dem | Name of the input DEM raster file; must be depressionless. |
| output | Name of the output raster file. |
| out_type | Output type; one of 'cells', 'specific contributing area' (default), and 'catchment area'. |
| exponent | Optional exponent parameter; default is 1.0. |
| threshold | Optional convergence threshold parameter, in grid cells; default is infinity. |

| | |
|---|---|
| log | Log-transform the output values?. |
| clip | Optional flag to request clipping the display max by 1 percent. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_radial_basis_function_interpolation

*Radial basis function interpolation*

---

## Description

Interpolates vector points into a raster surface using a radial basis function scheme.

## Usage

```
wbt_radial_basis_function_interpolation(
  input,
  field,
  output,
  use_z = FALSE,
  radius = NULL,
  min_points = NULL,
  func_type = "ThinPlateSpline",
  poly_order = "none",
  weight = 0.1,
  cell_size = NULL,
  base = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| `input` | Input vector points file. |
| `field` | Input field name in attribute table. |
| `output` | Output raster file. |
| `use_z` | Use z-coordinate instead of field?. |
| `radius` | Search Radius (in map units). |
| `min_points` | Minimum number of points. |
| `func_type` | Radial basis function type; options are 'ThinPlateSpline' (default), 'PolyHarmonic', 'Gaussian', 'MultiQuadric', 'InverseMultiQuadric'. |
| `poly_order` | Polynomial order; options are 'none' (default), 'constant', 'affine'. |
| `weight` | Weight parameter used in basis function. |
| `cell_size` | Optionally specified cell size of output raster. Not used when base raster is specified. |
| `base` | Optionally specified input base raster file. Not used when a cell size is specified. |
| `wd` | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see `wbt_wd()` for details. |
| `verbose_mode` | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| `compress_rasters` | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| `command_only` | Return command that would be executed by `system()` rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

`wbt_radius_of_gyration`

*Radius of gyration*

---

## Description

Calculates the distance of cells from their polygon's centroid.

## Usage

```
wbt_radius_of_gyration(
  input,
  output,
  text_output = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input raster file path. See `wbt_file_path()` for details. |
| output | Output raster file. |
| text_output | Optional text output. |
| wd | Changes the working directory. Default: `NULL` will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| verbose_mode | Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| command_only | Return command that would be executed by `system()` rather than running tool. Default: `FALSE`. |

## Value

Returns the tool text outputs.

---

| wbt_raise_walls | *Raise walls* |
|---|---|

---

## Description

Raises walls in a DEM along a line or around a polygon, e.g. a watershed.

## Usage

```
wbt_raise_walls(
  input,
  dem,
  output,
```

```
    breach = NULL,
    height = 100,
    wd = NULL,
    verbose_mode = NULL,
    compress_rasters = NULL,
    command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| `input` | Input vector lines or polygons file. |
| `dem` | Input raster DEM file. |
| `output` | Output raster file. |
| `breach` | Optional input vector breach lines. |
| `height` | Wall height. |
| `wd` | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| `verbose_mode` | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| `compress_rasters` | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| `command_only` | Return command that would be executed by `system()` rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

| `wbt_random_field` | *Random field* |
|---|---|

---

## Description

Creates an image containing random values.

## Usage

```
wbt_random_field(
    base,
    output,
    wd = NULL,
    verbose_mode = NULL,
    compress_rasters = NULL,
    command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| base | Input raster file path. See `wbt_file_path()` for details. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| command_only | Return command that would be executed by `system()` rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

```
wbt_random_forest_classification
```
*Random forest classification*

---

## Description

Performs a supervised random forest classification using training site polygons/points and predictor rasters.

## Usage

```
wbt_random_forest_classification(
  inputs,
  training,
  field,
  output = NULL,
  split_criterion = "Gini",
  n_trees = 500,
  min_samples_leaf = 1,
  min_samples_split = 2,
  test_proportion = 0.2,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| `inputs` | Names of the input predictor rasters. |
| `training` | Name of the input training site polygons/points shapefile. |
| `field` | Name of the attribute containing class data. |
| `output` | Name of the output raster file. |
| `split_criterion` | |
| | Split criterion to use when building a tree. Options include 'Gini', 'Entropy', and 'ClassificationError'. |
| `n_trees` | The number of trees in the forest. |
| `min_samples_leaf` | |
| | The minimum number of samples required to be at a leaf node. |
| `min_samples_split` | |
| | The minimum number of samples required to split an internal node. |
| `test_proportion` | |
| | The proportion of the dataset to include in the test split; default is 0.2. |
| `wd` | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| `verbose_mode` | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| `compress_rasters` | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| `command_only` | Return command that would be executed by `system()` rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

`wbt_random_forest_regression`
*Random forest regression*

---

## Description

Performs a random forest regression analysis using training site data and predictor rasters.

## Usage

```
wbt_random_forest_regression(
  inputs,
  training,
  field,
  output = NULL,
  n_trees = 100,
  min_samples_leaf = 1,
  min_samples_split = 2,
  test_proportion = 0.2,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| `inputs` | Names of the input predictor rasters. |
| `training` | Name of the input training site points shapefile. |
| `field` | Name of the attribute containing response variable name data. |
| `output` | Name of the output raster file. This parameter is optional. When unspecified, the tool will only build the model. When specified, the tool will use the built model and predictor rasters to perform a spatial prediction. |
| `n_trees` | The number of trees in the forest. |
| `min_samples_leaf` | |
| | The minimum number of samples required to be at a leaf node. |
| `min_samples_split` | |
| | The minimum number of samples required to split an internal node. |
| `test_proportion` | |
| | The proportion of the dataset to include in the test split; default is 0.2. |
| `wd` | Changes the working directory. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_wd()` for details. |
| `verbose_mode` | Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| `compress_rasters` | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| `command_only` | Return command that would be executed by `system()` rather than running tool. Default: `FALSE`. |

## Value

Returns the tool text outputs.

wbt_random_sample            *Random sample*

## Description

Creates an image containing randomly located sample grid cells with unique IDs.

## Usage

```
wbt_random_sample(
  base,
  output,
  num_samples = 1000,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| base | Input raster file path. See wbt_file_path() for details. |
| output | Output raster file. |
| num_samples | Number of samples. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

| | |
|---|---|
| `wbt_range_filter` | *Range filter* |

### Description

Assigns each cell in the output grid the range of values in a moving window centred on each grid cell in the input raster.

### Usage

```
wbt_range_filter(
  input,
  output,
  filterx = 11,
  filtery = 11,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input raster file path. See `wbt_file_path()` for details. |
| output | Output raster file. |
| filterx | Size of the filter kernel in the x-direction. |
| filtery | Size of the filter kernel in the y-direction. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| command_only | Return command that would be executed by `system()` rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_rasterize_streams    *Rasterize streams*

## Description

Rasterizes vector streams based on Lindsay (2016) method.

## Usage

```
wbt_rasterize_streams(
  streams,
  base,
  output,
  nodata = TRUE,
  feature_id = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| streams | Input vector streams file. |
| base | Input base raster file. |
| output | Output raster file. |
| nodata | Use NoData value for background?. |
| feature_id | Use feature number as output value?. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

wbt_raster_area          *Raster area*

### Description

Calculates the area of polygons or classes within a raster image.

### Usage

```
wbt_raster_area(
  input,
  output = NULL,
  out_text = FALSE,
  units = "grid cells",
  zero_back = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| output | Output raster file. |
| out_text | Would you like to output polygon areas to text?. |
| units | Area units; options include 'grid cells' and 'map units'. |
| zero_back | Flag indicating whether zero values should be treated as a background. |
| wd | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

---

`wbt_raster_calculator`   *Raster calculator*

---

### Description

Performs a complex mathematical operations on one or more input raster images on a cell-to-cell basis.

### Usage

```
wbt_raster_calculator(
  output,
  statement = "",
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| output | Name of the output raster file. |
| statement | Statement e.g. cos("raster1") * 35.0 + "raster2". This statement must be a valid Rust statement. |
| wd | Changes the working directory. Default: `NULL` will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| verbose_mode | Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| command_only | Return command that would be executed by `system()` rather than running tool. Default: `FALSE`. |

### Value

Returns the tool text outputs.

wbt_raster_cell_assignment

*Raster cell assignment*

## Description

Assign row or column number to cells.

## Usage

```
wbt_raster_cell_assignment(
  input,
  output,
  assign = "column",
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| output | Output raster file. |
| assign | Which variable would you like to assign to grid cells? Options include 'column', 'row', 'x', and 'y'. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

wbt_raster_histogram    *Raster histogram*

## Description

Creates a histogram from raster values.

## Usage

```
wbt_raster_histogram(
  input,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| output | Output HTML file (default name will be based on input file if unspecified). |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

wbt_raster_perimeter     *Raster perimeter*

## Description

Calculates the perimeters of polygons or classes within a raster image.

## Usage

```
wbt_raster_perimeter(
  input,
  output = NULL,
  out_text = FALSE,
  units = "grid cells",
  zero_back = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| output | Output raster file. |
| out_text | Would you like to output polygon areas to text?. |
| units | Area units; options include 'grid cells' and 'map units'. |
| zero_back | Flag indicating whether zero values should be treated as a background. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_raster_streams_to_vector

*Raster streams to vector*

---

### Description

Converts a raster stream file into a vector file.

### Usage

```
wbt_raster_streams_to_vector(
  streams,
  d8_pntr,
  output,
  esri_pntr = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| streams | Input raster streams file. |
| d8_pntr | Input raster D8 pointer file. |
| output | Output vector file. |
| esri_pntr | D8 pointer uses the ESRI style scheme. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

```
wbt_raster_summary_stats
```
*Raster summary stats*

## Description

Measures a rasters min, max, average, standard deviation, num. non-nodata cells, and total.

## Usage

```
wbt_raster_summary_stats(
  input,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input raster file path. See `wbt_file_path()` for details. |
| wd | Changes the working directory. Default: `NULL` will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| verbose_mode | Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| compress_rasters | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| command_only | Return command that would be executed by `system()` rather than running tool. Default: `FALSE`. |

## Value

Returns the tool text outputs.

wbt_raster_to_vector_lines

*Raster to vector lines*

### Description

Converts a raster lines features into a vector of the POLYLINE shapetype.

### Usage

```
wbt_raster_to_vector_lines(
  input,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input raster lines file. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_raster_to_vector_points

*Raster to vector points*

## Description

Converts a raster dataset to a vector of the POINT shapetype.

## Usage

```
wbt_raster_to_vector_points(
  input,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| output | Output vector points file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

wbt_raster_to_vector_polygons

*Raster to vector polygons*

### Description

Converts a raster dataset to a vector of the POLYGON shapetype.

### Usage

```
wbt_raster_to_vector_polygons(
  input,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| output | Output vector polygons file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

---

`wbt_reciprocal`          *Reciprocal*

---

## Description

Returns the reciprocal (i.e. 1 / z) of values in a raster.

## Usage

```
wbt_reciprocal(
  input,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input raster file path. See `wbt_file_path()` for details. |
| output | Output raster file. |
| wd | Changes the working directory. Default: `NULL` will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| verbose_mode | Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| compress_rasters | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| command_only | Return command that would be executed by `system()` rather than running tool. Default: `FALSE`. |

## Value

Returns the tool text outputs.

---

wbt_reclass                    *Reclass*

---

### Description

Reclassifies the values in a raster image.

### Usage

```
wbt_reclass(
  input,
  output,
  reclass_vals,
  assign_mode = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| output | Output raster file. |
| reclass_vals | Reclassification triplet values (new value; from value; to less than), e.g. '0.0;0.0;1.0;1.0;1.0;2.0'. |
| assign_mode | Optional Boolean flag indicating whether to operate in assign mode, reclass_vals values are interpreted as new value; old value pairs. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_reclass_equal_interval

*Reclass equal interval*

### Description

Reclassifies the values in a raster image based on equal-ranges.

### Usage

```
wbt_reclass_equal_interval(
  input,
  output,
  interval = 10,
  start_val = NULL,
  end_val = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| output | Output raster file. |
| interval | Class interval size. |
| start_val | Optional starting value (default is input minimum value). |
| end_val | Optional ending value (default is input maximum value). |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_reclass_from_file    *Reclass from file*

### Description

Reclassifies the values in a raster image using reclass ranges in a text file.

### Usage

```
wbt_reclass_from_file(
  input,
  reclass_file,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| reclass_file | Input text file containing reclass ranges. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_reconcile_multiple_headers

*Reconcile multiple headers*

## Description

This tool adjusts the crop yield values for data sets collected with multiple headers or combines.

## Usage

```
wbt_reconcile_multiple_headers(
  input,
  region_field,
  yield_field,
  output,
  radius = NULL,
  min_yield = NULL,
  max_yield = NULL,
  mean_tonnage = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Name of the input points shapefile. |
| region_field | Name of the attribute containing region data. |
| yield_field | Name of the attribute containing yield data. |
| output | Name of the output points shapefile. |
| radius | Optional search radius, in metres. Only specify this value if you want to calculate locally normalized yield. |
| min_yield | Minimum yield value in output. |
| max_yield | Maximum yield value in output. |
| mean_tonnage | Use this optional parameter to force the output to have a certain overall average tonnage. |
| wd | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |

compress_rasters

                Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details.

command_only     Return command that would be executed by system() rather than running tool. Default: FALSE.

## Value

Returns the tool text outputs.

---

wbt_recover_flightline_info

*Recover flightline info*

---

## Description

Associates LiDAR points by their flightlines.

## Usage

```
wbt_recover_flightline_info(
  input,
  output,
  max_time_diff = 5,
  pt_src_id = FALSE,
  user_data = FALSE,
  rgb = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

input            Name of the input LiDAR points.

output         Name of the output LiDAR points.

max_time_diff   Maximum in-flightline time difference (seconds).

pt_src_id      Add flightline information to the point source ID.

user_data      Add flightline information to the user data.

rgb             Add flightline information to the RGB colour data.

wd              Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details.

| | |
|---|---|
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_recreate_pass_lines

*Recreate pass lines*

---

## Description

This tool can be used to approximate the harvester pass lines from yield points.

## Usage

```
wbt_recreate_pass_lines(
  input,
  yield_field_name,
  output_lines,
  output_points,
  max_change_in_heading = 25,
  ignore_zeros = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Name of the input points shapefile. |
| yield_field_name | |
| | Name of the attribute containing yield data. |
| output_lines | Name of the output pass lines shapefile. |
| output_points | Name of the output points shapefile. |
| max_change_in_heading | |
| | Max change in heading. |

| | |
|---|---|
| ignore_zeros | Ignore zero-valued yield points?. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_reinitialize_attribute_table

*Reinitialize attribute table*

---

## Description

Reinitializes a vector's attribute table deleting all fields but the feature ID (FID).

## Usage

```
wbt_reinitialize_attribute_table(
  input,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input vector file path. See wbt_file_path() for details. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |

command_only    Return command that would be executed by system() rather than running tool. Default: FALSE.

## Value

Returns the tool text outputs.

---

wbt_related_circumscribing_circle

*Related circumscribing circle*

---

## Description

Calculates the related circumscribing circle of vector polygons.

## Usage

```
wbt_related_circumscribing_circle(
  input,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input vector polygon file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

`wbt_relative_aspect`          *Relative aspect*

---

### Description

Calculates relative aspect (relative to a user-specified direction) from an input DEM.

### Usage

```
wbt_relative_aspect(
  dem,
  output,
  azimuth = 0,
  zfactor = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| output | Output raster file. |
| azimuth | Illumination source azimuth. |
| zfactor | Optional multiplier for when the vertical and horizontal units are not the same. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_relative_topographic_position

*Relative topographic position*

---

### Description

Calculates the relative topographic position index from a DEM.

### Usage

```
wbt_relative_topographic_position(
  dem,
  output,
  filterx = 11,
  filtery = 11,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| output | Output raster file. |
| filterx | Size of the filter kernel in the x-direction. |
| filtery | Size of the filter kernel in the y-direction. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_remove_field_edge_points

*Remove field edge points*

#### Description

This tool can be used to remove, or flag, most of the points along the edges from a crop yield data set.

#### Usage

```
wbt_remove_field_edge_points(
  input,
  output,
  dist = NULL,
  max_change_in_heading = 25,
  flag_edges = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

#### Arguments

| | |
|---|---|
| input | Name of the input points shapefile. |
| output | Name of the output points shapefile. |
| dist | Average distance between passes, in meters. |
| max_change_in_heading | |
| | Max change in heading. |
| flag_edges | Don't remove edge points, just flag them in the attribute table?. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

#### Value

Returns the tool text outputs.

wbt_remove_off_terrain_objects

*Remove off terrain objects*

### Description

Removes off-terrain objects from a raster digital elevation model (DEM).

### Usage

```
wbt_remove_off_terrain_objects(
  dem,
  output,
  filter = 11,
  slope = 15,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| output | Output raster file. |
| filter | Filter size (cells). |
| slope | Slope threshold value. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_remove_polygon_holes

*Remove polygon holes*

### Description

Removes holes within the features of a vector polygon file.

### Usage

```
wbt_remove_polygon_holes(
  input,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input vector polygon file. |
| output | Output vector polygon file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

## wbt_remove_raster_polygon_holes

*Remove raster polygon holes*

### Description

Removes polygon holes, or 'donut-holes', from raster polygons.

### Usage

```
wbt_remove_raster_polygon_holes(
  input,
  output,
  threshold = 3,
  use_diagonals = TRUE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Name of the input raster image file. |
| output | Name of the output raster file. |
| threshold | Maximum size of removed holes, in grid cells. Blank for no threshold, i.e. remove all holes. |
| use_diagonals | Use diagonal neighbours during clumping operation. |
| wd | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_remove_short_streams

*Remove short streams*

### Description

Removes short first-order streams from a stream network.

### Usage

```
wbt_remove_short_streams(
  d8_pntr,
  streams,
  output,
  min_length,
  esri_pntr = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| d8_pntr | Input raster D8 pointer file. |
| streams | Input raster streams file. |
| output | Output raster file. |
| min_length | Minimum tributary length (in map units) used for network pruning. |
| esri_pntr | D8 pointer uses the ESRI style scheme. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_remove_spurs          *Remove spurs*

## Description

Removes the spurs (pruning operation) from a Boolean line image; intended to be used on the output of the LineThinning tool.

## Usage

```
wbt_remove_spurs(
  input,
  output,
  iterations = 10,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| output | Output raster file. |
| iterations | Maximum number of iterations. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_repair_stream_vector_topology

*Repair stream vector topology*

---

### Description

This tool resolves topological errors and inconsistencies associated with digitized vector streams.

### Usage

```
wbt_repair_stream_vector_topology(
  input,
  output,
  dist = "",
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Name of the input lines vector file. |
| output | Name of the output lines vector file. |
| dist | Snap distance, in xy units (metres). |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

| wbt_resample | *Resample* |
|---|---|

## Description

Resamples one or more input images into a destination image.

## Usage

```
wbt_resample(
  inputs,
  output,
  cell_size = NULL,
  base = NULL,
  method = "cc",
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| inputs | Input raster file paths, concatenated with "," or ";". See wbt_file_path() for details. |
| output | Output raster file. |
| cell_size | Optionally specified cell size of output raster. Not used when base raster is specified. |
| base | Optionally specified input base raster file. Not used when a cell size is specified. |
| method | Resampling method; options include 'nn' (nearest neighbour), 'bilinear', and 'cc' (cubic convolution). |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

wbt_rescale_value_range

*Rescale value range*

### Description

Performs a min-max contrast stretch on an input greytone image.

### Usage

```
wbt_rescale_value_range(
  input,
  output,
  out_min_val,
  out_max_val,
  clip_min = NULL,
  clip_max = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| output | Output raster file. |
| out_min_val | New minimum value in output image. |
| out_max_val | New maximum value in output image. |
| clip_min | Optional lower tail clip value. |
| clip_max | Optional upper tail clip value. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_rgb_to_ihs *Rgb to ihs*

## Description

Converts red, green, and blue (RGB) images into intensity, hue, and saturation (IHS) images.

## Usage

```
wbt_rgb_to_ihs(
  intensity,
  hue,
  saturation,
  red = NULL,
  green = NULL,
  blue = NULL,
  composite = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| intensity | Output intensity raster file. |
| hue | Output hue raster file. |
| saturation | Output saturation raster file. |
| red | Input red band image file. Optionally specified if colour-composite not specified. |
| green | Input green band image file. Optionally specified if colour-composite not specified. |
| blue | Input blue band image file. Optionally specified if colour-composite not specified. |
| composite | Input colour-composite image file. Only used if individual bands are not specified. |
| wd | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |

| command_only | Return command that would be executed by `system()` rather than running tool. Default: `FALSE`. |
|---|---|

## Value

Returns the tool text outputs.

---

wbt_rho8_flow_accumulation

*Rho8 flow accumulation*

---

## Description

Calculates Fairfield and Leymarie (1991) flow accumulation.

## Usage

```
wbt_rho8_flow_accumulation(
  input,
  output,
  out_type = "specific contributing area",
  log = FALSE,
  clip = FALSE,
  pntr = FALSE,
  esri_pntr = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| input | Input DEM or Rho8 pointer file; if a DEM is used, it must be depressionless. |
|---|---|
| output | Name of the output raster file. |
| out_type | Output type; one of 'cells', 'specific contributing area' (default), and 'catchment area'. |
| log | Log-transform the output values?. |
| clip | Optional flag to request clipping the display max by 1 percent. |
| pntr | Is the input raster a Rho8 flow pointer rather than a DEM?. |
| esri_pntr | Does the input Rho8 pointer use the ESRI style scheme?. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| verbose_mode | Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |

compress_rasters

> Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details.

command_only    Return command that would be executed by system() rather than running tool. Default: FALSE.

## Value

Returns the tool text outputs.

---

wbt_rho8_pointer        *Rho8 pointer*

---

## Description

Calculates a stochastic Rho8 flow pointer raster from an input DEM.

## Usage

```
wbt_rho8_pointer(
  dem,
  output,
  esri_pntr = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

dem        Input raster DEM file.

output        Output raster file.

esri_pntr        D8 pointer uses the ESRI style scheme.

wd        Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details.

verbose_mode        Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details.

compress_rasters

> Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details.

command_only        Return command that would be executed by system() rather than running tool. Default: FALSE.

**Value**

Returns the tool text outputs.

---

wbt_ring_curvature          *Ring curvature*

---

**Description**

This tool calculates ring curvature from an input DEM.

**Usage**

```
wbt_ring_curvature(
  dem,
  output,
  log = FALSE,
  zfactor = 1,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

**Arguments**

| | |
|---|---|
| dem | Name of the input raster DEM file. |
| output | Name of the output raster image file. |
| log | Display output values using a log-scale. |
| zfactor | Z conversion factor. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

**Value**

Returns the tool text outputs.

wbt_river_centerlines    *River centerlines*

## Description

Maps river centerlines from an input water raster.

## Usage

```
wbt_river_centerlines(
  input,
  output,
  min_length = 3,
  radius = 4,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Name of the input raster image file. |
| output | Name of the output vector lines file. |
| min_length | Minimum line length, in grid cells. |
| radius | Search radius for joining distant endnodes, in grid cells. |
| wd | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

```
wbt_roberts_cross_filter
```
*Roberts cross filter*

### Description

Performs a Robert's cross edge-detection filter on an image.

### Usage

```
wbt_roberts_cross_filter(
  input,
  output,
  clip = 0,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input raster file path. See `wbt_file_path()` for details. |
| output | Output raster file. |
| clip | Optional amount to clip the distribution tails by, in percent. |
| wd | Changes the working directory. Default: `NULL` will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| verbose_mode | Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| compress_rasters | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| command_only | Return command that would be executed by `system()` rather than running tool. Default: `FALSE`. |

### Value

Returns the tool text outputs.

wbt_root_mean_square_error

*Root mean square error*

## Description

Calculates the RMSE and other accuracy statistics.

## Usage

```
wbt_root_mean_square_error(
  input,
  base,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input raster file path. See `wbt_file_path()` for details. |
| base | Input base raster file used for comparison. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| command_only | Return command that would be executed by `system()` rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

| | |
|---|---|
| wbt_rotor | *Rotor* |

#### Description

This tool calculates rotor from an input DEM.

#### Usage

```
wbt_rotor(
  dem,
  output,
  log = FALSE,
  zfactor = 1,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

#### Arguments

| | |
|---|---|
| dem | Name of the input raster DEM file. |
| output | Name of the output raster image file. |
| log | Display output values using a log-scale. |
| zfactor | Z conversion factor. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

#### Value

Returns the tool text outputs.

---

| wbt_round | *Round* |
|-----------|---------|

---

## Description

Rounds the values in an input raster to the nearest integer value.

## Usage

```
wbt_round(
  input,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input raster file path. See `wbt_file_path()` for details. |
| output | Output raster file. |
| wd | Changes the working directory. Default: `NULL` will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| verbose_mode | Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| command_only | Return command that would be executed by `system()` rather than running tool. Default: `FALSE`. |

## Value

Returns the tool text outputs.

wbt_ruggedness_index          *Ruggedness index*

## Description

Calculates the Riley et al.'s (1999) terrain ruggedness index from an input DEM.

## Usage

```
wbt_ruggedness_index(
  dem,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

dem                 Input raster DEM file.

output              Output raster file.

wd                  Changes the working directory. Default: NULL will use the value in Whitebox-
                    Tools settings, see wbt_wd() for details.

verbose_mode        Sets verbose mode. If verbose mode is FALSE, tools will not print output mes-
                    sages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose()
                    for details.

compress_rasters
                    Sets the flag used by 'WhiteboxTools' to determine whether to use compression
                    for output rasters. Default: NULL will use the value in WhiteboxTools settings,
                    see wbt_compress_rasters() for details.

command_only        Return command that would be executed by system() rather than running tool.
                    Default: FALSE.

## Value

Returns the tool text outputs.

## wbt_run_tool

*Run a tool in 'WhiteboxTools' by name*

#### Description

Runs a tool and specifies tool arguments. If the prefix "whitebox::" or "wbt_" is in `tool_name` it is removed to match the definitions in `wbt_list_tools()`

#### Usage

```
wbt_run_tool(tool_name, args, verbose_mode = FALSE, command_only = FALSE)
```

#### Arguments

| | |
|---|---|
| `tool_name` | The name of the tool to run. |
| `args` | Tool arguments. |
| `verbose_mode` | Verbose mode. Without this flag, tool outputs will not be printed. |
| `command_only` | Return command that would be run with `system()`? Default: FALSE |

#### Value

Returns the (character) output of the tool.

#### See Also

[wbt_list_tools](#)

#### Examples

```
## Not run:
tool_name <- "breach_depressions"
dem <- system.file("extdata", "DEM.tif", package="whitebox")
output <- "./output.tif"
arg1 <- paste0("--dem=", dem)
arg2 <- paste0("--output=", output)
args <- paste(arg1, arg2)
wbt_run_tool(tool_name, args)

## End(Not run)
```

---

| wbt_rust_backtrace | *Convenience method for setting RUST_BACKTRACE options for debugging* |
|---|---|

---

### Description

Convenience method for setting RUST_BACKTRACE options for debugging

### Usage

```
wbt_rust_backtrace(RUST_BACKTRACE = c("0", "1", "full"))
```

### Arguments

RUST_BACKTRACE   One of "0", "1", "full", Logical values are converted to integer and then character.

### Value

value of system environment variable RUST_BACKTRACE

### Examples

```
## Not run:
wbt_rust_backtrace(TRUE)

## End(Not run)
```

---

| wbt_scharr_filter | *Scharr filter* |
|---|---|

---

### Description

Performs a Scharr edge-detection filter on an image.

### Usage

```
wbt_scharr_filter(
  input,
  output,
  clip = 0,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| `input` | Input raster file path. See `wbt_file_path()` for details. |
| `output` | Output raster file. |
| `clip` | Optional amount to clip the distribution tails by, in percent. |
| `wd` | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see `wbt_wd()` for details. |
| `verbose_mode` | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| `compress_rasters` | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| `command_only` | Return command that would be executed by `system()` rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_sediment_transport_index

*Sediment transport index*

---

## Description

Calculates the sediment transport index.

## Usage

```
wbt_sediment_transport_index(
  sca,
  slope,
  output,
  sca_exponent = 0.4,
  slope_exponent = 1.3,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| `sca` | Input raster specific contributing area (SCA) file. |
| `slope` | Input raster slope file. |
| `output` | Output raster file. |
| `sca_exponent` | SCA exponent value. |
| `slope_exponent` | Slope exponent value. |
| `wd` | Changes the working directory. Default: `NULL` will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| `verbose_mode` | Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| `compress_rasters` | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| `command_only` | Return command that would be executed by `system()` rather than running tool. Default: `FALSE`. |

## Value

Returns the tool text outputs.

---

`wbt_select_tiles_by_polygon`

*Select tiles by polygon*

---

## Description

Copies LiDAR tiles overlapping with a polygon into an output directory.

## Usage

```
wbt_select_tiles_by_polygon(
  indir,
  outdir,
  polygons,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| `indir` | Input LAS file source directory. |
| `outdir` | Output directory into which LAS files within the polygon are copied. |
| `polygons` | Input vector polygons file. |
| `wd` | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| `verbose_mode` | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| `compress_rasters` | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| `command_only` | Return command that would be executed by `system()` rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

`wbt_set_nodata_value`  *Set nodata value*

---

## Description

Assign the NoData value for an input image.

## Usage

```
wbt_set_nodata_value(
  input,
  output,
  back_value = 0,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| `input` | Input raster file path. See `wbt_file_path()` for details. |
| `output` | Output raster file. |
| `back_value` | Background value to set to nodata. |

| | |
|---|---|
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_shadow_animation          *Shadow animation*

---

## Description

This tool creates an animated GIF of shadows based on an input DEM.

## Usage

```
wbt_shadow_animation(
  input,
  output,
  palette = "atlas",
  max_dist = "",
  date = "21/06/2021",
  interval = 15,
  location = "43.5448/-80.2482/-4",
  height = 600,
  delay = 250,
  label = "",
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Name of the input digital surface model (DSM) raster file. |
| output | Name of the output HTML file (*.html). |

| | |
|---|---|
| palette | DSM image palette; options are 'atlas', 'high_relief', 'arid', 'soft', 'muted', 'light_quant', 'purple', 'viridis', 'gn_yl', 'pi_y_g', 'bl_yl_rd', 'deep', and 'none'. |
| max_dist | Optional maximum search distance, in xy units. Minimum value is 5 x cell size. |
| date | Date in format DD/MM/YYYY. |
| interval | Time interval, in minutes (1-60). |
| location | Location, defined as Lat/Long/UTC-offset (e.g. 43.5448/-80.2482/-4). |
| height | Image height, in pixels. |
| delay | GIF time delay in milliseconds. |
| label | Label text (leave blank for none). |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| command_only | Return command that would be executed by `system()` rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

| | |
|---|---|
| wbt_shadow_image | *Shadow image* |

---

## Description

This tool creates a raster of shadow areas based on an input DEM.

## Usage

```
wbt_shadow_image(
  input,
  output,
  palette = "soft",
  max_dist = "",
  date = "21/06/2021",
  time = "13:00",
  location = "43.5448/-80.2482/-4",
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| `input` | Name of the input digital surface model (DSM) raster file. |
| `output` | Name of the output raster file. |
| `palette` | DSM image palette; options are 'atlas', 'high_relief', 'arid', 'soft', 'muted', 'light_quant', 'purple', 'viridi', 'gn_yl', 'pi_y_g', 'bl_yl_rd', 'deep', and 'none'. |
| `max_dist` | Optional maximum search distance, in xy unites. Minimum value is 5 x cell size. |
| `date` | Date in format DD/MM/YYYY. |
| `time` | Time in format HH::MM, e.g. 03:15AM or 14:30. |
| `location` | Location, defined as Lat/Long/UTC-offset (e.g. 43.5448/-80.2482/-4). |
| `wd` | Changes the working directory. Default: `NULL` will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| `verbose_mode` | Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| `compress_rasters` | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| `command_only` | Return command that would be executed by `system()` rather than running tool. Default: `FALSE`. |

## Value

Returns the tool text outputs.

---

`wbt_shape_complexity_index`

*Shape complexity index*

---

## Description

Calculates overall polygon shape complexity or irregularity.

## Usage

```
wbt_shape_complexity_index(
  input,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input vector polygon file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| command_only | Return command that would be executed by `system()` rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_shape_complexity_index_raster
*Shape complexity index raster*

---

## Description

Calculates the complexity of raster polygons or classes.

## Usage

```
wbt_shape_complexity_index_raster(
  input,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input raster file path. See `wbt_file_path()` for details. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |

compress_rasters

> Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details.

command_only   Return command that would be executed by system() rather than running tool. Default: FALSE.

## Value

Returns the tool text outputs.

---

wbt_shape_index            *Shape index*

---

## Description

This tool calculates the shape index from an input DEM.

## Usage

```
wbt_shape_index(
  dem,
  output,
  zfactor = 1,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

dem            Name of the input raster DEM file.

output         Name of the output raster image file.

zfactor        Z conversion factor.

wd             Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details.

verbose_mode   Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details.

compress_rasters

> Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details.

command_only   Return command that would be executed by system() rather than running tool. Default: FALSE.

## Value

Returns the tool text outputs.

---

wbt_shreve_stream_magnitude

*Shreve stream magnitude*

---

## Description

Assigns the Shreve stream magnitude to each link in a stream network.

## Usage

```
wbt_shreve_stream_magnitude(
  d8_pntr,
  streams,
  output,
  esri_pntr = FALSE,
  zero_background = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| d8_pntr | Input raster D8 pointer file. |
| streams | Input raster streams file. |
| output | Output raster file. |
| esri_pntr | D8 pointer uses the ESRI style scheme. |
| zero_background | |
| | Flag indicating whether a background value of zero should be used. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

**Value**

Returns the tool text outputs.

---

wbt_sigmoidal_contrast_stretch
*Sigmoidal contrast stretch*

---

## Description

Performs a sigmoidal contrast stretch on input images.

## Usage

```
wbt_sigmoidal_contrast_stretch(
  input,
  output,
  cutoff = 0,
  gain = 1,
  num_tones = 256,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| output | Output raster file. |
| cutoff | Cutoff value between 0.0 and 0.95. |
| gain | Gain value. |
| num_tones | Number of tones in the output image. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

wbt_sin                          *Sin*

## Description

Returns the sine (sin) of each values in a raster.

## Usage

```
wbt_sin(
  input,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

wbt_single_part_to_multi_part

*Single part to multi part*

### Description

Converts a vector file containing multi-part features into a vector containing only single-part features.

### Usage

```
wbt_single_part_to_multi_part(
  input,
  output,
  field = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input vector line or polygon file. |
| output | Output vector line or polygon file. |
| field | Grouping ID field name in attribute table. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

| | |
|---|---|
| wbt_sinh | *Sinh* |

### Description

Returns the hyperbolic sine (sinh) of each values in a raster.

### Usage

```
wbt_sinh(
  input,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_sink                          *Sink*

### Description

Identifies the depressions in a DEM, giving each feature a unique identifier.

### Usage

```
wbt_sink(
  input,
  output,
  zero_background = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input raster DEM file. |
| output | Output raster file. |
| zero_background | |
| | Flag indicating whether a background value of zero should be used. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

---

| | |
|---|---|
| `wbt_slope` | *Slope* |

---

## Description

Calculates a slope raster from an input DEM.

## Usage

```
wbt_slope(
  dem,
  output,
  zfactor = NULL,
  units = "degrees",
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| output | Output raster file. |
| zfactor | Optional multiplier for when the vertical and horizontal units are not the same. |
| units | Units of output raster; options include 'degrees', 'radians', 'percent'. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| command_only | Return command that would be executed by `system()` rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

```
wbt_slope_vs_aspect_plot
```
*Slope vs aspect plot*

### Description

This tool creates a slope-aspect relation plot from an input DEM.

### Usage

```
wbt_slope_vs_aspect_plot(
  input,
  output,
  bin_size = 2,
  min_slope = 0.1,
  zfactor = 1,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Name of the input raster image file. |
| output | Name of the output report file (*.html). |
| bin_size | Aspect bin size, in degrees. |
| min_slope | Minimum slope, in degrees. |
| zfactor | Z conversion factor. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_slope_vs_elevation_plot

*Slope vs elevation plot*

### Description

Creates a slope vs. elevation plot for one or more DEMs.

### Usage

```
wbt_slope_vs_elevation_plot(
  inputs,
  output,
  watershed = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| inputs | Input DEM files. |
| output | Output HTML file (default name will be based on input file if unspecified). |
| watershed | Input watershed files (optional). |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

---

wbt_smooth_vectors          *Smooth vectors*

---

### Description

Smooths a vector coverage of either a POLYLINE or POLYGON base ShapeType.

### Usage

```
wbt_smooth_vectors(
  input,
  output,
  filter = 3,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input vector POLYLINE or POLYGON file. |
| output | Output vector file. |
| filter | The filter size, any odd integer greater than or equal to 3; default is 3. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_smooth_vegetation_residual

*Smooth vegetation residual*

## Description

This tool can smooth the residual roughness due to vegetation cover in LiDAR DEMs.

## Usage

```
wbt_smooth_vegetation_residual(
  input,
  output,
  max_scale = 30,
  dev_threshold = 1,
  scale_threshold = 5,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Name of the input digital elevation model (DEM) raster file. |
| output | Name of the output raster file. |
| max_scale | Maximum search neighbourhood radius in grid cells. |
| dev_threshold scale_threshold | DEVmax Threshold. |
| | DEVmax scale threshold. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

`wbt_snap_pour_points`          *Snap pour points*

---

### Description

Moves outlet points used to specify points of interest in a watershedding operation to the cell with
the highest flow accumulation in its neighbourhood.

### Usage

```
wbt_snap_pour_points(
  pour_pts,
  flow_accum,
  output,
  snap_dist,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| pour_pts | Input vector pour points (outlet) file. |
| flow_accum | Input raster D8 flow accumulation file. |
| output | Output vector file. |
| snap_dist | Maximum snap distance in map units. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| command_only | Return command that would be executed by `system()` rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_sobel_filter *Sobel filter*

### Description

Performs a Sobel edge-detection filter on an image.

### Usage

```
wbt_sobel_filter(
  input,
  output,
  variant = "3x3",
  clip = 0,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| output | Output raster file. |
| variant | Optional variant value. Options include 3x3 and 5x5 (default is 3x3). |
| clip | Optional amount to clip the distribution tails by, in percent (default is 0.0). |
| wd | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

| wbt_sort_lidar | *Sort lidar* |
|---|---|

### Description

Sorts LiDAR points based on their properties.

### Usage

```
wbt_sort_lidar(
  input,
  output = NULL,
  criteria = "",
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Name of the input LiDAR points. |
| output | Name of the output LiDAR points. |
| criteria | Sort criteria e.g. 'x 50.0, y 50.0, z'; criteria may include x, y, z, intensity, class, user_data, point_source_id, and scan_angle. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

---

wbt_source                     *Initialize an R object containing spatial data for use by WhiteboxTools*

---

### Description

Initialize an R object containing spatial data for use by WhiteboxTools

### Usage

```
wbt_source(
  x,
  dsn = NULL,
  layer = NULL,
  force = FALSE,
  verbose = wbt_verbose(),
  ...
)
```

### Arguments

| | |
|---|---|
| x | A terra SpatVector or sf object, or a path to a file that can be read as a SpatVectorProxy |
| dsn | Data source path / file name |
| layer | Data layer |
| force | Force write of vector data to file? Default: FALSE (only write if file does not exist) |
| verbose | Print information about data source and contents? |
| ... | Additional arguments passed to `terra::writeVector()` or `sf::st_write()` |

### Value

An R object with attributes `wbt_dsn` and `wbt_layer` set as needed to support reading and writing R objects from file by WhiteboxTools.

---

wbt_spherical_std_dev_of_normals
                     *Spherical std dev of normals*

---

### Description

Calculates the spherical standard deviation of surface normals for a DEM.

**Usage**

```
wbt_spherical_std_dev_of_normals(
  dem,
  output,
  filter = 11,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

dem             Input raster DEM file.

output          Output raster file.

filter          Size of the filter kernel.

wd              Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see `wbt_wd()` for details.

verbose_mode    Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see `wbt_verbose()` for details.

compress_rasters
                Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details.

command_only    Return command that would be executed by `system()` rather than running tool. Default: `FALSE`.

## Value

Returns the tool text outputs.

---

wbt_split_colour_composite

*Split colour composite*

---

## Description

Splits an RGB colour composite image into separate multispectral images.

## Usage

```
wbt_split_colour_composite(
  input,
  red = NULL,
  green = NULL,
  blue = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| `input` | Input colour composite image file. |
| `red` | Output red band file. |
| `green` | Output green band file. |
| `blue` | Output blue band file. |
| `wd` | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| `verbose_mode` | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| `compress_rasters` | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| `command_only` | Return command that would be executed by `system()` rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

`wbt_split_lidar`          *Split lidar*

---

## Description

Splits LiDAR points up into a series of new files based on their properties.

## Usage

```
wbt_split_lidar(
  input,
  criterion = "num_pts",
  interval = "",
  min_pts = 5,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Name of the input LiDAR points. |
| criterion | Criterion on which to base the split of the input file. Options include 'num_pts, 'x', 'y', 'z', intensity, 'class', 'user_data', 'point_source_id', 'scan_angle', 'time'. |
| interval | Interval. |
| min_pts | Minimum number of points in an output file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_split_vector_lines

*Split vector lines*

---

## Description

Used to split a vector line coverage into even-lengthed segments.

## Usage

```
wbt_split_vector_lines(
  input,
  output,
  length = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Name of the input lines shapefile. |
| output | Name of the output lines shapefile. |
| length | Maximum segment length (m). |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| command_only | Return command that would be executed by `system()` rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

`wbt_split_with_lines`    *Split with lines*

---

## Description

Splits the lines or polygons in one layer using the lines in another layer.

## Usage

```
wbt_split_with_lines(
  input,
  split,
  output,
```

```
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input vector line or polygon file. |
| split | Input vector polyline file. |
| output | Output vector file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

| wbt_square | *Square* |
|---|---|

---

## Description

Squares the values in a raster.

## Usage

```
wbt_square(
  input,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| `input` | Input raster file path. See `wbt_file_path()` for details. |
| `output` | Output raster file. |
| `wd` | Changes the working directory. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_wd()` for details. |
| `verbose_mode` | Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| `compress_rasters` | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| `command_only` | Return command that would be executed by `system()` rather than running tool. Default: `FALSE`. |

## Value

Returns the tool text outputs.

---

| `wbt_square_root` | *Square root* |
|---|---|

---

## Description

Returns the square root of the values in a raster.

## Usage

```
wbt_square_root(
  input,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| `input` | Input raster file path. See `wbt_file_path()` for details. |
| `output` | Output raster file. |
| `wd` | Changes the working directory. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_wd()` for details. |

| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_standard_deviation_contrast_stretch

*Standard deviation contrast stretch*

---

## Description

Performs a standard-deviation contrast stretch on input images.

## Usage

```
wbt_standard_deviation_contrast_stretch(
  input,
  output,
  stdev = 2,
  num_tones = 256,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| input | Input raster file path. See wbt_file_path() for details. |
| output | Output raster file. |
| stdev | Standard deviation clip value. |
| num_tones | Number of tones in the output image. |
| wd | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |

compress_rasters

>Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details.

command_only Return command that would be executed by `system()` rather than running tool. Default: `FALSE`.

## Value

Returns the tool text outputs.

---

wbt_standard_deviation_filter

*Standard deviation filter*

---

## Description

Assigns each cell in the output grid the standard deviation of values in a moving window centred on each grid cell in the input raster.

## Usage

```
wbt_standard_deviation_filter(
  input,
  output,
  filterx = 11,
  filtery = 11,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

input           Input raster file path. See `wbt_file_path()` for details.

output          Output raster file.

filterx         Size of the filter kernel in the x-direction.

filtery         Size of the filter kernel in the y-direction.

wd              Changes the working directory. Default: `NULL` will use the value in Whitebox-Tools settings, see `wbt_wd()` for details.

verbose_mode    Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details.

compress_rasters

>Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details.

command_only      Return command that would be executed by system() rather than running tool. Default: FALSE.

## Value

Returns the tool text outputs.

---

wbt_standard_deviation_of_slope
*Standard deviation of slope*

---

### Description

Calculates the standard deviation of slope from an input DEM.

### Usage

```
wbt_standard_deviation_of_slope(
  input,
  output,
  zfactor = NULL,
  filterx = 11,
  filtery = 11,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input raster DEM file. |
| output | Output raster DEM file. |
| zfactor | Optional multiplier for when the vertical and horizontal units are not the same. |
| filterx | Size of the filter kernel in the x-direction. |
| filtery | Size of the filter kernel in the y-direction. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |

compress_rasters

        Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details.

command_only     Return command that would be executed by `system()` rather than running tool. Default: `FALSE`.

## Value

Returns the tool text outputs.

---

wbt_stochastic_depression_analysis

*Stochastic depression analysis*

---

## Description

Performs a stochastic analysis of depressions within a DEM.

## Usage

```
wbt_stochastic_depression_analysis(
  dem,
  output,
  rmse,
  range,
  iterations = 100,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

dem             Input raster DEM file.

output          Output file.

rmse           The DEM's root-mean-square-error (RMSE), in z units. This determines error magnitude.

range          The error field's correlation length, in xy-units.

iterations    The number of iterations.

wd              Changes the working directory. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_wd()` for details.

verbose_mode   Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details.

compress_rasters

        Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details.

command_only    Return command that would be executed by system() rather than running tool. Default: FALSE.

## Value

Returns the tool text outputs.

---

wbt_strahler_order_basins

*Strahler order basins*

---

### Description

Identifies Strahler-order basins from an input stream network.

### Usage

```
wbt_strahler_order_basins(
  d8_pntr,
  streams,
  output,
  esri_pntr = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

d8_pntr        Input raster D8 pointer file.

streams        Input raster streams file.

output        Output raster file.

esri_pntr        D8 pointer uses the ESRI style scheme.

wd        Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details.

verbose_mode    Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details.

compress_rasters

        Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details.

|             |                                                                                      |
| ----------- | ------------------------------------------------------------------------------------ |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_strahler_stream_order

*Strahler stream order*

---

## Description

Assigns the Strahler stream order to each link in a stream network.

## Usage

```
wbt_strahler_stream_order(
  d8_pntr,
  streams,
  output,
  esri_pntr = FALSE,
  zero_background = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
| --- | --- |
| d8_pntr | Input raster D8 pointer file. |
| streams | Input raster streams file. |
| output | Output raster file. |
| esri_pntr | D8 pointer uses the ESRI style scheme. |
| zero_background | |
| | Flag indicating whether a background value of zero should be used. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

**Value**

Returns the tool text outputs.

---

wbt_stream_link_class   *Stream link class*

---

### Description

Identifies the exterior/interior links and nodes in a stream network.

### Usage

```
wbt_stream_link_class(
  d8_pntr,
  streams,
  output,
  esri_pntr = FALSE,
  zero_background = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| d8_pntr | Input raster D8 pointer file. |
| streams | Input raster streams file. |
| output | Output raster file. |
| esri_pntr | D8 pointer uses the ESRI style scheme. |
| zero_background | |
| | Flag indicating whether a background value of zero should be used. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_stream_link_identifier

*Stream link identifier*

### Description

Assigns a unique identifier to each link in a stream network.

### Usage

```
wbt_stream_link_identifier(
  d8_pntr,
  streams,
  output,
  esri_pntr = FALSE,
  zero_background = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| d8_pntr | Input raster D8 pointer file. |
| streams | Input raster streams file. |
| output | Output raster file. |
| esri_pntr | D8 pointer uses the ESRI style scheme. |
| zero_background | |
| | Flag indicating whether a background value of zero should be used. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_stream_link_length

*Stream link length*

### Description

Estimates the length of each link (or tributary) in a stream network.

### Usage

```
wbt_stream_link_length(
  d8_pntr,
  linkid,
  output,
  esri_pntr = FALSE,
  zero_background = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| d8_pntr | Input raster D8 pointer file. |
| linkid | Input raster streams link ID (or tributary ID) file. |
| output | Output raster file. |
| esri_pntr | D8 pointer uses the ESRI style scheme. |
| zero_background | |
| | Flag indicating whether a background value of zero should be used. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_stream_link_slope  *Stream link slope*

#### Description

Estimates the average slope of each link (or tributary) in a stream network.

#### Usage

```
wbt_stream_link_slope(
  d8_pntr,
  linkid,
  dem,
  output,
  esri_pntr = FALSE,
  zero_background = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

#### Arguments

| | |
|---|---|
| d8_pntr | Input raster D8 pointer file. |
| linkid | Input raster streams link ID (or tributary ID) file. |
| dem | Input raster DEM file. |
| output | Output raster file. |
| esri_pntr | D8 pointer uses the ESRI style scheme. |
| zero_background | |
| | Flag indicating whether a background value of zero should be used. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

#### Value

Returns the tool text outputs.

wbt_stream_power_index

*Stream power index*

### Description

Calculates the relative stream power index.

### Usage

```
wbt_stream_power_index(
  sca,
  slope,
  output,
  exponent = 1,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| sca | Input raster specific contributing area (SCA) file. |
| slope | Input raster slope file. |
| output | Output raster file. |
| exponent | SCA exponent value. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

## wbt_stream_slope_continuous

*Stream slope continuous*

#### Description

Estimates the slope of each grid cell in a stream network.

#### Usage

```
wbt_stream_slope_continuous(
  d8_pntr,
  streams,
  dem,
  output,
  esri_pntr = FALSE,
  zero_background = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

#### Arguments

| | |
|---|---|
| d8_pntr | Input raster D8 pointer file. |
| streams | Input raster streams file. |
| dem | Input raster DEM file. |
| output | Output raster file. |
| esri_pntr | D8 pointer uses the ESRI style scheme. |
| zero_background | Flag indicating whether a background value of zero should be used. |
| wd | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

**Value**

Returns the tool text outputs.

---

wbt_subbasins *Subbasins*

---

**Description**

Identifies the catchments, or sub-basin, draining to each link in a stream network.

**Usage**

```
wbt_subbasins(
  d8_pntr,
  streams,
  output,
  esri_pntr = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

**Arguments**

| | |
|---|---|
| d8_pntr | Input D8 pointer raster file. |
| streams | Input raster streams file. |
| output | Output raster file. |
| esri_pntr | D8 pointer uses the ESRI style scheme. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

**Value**

Returns the tool text outputs.

---

wbt_subtract                   *Subtract*

---

### Description

Performs a differencing operation on two rasters or a raster and a constant value.

### Usage

```
wbt_subtract(
  input1,
  input2,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input1 | Input raster file or constant value. |
| input2 | Input raster file or constant value. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

| wbt_sum_overlay | *Sum overlay* |
|---|---|

### Description

Calculates the sum for each grid cell from a group of raster images.

### Usage

```
wbt_sum_overlay(
  inputs,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| inputs | Input raster file paths, concatenated with `","` or `";"`. See `wbt_file_path()` for details. |
| output | Output raster file. |
| wd | Changes the working directory. Default: `NULL` will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| verbose_mode | Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| command_only | Return command that would be executed by `system()` rather than running tool. Default: `FALSE`. |

### Value

Returns the tool text outputs.

---

```
wbt_surface_area_ratio
```
                        *Surface area ratio*

---

## Description

Calculates a the surface area ratio of each grid cell in an input DEM.

## Usage

```
wbt_surface_area_ratio(
  dem,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

```
wbt_svm_classification
```
*Svm classification*

---

### Description

Performs an SVM binary classification using training site polygons/points and multiple input images.

### Usage

```
wbt_svm_classification(
  inputs,
  training,
  field,
  scaling = "Normalize",
  output = NULL,
  c = 200,
  gamma = 50,
  tolerance = 0.1,
  test_proportion = 0.2,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| inputs | Names of the input predictor rasters. |
| training | Name of the input training site polygons/points Shapefile. |
| field | Name of the attribute containing class data. |
| scaling | Scaling method for predictors. Options include 'None', 'Normalize', and 'Standardize'. |
| output | Name of the output raster file. |
| c | c-value, the regularization parameter. |
| gamma | Gamma parameter used in setting the RBF (Gaussian) kernel function. |
| tolerance | The tolerance parameter used in determining the stopping condition. |
| test_proportion | The proportion of the dataset to include in the test split; default is 0.2. |
| wd | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |

compress_rasters

Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details.

command_only   Return command that would be executed by `system()` rather than running tool. Default: `FALSE`.

## Value

Returns the tool text outputs.

---

wbt_svm_regression        *Svm regression*

---

## Description

Performs a supervised SVM regression analysis using training site points and predictor rasters.

## Usage

```
wbt_svm_regression(
  inputs,
  training,
  field,
  scaling = "Normalize",
  output = NULL,
  c = 50,
  eps = 10,
  gamma = 0.5,
  test_proportion = 0.2,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

inputs      Names of the input predictor rasters.

training    Name of the input training site points Shapefile.

field       Name of the attribute containing class data.

scaling     Scaling method for predictors. Options include 'None', 'Normalize', and 'Standardize'.

output      Name of the output raster file.

c           c-value, the regularization parameter.

eps                    Epsilon in the epsilon-SVR model.

gamma                  Gamma parameter used in setting the RBF (Gaussian) kernel function.

test_proportion
                       The proportion of the dataset to include in the test split; default is 0.2.

wd                     Changes the working directory. Default: NULL will use the value in Whitebox-
                       Tools settings, see wbt_wd() for details.

verbose_mode           Sets verbose mode. If verbose mode is FALSE, tools will not print output mes-
                       sages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose()
                       for details.

compress_rasters
                       Sets the flag used by 'WhiteboxTools' to determine whether to use compression
                       for output rasters. Default: NULL will use the value in WhiteboxTools settings,
                       see wbt_compress_rasters() for details.

command_only           Return command that would be executed by system() rather than running tool.
                       Default: FALSE.

## Value

Returns the tool text outputs.

---

wbt_symmetrical_difference
                              *Symmetrical difference*

---

## Description

Outputs the features that occur in one of the two vector inputs but not both, i.e. no overlapping
features.

## Usage

```
wbt_symmetrical_difference(
  input,
  overlay,
  output,
  snap = 0,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input vector file path. See wbt_file_path() for details. |
| overlay | Input overlay vector file. |
| output | Output vector file. |
| snap | Snap tolerance. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

| | |
|---|---|
| wbt_tan | *Tan* |

---

## Description

Returns the tangent (tan) of each values in a raster.

## Usage

```
wbt_tan(
  input,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |

verbose_mode        Sets verbose mode. If verbose mode is FALSE, tools will not print output mes-
                    sages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose()
                    for details.

compress_rasters
                    Sets the flag used by 'WhiteboxTools' to determine whether to use compression
                    for output rasters. Default: NULL will use the value in WhiteboxTools settings,
                    see wbt_compress_rasters() for details.

command_only        Return command that would be executed by system() rather than running tool.
                    Default: FALSE.

## Value

Returns the tool text outputs.

---

wbt_tangential_curvature

*Tangential curvature*

---

## Description

Calculates a tangential curvature raster from an input DEM.

## Usage

```
wbt_tangential_curvature(
  dem,
  output,
  log = FALSE,
  zfactor = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

dem                 Input raster DEM file.

output              Output raster file.

log                 Display output values using a log-scale.

zfactor             Optional multiplier for when the vertical and horizontal units are not the same.

wd                  Changes the working directory. Default: NULL will use the value in Whitebox-
                    Tools settings, see wbt_wd() for details.

verbose_mode        Sets verbose mode. If verbose mode is FALSE, tools will not print output mes-
                    sages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose()
                    for details.

compress_rasters

> Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details.

command_only   Return command that would be executed by system() rather than running tool. Default: FALSE.

## Value

Returns the tool text outputs.

---

wbt_tanh                          *Tanh*

---

## Description

Returns the hyperbolic tangent (tanh) of each values in a raster.

## Usage

```
wbt_tanh(
  input,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

input          Input raster file path. See wbt_file_path() for details.

output         Output raster file.

wd             Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details.

verbose_mode   Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details.

compress_rasters

> Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details.

command_only   Return command that would be executed by system() rather than running tool. Default: FALSE.

## Value

Returns the tool text outputs.

wbt_thicken_raster_line

*Thicken raster line*

### Description

Thickens single-cell wide lines within a raster image.

### Usage

```
wbt_thicken_raster_line(
  input,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_time_in_daylight     *Time in daylight*

## Description

Calculates the proportion of time a location is not within an area of shadow.

## Usage

```
wbt_time_in_daylight(
  dem,
  output,
  lat,
  long,
  az_fraction = 10,
  max_dist = 100,
  utc_offset = "00:00",
  start_day = 1,
  end_day = 365,
  start_time = "00:00:00",
  end_time = "23:59:59",
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| output | Output raster file. |
| lat | Centre point latitude. |
| long | Centre point longitude. |
| az_fraction | Azimuth fraction in degrees. |
| max_dist | Optional maximum search distance. Minimum value is 5 x cell size. |
| utc_offset | UTC time offset, in hours (e.g. -04:00, +06:00). |
| start_day | Start day of the year (1-365). |
| end_day | End day of the year (1-365). |
| start_time | Starting hour to track shadows (e.g. 5, 5:00, 05:00:00). Assumes 24-hour time: HH:MM:SS. 'sunrise' is also a valid time. |
| end_time | Ending hour to track shadows (e.g. 21, 21:00, 21:00:00). Assumes 24-hour time: HH:MM:SS. 'sunset' is also a valid time. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |

| | |
|---|---|
| verbose_mode | Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| command_only | Return command that would be executed by `system()` rather than running tool. Default: `FALSE`. |

## Value

Returns the tool text outputs.

---

| wbt_tin_gridding | *Tin gridding* |
|---|---|

---

## Description

Creates a raster grid based on a triangular irregular network (TIN) fitted to vector points.

## Usage

```
wbt_tin_gridding(
  input,
  output,
  field = NULL,
  use_z = FALSE,
  resolution = NULL,
  base = NULL,
  max_triangle_edge_length = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input vector points file. |
| output | Output raster file. |
| field | Input field name in attribute table. |
| use_z | Use the 'z' dimension of the Shapefile's geometry instead of an attribute field?. |
| resolution | Output raster's grid resolution. |
| base | Optionally specified input base raster file. Not used when a cell size is specified. |

max_triangle_edge_length

> Optional maximum triangle edge length; triangles larger than this size will not be gridded.

wd             Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details.

verbose_mode     Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details.

compress_rasters

> Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details.

command_only    Return command that would be executed by system() rather than running tool. Default: FALSE.

## Value

Returns the tool text outputs.

---

wbt_toolbox                 *The toolbox for a specific tool in WhiteboxTools*

---

## Description

Retrieve the toolbox for a specific tool.

## Usage

```
wbt_toolbox(tool_name = NULL)
```

## Arguments

tool_name      The name of the tool.

## Details

Leaving tool_name as default NULL returns results for all tools, but does not work on Windows.

## Value

Returns the toolbox for a specific tool.

## Examples

```
## Not run:
wbt_toolbox("breach_depressions")

## End(Not run)
```

---

wbt_tool_help                    *Help description for a specific tool in 'WhiteboxTools'*

---

### Description

Retrieves the help description for a specific tool.

### Usage

```
wbt_tool_help(tool_name = NULL)
```

### Arguments

tool_name          The name of the tool.

### Details

Leaving `tool_name` as default `NULL` returns results for all tools, but does not work on Windows.

### Value

Returns the help description for a specific tool.

### Examples

```
## Not run:
wbt_tool_help("lidar_info")

## End(Not run)
```

---

wbt_tool_parameters    *Tool parameter descriptions for a specific tool in 'WhiteboxTools'*

---

### Description

Retrieves the tool parameter descriptions for a specific tool.

### Usage

```
wbt_tool_parameters(tool_name, quiet = FALSE)
```

### Arguments

tool_name          The name of the tool.

quiet              Prevent tool output being printed. Default: `FALSE`

## Details

quiet argument can be set to TRUE to allow for "quiet" internal use within other functions.

## Value

Returns the tool parameter descriptions for a specific tool.

## Examples

```
## Not run:
wbt_tool_parameters("lidar_info")

## End(Not run)
```

---

wbt_tophat_transform     *Tophat transform*

---

## Description

Performs either a white or black top-hat transform on an input image.

## Usage

```
wbt_tophat_transform(
  input,
  output,
  filterx = 11,
  filtery = 11,
  variant = "white",
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| output | Output raster file. |
| filterx | Size of the filter kernel in the x-direction. |
| filtery | Size of the filter kernel in the y-direction. |
| variant | Optional variant value. Options include 'white' and 'black'. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |

| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
|---|---|
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_topographic_position_animation

*Topographic position animation*

---

## Description

This tool creates an animated GIF of multi-scale local topographic position (elevation deviation).

## Usage

```
wbt_topographic_position_animation(
  input,
  output,
  palette = "bl_yl_rd",
  min_scale = 1,
  num_steps = 100,
  step_nonlinearity = 1.5,
  height = 600,
  delay = 250,
  label = "",
  dev_max = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| input | Name of the input digital elevation model (DEM) raster file. |
|---|---|
| output | Name of the output HTML file (*.html). |
| palette | Image palette; options are 'bl_yl_rd', 'bl_w_rd', 'purple', 'gn_yl', 'pi_y_g', and 'viridis'. |

| | |
|---|---|
| min_scale | Minimum search neighbourhood radius in grid cells. |
| num_steps | Number of steps. |
| step_nonlinearity | |
| | Step nonlinearity factor (1.0-2.0 is typical). |
| height | Image height, in pixels. |
| delay | GIF time delay in milliseconds. |
| label | Label text (leave blank for none). |
| dev_max | Do you want to use DEVmax instead of DEV for measuring local topographic position?. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_topological_stream_order

*Topological stream order*

---

## Description

Assigns each link in a stream network its topological order.

## Usage

```
wbt_topological_stream_order(
  d8_pntr,
  streams,
  output,
  esri_pntr = FALSE,
  zero_background = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| `d8_pntr` | Input raster D8 pointer file. |
| `streams` | Input raster streams file. |
| `output` | Output raster file. |
| `esri_pntr` | D8 pointer uses the ESRI style scheme. |
| `zero_background` | |
| | Flag indicating whether a background value of zero should be used. |
| `wd` | Changes the working directory. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_wd()` for details. |
| `verbose_mode` | Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| `compress_rasters` | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| `command_only` | Return command that would be executed by `system()` rather than running tool. Default: `FALSE`. |

## Value

Returns the tool text outputs.

---

| `wbt_topo_render` | *Topo render* |
|---|---|

---

## Description

This tool creates a pseudo-3D rendering from an input DEM, for the purpose of effective topographic visualization.

## Usage

```
wbt_topo_render(
  dem,
  output,
  palette = "soft",
  rev_palette = FALSE,
  az = 315,
  alt = 30,
  background_hgt_offset = 10,
  polygon = NULL,
  background_clr = "[255, 255, 255]",
  attenuation = 0.6,
  ambient_light = 0.2,
```

```
        z_factor = 1,
        wd = NULL,
        verbose_mode = NULL,
        compress_rasters = NULL,
        command_only = FALSE
    )
```

## Arguments

| | |
|---|---|
| dem | Name of the input digital elevation model (DEM) raster file. |
| output | Name of the output raster file. |
| palette | Palette name; options are 'atlas', 'high_relief', 'arid', 'soft', 'earthtones', 'muted', 'light_quant', 'purple', 'viridi', 'gn_yl', 'pi_y_g', 'bl_yl_rd', 'deep', 'imhof', and 'white'. |
| rev_palette | Reverse the palette?. |
| az | Light source azimuth direction (degrees, 0-360). |
| alt | Light source altitude (degrees, 0-90). |
| background_hgt_offset | |
| | Offset height of background, in z-units. |
| polygon | Clipping polygon vector file (optional). |
| background_clr | Background red-green-blue (RGB) or red-green-blue-alpha (RGBA) colour, e.g. '[255, 255, 245]', '[255, 255, 245, 200]'. |
| attenuation | Attenuation parameter. Range is 0-4. Zero means no attenuation. |
| ambient_light | Ambient light parameter. Range is 0.0-0.7. Zero means no ambient light. |
| z_factor | Elevation multiplier, or a vertical exageration. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

wbt_total_curvature          *Total curvature*

### Description

Calculates a total curvature raster from an input DEM.

### Usage

```
wbt_total_curvature(
  dem,
  output,
  log = FALSE,
  zfactor = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| output | Output raster file. |
| log | Display output values using a log-scale. |
| zfactor | Optional multiplier for when the vertical and horizontal units are not the same. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

---

wbt_total_filter          *Total filter*

---

### Description

Performs a total filter on an input image.

### Usage

```
wbt_total_filter(
  input,
  output,
  filterx = 11,
  filtery = 11,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| output | Output raster file. |
| filterx | Size of the filter kernel in the x-direction. |
| filtery | Size of the filter kernel in the y-direction. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

| wbt_to_degrees | *To degrees* |
|---|---|

## Description

Converts a raster from radians to degrees.

## Usage

```
wbt_to_degrees(
  input,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

| wbt_to_radians | *To radians* |
|---|---|

## Description

Converts a raster from degrees to radians.

## Usage

```
wbt_to_radians(
  input,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_trace_downslope_flowpaths

*Trace downslope flowpaths*

---

### Description

Traces downslope flowpaths from one or more target sites (i.e. seed points).

### Usage

```
wbt_trace_downslope_flowpaths(
  seed_pts,
  d8_pntr,
  output,
  esri_pntr = FALSE,
  zero_background = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| seed_pts | Input vector seed points file. |
| d8_pntr | Input D8 pointer raster file. |
| output | Output raster file. |
| esri_pntr | D8 pointer uses the ESRI style scheme. |
| zero_background | |
| | Flag indicating whether a background value of zero should be used. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

---

wbt_travelling_salesman_problem

*Travelling salesman problem*

---

## Description

Finds approximate solutions to travelling salesman problems, the goal of which is to identify the shortest route connecting a set of locations.

## Usage

```
wbt_travelling_salesman_problem(
  input,
  output,
  duration = 60,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Name of the input points shapefile. |
| output | Name of the output lines shapefile. |
| duration | Maximum duration, in seconds. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

wbt_trend_surface          *Trend surface*

### Description

Estimates the trend surface of an input raster file.

### Usage

```
wbt_trend_surface(
  input,
  output,
  order = 1,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| output | Output raster file. |
| order | Polynomial order (1 to 10). |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_trend_surface_vector_points

*Trend surface vector points*

### Description

Estimates a trend surface from vector points.

### Usage

```
wbt_trend_surface_vector_points(
  input,
  field,
  output,
  cell_size,
  order = 1,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input vector Points file. |
| field | Input field name in attribute table. |
| output | Output raster file. |
| cell_size | Optionally specified cell size of output raster. Not used when base raster is specified. |
| order | Polynomial order (1 to 10). |
| wd | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

---

wbt_tributary_identifier

*Tributary identifier*

---

## Description

Assigns a unique identifier to each tributary in a stream network.

## Usage

```
wbt_tributary_identifier(
  d8_pntr,
  streams,
  output,
  esri_pntr = FALSE,
  zero_background = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| d8_pntr | Input raster D8 pointer file. |
| streams | Input raster streams file. |
| output | Output raster file. |
| esri_pntr | D8 pointer uses the ESRI style scheme. |
| zero_background | |
| | Flag indicating whether a background value of zero should be used. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_truncate *Truncate*

---

## Description

Truncates the values in a raster to the desired number of decimal places.

## Usage

```
wbt_truncate(
  input,
  output,
  num_decimals = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| output | Output raster file. |
| num_decimals | Number of decimals left after truncation (default is zero). |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

## wbt_turning_bands_simulation

*Turning bands simulation*

### Description

Creates an image containing random values based on a turning-bands simulation.

### Usage

```
wbt_turning_bands_simulation(
  base,
  output,
  range,
  iterations = 1000,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| base | Input base raster file. |
| output | Output file. |
| range | The field's range, in xy-units, related to the extent of spatial autocorrelation. |
| iterations | The number of iterations. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_two_sample_ks_test

*Two sample ks test*

### Description

Performs a 2-sample K-S test for significant differences on two input rasters.

### Usage

```
wbt_two_sample_ks_test(
  input1,
  input2,
  output,
  num_samples = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input1 | First input raster file. |
| input2 | Second input raster file. |
| output | Output HTML file. |
| num_samples | Number of samples. Leave blank to use whole image. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

---

wbt_union                          *Union*

---

## Description

Splits vector layers at their overlaps, creating a layer containing all the portions from both input and overlay layers.

## Usage

```
wbt_union(
  input,
  overlay,
  output,
  snap = 0,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input vector file path. See `wbt_file_path()` for details. |
| overlay | Input overlay vector file. |
| output | Output vector file. |
| snap | Snap tolerance. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| command_only | Return command that would be executed by `system()` rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

| | |
|---|---|
| wbt_unnest_basins | *Unnest basins* |

### Description

Extract whole watersheds for a set of outlet points.

### Usage

```
wbt_unnest_basins(
  d8_pntr,
  pour_pts,
  output,
  esri_pntr = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| d8_pntr | Input D8 pointer raster file. |
| pour_pts | Input vector pour points (outlet) file. |
| output | Output raster file. |
| esri_pntr | D8 pointer uses the ESRI style scheme. |
| wd | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_unsharp_masking          *Unsharp masking*

### Description

An image sharpening technique that enhances edges.

### Usage

```
wbt_unsharp_masking(
  input,
  output,
  sigma = 0.75,
  amount = 100,
  threshold = 0,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| output | Output raster file. |
| sigma | Standard deviation distance in pixels. |
| amount | A percentage and controls the magnitude of each overshoot. |
| threshold | Controls the minimal brightness change that will be sharpened. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_unsphericity *Unsphericity*

## Description

This tool calculates the unsphericity curvature from an input DEM.

## Usage

```
wbt_unsphericity(
  dem,
  output,
  log = FALSE,
  zfactor = 1,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| dem | Name of the input raster DEM file. |
| output | Name of the output raster image file. |
| log | Display output values using a log-scale. |
| zfactor | Z conversion factor. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

```
wbt_update_nodata_cells
```
*Update nodata cells*

#### Description

Replaces the NoData values in an input raster with the corresponding values contained in a second update layer.

#### Usage

```
wbt_update_nodata_cells(
  input1,
  input2,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

#### Arguments

| | |
|---|---|
| input1 | Input raster file 1. |
| input2 | Input raster file 2; update layer. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

#### Value

Returns the tool text outputs.

wbt_upslope_depression_storage

*Upslope depression storage*

## Description

Estimates the average upslope depression storage depth.

## Usage

```
wbt_upslope_depression_storage(
  dem,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_user_defined_weights_filter
*User ined weights filter*

---

### Description

Performs a user-defined weights filter on an image.

### Usage

```
wbt_user_defined_weights_filter(
  input,
  weights,
  output,
  center = "center",
  normalize = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input raster file path. See wbt_file_path() for details. |
| weights | Input weights file. |
| output | Output raster file. |
| center | Kernel center cell; options include 'center', 'upper-left', 'upper-right', 'lower-left', 'lower-right'. |
| normalize | Normalize kernel weights? This can reduce edge effects and lessen the impact of data gaps (nodata) but is not suited when the kernel weights sum to zero. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_vector_hex_binning

*Vector hex binning*

## Description

Hex-bins a set of vector points.

## Usage

```
wbt_vector_hex_binning(
  input,
  output,
  width,
  orientation = "horizontal",
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input base file. |
| output | Output vector polygon file. |
| width | The grid cell width. |
| orientation | Grid Orientation, 'horizontal' or 'vertical'. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_vector_lines_to_raster

*Vector lines to raster*

---

### Description

Converts a vector containing polylines into a raster.

### Usage

```
wbt_vector_lines_to_raster(
  input,
  output,
  field = "FID",
  nodata = TRUE,
  cell_size = NULL,
  base = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input vector lines file. |
| output | Output raster file. |
| field | Input field name in attribute table. |
| nodata | Background value to set to NoData. Without this flag, it will be set to 0.0. |
| cell_size | Optionally specified cell size of output raster. Not used when base raster is specified. |
| base | Optionally specified input base raster file. Not used when a cell size is specified. |
| wd | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

```
wbt_vector_points_to_raster
```
*Vector points to raster*

---

## Description

Converts a vector containing points into a raster.

## Usage

```
wbt_vector_points_to_raster(
  input,
  output,
  field = "FID",
  assign = "last",
  nodata = TRUE,
  cell_size = NULL,
  base = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input vector Points file. |
| output | Output raster file. |
| field | Input field name in attribute table. |
| assign | Assignment operation, where multiple points are in the same grid cell; options include 'first', 'last' (default), 'min', 'max', 'sum', 'number'. |
| nodata | Background value to set to NoData. Without this flag, it will be set to 0.0. |
| cell_size | Optionally specified cell size of output raster. Not used when base raster is specified. |
| base | Optionally specified input base raster file. Not used when a cell size is specified. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |

compress_rasters

                Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details.

command_only     Return command that would be executed by `system()` rather than running tool. Default: `FALSE`.

## Value

Returns the tool text outputs.

---

wbt_vector_polygons_to_raster

*Vector polygons to raster*

---

## Description

Converts a vector containing polygons into a raster.

## Usage

```
wbt_vector_polygons_to_raster(
  input,
  output,
  field = "FID",
  nodata = TRUE,
  cell_size = NULL,
  base = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Input vector polygons file. |
| output | Output raster file. |
| field | Input field name in attribute table. |
| nodata | Background value to set to NoData. Without this flag, it will be set to 0.0. |
| cell_size | Optionally specified cell size of output raster. Not used when base raster is specified. |
| base | Optionally specified input base raster file. Not used when a cell size is specified. |
| wd | Changes the working directory. Default: `NULL` will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |

verbose_mode    Sets verbose mode. If verbose mode is FALSE, tools will not print output mes-
                sages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose()
                for details.

compress_rasters

                Sets the flag used by 'WhiteboxTools' to determine whether to use compression
                for output rasters. Default: NULL will use the value in WhiteboxTools settings,
                see wbt_compress_rasters() for details.

command_only    Return command that would be executed by system() rather than running tool.
                Default: FALSE.

## Value

Returns the tool text outputs.

---

wbt_vector_stream_network_analysis

*Vector stream network analysis*

---

## Description

This tool performs common stream network analysis operations on an input vector stream file.

## Usage

```
wbt_vector_stream_network_analysis(
  streams,
  output,
  snap = 0.1,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

streams         Name of the input streams vector file.

output          Name of the output lines shapefile.

snap            Snap distance, in xy units (metres).

wd              Changes the working directory. Default: NULL will use the value in Whitebox-
                Tools settings, see wbt_wd() for details.

verbose_mode    Sets verbose mode. If verbose mode is FALSE, tools will not print output mes-
                sages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose()
                for details.

compress_rasters

                Sets the flag used by 'WhiteboxTools' to determine whether to use compression
                for output rasters. Default: `NULL` will use the value in WhiteboxTools settings,
                see `wbt_compress_rasters()` for details.

command_only    Return command that would be executed by `system()` rather than running tool.
                Default: `FALSE`.

### Value

Returns the tool text outputs.

---

wbt_version                *Version information for 'WhiteboxTools'*

---

### Description

Version information for 'WhiteboxTools'

### Usage

```
wbt_version(extract = FALSE)
```

### Arguments

extract           Extract semantic version number from first line of result? Default: `FALSE`

### Value

Returns the version information for 'WhiteboxTools' as an R character vector.

### Examples

```
## Not run:
wbt_version()

## End(Not run)
```

wbt_vertical_excess_curvature

*Vertical excess curvature*

## Description

This tool calculates vertical excess curvature from an input DEM.

## Usage

```
wbt_vertical_excess_curvature(
  dem,
  output,
  log = FALSE,
  zfactor = 1,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| dem | Name of the input raster DEM file. |
| output | Name of the output raster image file. |
| log | Display output values using a log-scale. |
| zfactor | Z conversion factor. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_viewshed                    *Viewshed*

---

### Description

Identifies the viewshed for a point or set of points.

### Usage

```
wbt_viewshed(
  dem,
  stations,
  output,
  height = 2,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| dem | Input raster DEM file. |
| stations | Input viewing station vector file. |
| output | Output raster file. |
| height | Viewing station height, in z units. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

---

wbt_view_code *Source code for a specific tool in 'WhiteboxTools'*

---

### Description

Opens a web browser to view the source code for a specific tool on the projects source code repository.

### Usage

```
wbt_view_code(tool_name, viewer = FALSE)
```

### Arguments

| | |
|---|---|
| tool_name | Name of the tool. |
| viewer | Show source code in browser? default: TRUE |

### Value

Returns a GitHub URL to view the source code of the tool.

### Examples

```
## Not run:
wbt_view_code("breach_depressions")

## End(Not run)
```

---

wbt_visibility_index *Visibility index*

---

### Description

Estimates the relative visibility of sites in a DEM.

### Usage

```
wbt_visibility_index(
  dem,
  output,
  height = 2,
  res_factor = 2,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| `dem` | Input raster DEM file. |
| `output` | Output raster file. |
| `height` | Viewing station height, in z units. |
| `res_factor` | The resolution factor determines the density of measured viewsheds. |
| `wd` | Changes the working directory. Default: `NULL` will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| `verbose_mode` | Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| `compress_rasters` | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| `command_only` | Return command that would be executed by `system()` rather than running tool. Default: `FALSE`. |

## Value

Returns the tool text outputs.

---

| | |
|---|---|
| `wbt_voronoi_diagram` | *Voronoi diagram* |

---

## Description

Creates a vector Voronoi diagram for a set of vector points.

## Usage

```
wbt_voronoi_diagram(
  input,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| `input` | Input vector points file. |
| `output` | Output vector polygon file. |
| `wd` | Changes the working directory. Default: `NULL` will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |

| verbose_mode | Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |

| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |

| command_only | Return command that would be executed by `system()` rather than running tool. Default: `FALSE`. |

## Value

Returns the tool text outputs.

---

| wbt_watershed | *Watershed* |

---

## Description

Identifies the watershed, or drainage basin, draining to a set of target cells.

## Usage

```
wbt_watershed(
  d8_pntr,
  pour_pts,
  output,
  esri_pntr = FALSE,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| d8_pntr | Input D8 pointer raster file. |
| pour_pts | Input pour points (outlet) file. |
| output | Output raster file. |
| esri_pntr | D8 pointer uses the ESRI style scheme. |
| wd | Changes the working directory. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_wd()` for details. |
| verbose_mode | Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |

compress_rasters

> Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details.

command_only       Return command that would be executed by system() rather than running tool. Default: FALSE.

## Value

Returns the tool text outputs.

---

wbt_weighted_overlay       *Weighted overlay*

---

## Description

Performs a weighted sum on multiple input rasters after converting each image to a common scale. The tool performs a multi-criteria evaluation (MCE).

## Usage

```
wbt_weighted_overlay(
  factors,
  weights,
  output,
  cost = NULL,
  constraints = NULL,
  scale_max = 1,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

factors            Input factor raster files.

weights            Weight values, contained in quotes and separated by commas or semicolons. Must have the same number as factors.

output             Output raster file.

cost               Boolean array indicating which factors are cost factors, contained in quotes and separated by commas or semicolons. Must have the same number as factors.

constraints        Input constraints raster files.

scale_max          Suitability scale maximum value (common values are 1.0, 100.0, and 255.0).

wd                 Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details.

verbose_mode    Sets verbose mode. If verbose mode is `FALSE`, tools will not print output mes-
                sages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()`
                for details.

compress_rasters

                Sets the flag used by 'WhiteboxTools' to determine whether to use compression
                for output rasters. Default: `NULL` will use the value in WhiteboxTools settings,
                see `wbt_compress_rasters()` for details.

command_only    Return command that would be executed by `system()` rather than running tool.
                Default: `FALSE`.

## Value

Returns the tool text outputs.

---

wbt_weighted_sum           *Weighted sum*

---

## Description

Performs a weighted-sum overlay on multiple input raster images.

## Usage

```
wbt_weighted_sum(
  inputs,
  weights,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

inputs          Input raster file paths, concatenated with `","` or `";"`. See `wbt_file_path()` for
                details.

weights         Weight values, contained in quotes and separated by commas or semicolons.

output          Output raster file.

wd              Changes the working directory. Default: `NULL` will use the value in Whitebox-
                Tools settings, see `wbt_wd()` for details.

verbose_mode    Sets verbose mode. If verbose mode is `FALSE`, tools will not print output mes-
                sages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()`
                for details.

compress_rasters

>
Sets the flag used by 'WhiteboxTools' to determine whether to use compression
for output rasters. Default: `NULL` will use the value in WhiteboxTools settings,
see `wbt_compress_rasters()` for details.

command_only       Return command that would be executed by `system()` rather than running tool.
Default: `FALSE`.

## Value

Returns the tool text outputs.

---

wbt_wetness_index               *Wetness index*

---

## Description

Calculates the topographic wetness index, Ln(A / tan(slope)).

## Usage

```
wbt_wetness_index(
  sca,
  slope,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

sca                Input raster specific contributing area (SCA) file.

slope              Input raster slope file (in degrees).

output             Output raster file.

wd                 Changes the working directory. Default: `NULL` will use the value in Whitebox-
Tools settings, see `wbt_wd()` for details.

verbose_mode       Sets verbose mode. If verbose mode is `FALSE`, tools will not print output mes-
sages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()`
for details.

compress_rasters

>
Sets the flag used by 'WhiteboxTools' to determine whether to use compression
for output rasters. Default: `NULL` will use the value in WhiteboxTools settings,
see `wbt_compress_rasters()` for details.

command_only       Return command that would be executed by `system()` rather than running tool.
Default: `FALSE`.

## Value

Returns the tool text outputs.

---

wbt_wilcoxon_signed_rank_test
*Wilcoxon signed rank test*

---

## Description

Performs a 2-sample K-S test for significant differences on two input rasters.

## Usage

```
wbt_wilcoxon_signed_rank_test(
  input1,
  input2,
  output,
  num_samples = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input1 | First input raster file. |
| input2 | Second input raster file. |
| output | Output HTML file. |
| num_samples | Number of samples. Leave blank to use whole image. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_write_function_memory_insertion

*Write function memory insertion*

---

### Description

Performs a write function memory insertion for single-band multi-date change detection.

### Usage

```
wbt_write_function_memory_insertion(
  input1,
  input2,
  output,
  input3 = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input1 | Input raster file associated with the first date. |
| input2 | Input raster file associated with the second date. |
| output | Output raster file. |
| input3 | Optional input raster file associated with the third date. |
| wd | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

---

wbt_xor                        *Xor*

---

### Description

Performs a logical XOR operator on two Boolean raster images.

### Usage

```
wbt_xor(
  input1,
  input2,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input1 | Input raster file path. See wbt_file_path() for details. |
| input2 | Input raster file path. See wbt_file_path() for details. |
| output | Output raster file. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

### Value

Returns the tool text outputs.

wbt_yield_filter          *Yield filter*

### Description

Filters crop yield values of point data derived from combine harvester yield monitors.

### Usage

```
wbt_yield_filter(
  input,
  yield_field,
  pass_field,
  output,
  width = 6.096,
  z_score_threshold = 2.5,
  min_yield = 0,
  max_yield = 99999.9,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Name of the input points shapefile. |
| yield_field | Name of the attribute containing yield data. |
| pass_field | Name of the attribute containing pass line ID. |
| output | Name of the output points shapefile. |
| width | Pass swath width (m). |
| z_score_threshold | |
| | Z-score threshold value (default=2.5). |
| min_yield | Minimum yield value in output. |
| max_yield | Maximum yield value in output. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

## Value

Returns the tool text outputs.

---

wbt_yield_map                    *Yield map*

---

## Description

This tool can be used to create a segmented-vector polygon yield map from a set of harvester points.

## Usage

```
wbt_yield_map(
  input,
  pass_field_name,
  output,
  width = 6.096,
  max_change_in_heading = 25,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

| | |
|---|---|
| input | Name of the input points shapefile. |
| pass_field_name | |
| | Name of the attribute containing pass line ID. |
| output | Name of the output polygon shapefile. |
| width | Pass swath width (m). |
| max_change_in_heading | |
| | Max change in heading. |
| wd | Changes the working directory. Default: NULL will use the value in Whitebox-Tools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

**Value**

Returns the tool text outputs.

---

wbt_yield_normalization

*Yield normalization*

---

**Description**

This tool can be used to normalize the yield points for a field.

**Usage**

```
wbt_yield_normalization(
  input,
  yield_field,
  output,
  standardize = FALSE,
  radius = NULL,
  min_yield = 0,
  max_yield = 99999.9,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

**Arguments**

| | |
|---|---|
| input | Name of the input points shapefile. |
| yield_field | Name of the attribute containing yield data. |
| output | Name of the output points shapefile. |
| standardize | Should the yield values be standardized (converted to z-scores) rather than normalized?. |
| radius | Optional search radius, in metres. Only specify this value if you want to calculate locally normalized yield. |
| min_yield | Minimum yield value in output. |
| max_yield | Maximum yield value in output. |
| wd | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |

compress_rasters

> Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details.

command_only    Return command that would be executed by `system()` rather than running tool. Default: `FALSE`.

## Value

Returns the tool text outputs.

---

wbt_zlidar_to_las          *Zlidar to las*

---

## Description

Converts one or more zlidar files into the LAS data format.

## Usage

```
wbt_zlidar_to_las(
  inputs = NULL,
  outdir = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

## Arguments

inputs          Input ZLidar files.

outdir          Output directory into which zlidar files are created. If unspecified, it is assumed to be the same as the inputs.

wd              Changes the working directory. Default: `NULL` will use the value in Whitebox-Tools settings, see `wbt_wd()` for details.

verbose_mode    Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details.

compress_rasters

> Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details.

command_only    Return command that would be executed by `system()` rather than running tool. Default: `FALSE`.

**Value**

Returns the tool text outputs.

---

wbt_zonal_statistics      *Zonal statistics*

---

**Description**

Extracts descriptive statistics for a group of patches in a raster.

**Usage**

```
wbt_zonal_statistics(
  input,
  features,
  output = NULL,
  stat = "mean",
  out_table = NULL,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

**Arguments**

| | |
|---|---|
| input | Input data raster file. |
| features | Input feature definition raster file. |
| output | Output raster file. |
| stat | Statistic to extract, including 'mean', 'median', 'minimum', 'maximum', 'range', 'standard deviation', and 'total'. |
| out_table | Output HTML Table file. |
| wd | Changes the working directory. Default: NULL will use the value in WhiteboxTools settings, see wbt_wd() for details. |
| verbose_mode | Sets verbose mode. If verbose mode is FALSE, tools will not print output messages. Default: NULL will use the value in WhiteboxTools settings, see wbt_verbose() for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: NULL will use the value in WhiteboxTools settings, see wbt_compress_rasters() for details. |
| command_only | Return command that would be executed by system() rather than running tool. Default: FALSE. |

**Value**

Returns the tool text outputs.

### Description

Standardizes the values in an input raster by converting to z-scores.

### Usage

```
wbt_z_scores(
  input,
  output,
  wd = NULL,
  verbose_mode = NULL,
  compress_rasters = NULL,
  command_only = FALSE
)
```

### Arguments

| | |
|---|---|
| input | Input raster file path. See `wbt_file_path()` for details. |
| output | Output raster file. |
| wd | Changes the working directory. Default: `NULL` will use the value in Whitebox-Tools settings, see `wbt_wd()` for details. |
| verbose_mode | Sets verbose mode. If verbose mode is `FALSE`, tools will not print output messages. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_verbose()` for details. |
| compress_rasters | |
| | Sets the flag used by 'WhiteboxTools' to determine whether to use compression for output rasters. Default: `NULL` will use the value in WhiteboxTools settings, see `wbt_compress_rasters()` for details. |
| command_only | Return command that would be executed by `system()` rather than running tool. Default: `FALSE`. |

### Value

Returns the tool text outputs.

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