

Package ‘StreamCatTools’

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Type Package

Title 'StreamCatTools'

Version 0.8.0

Description Tools for using the 'StreamCat' and 'LakeCat' API and interacting with the 'StreamCat' and 'LakeCat' database. Convenience functions in the package wrap the API for 'StreamCat' on <https://api.epa.gov/StreamCat/streams/metrics>.

Depends R (>= 4.1.0)

Imports sf, nhdplusTools, jsonlite, httr2, curl (>= 6.0.0)

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Encoding UTF-8

URL <https://usepa.github.io/StreamCatTools/>,
<https://github.com/USEPA/StreamCatTools>

BugReports <https://github.com/USEPA/StreamCatTools/issues>

VignetteBuilder knitr,rmarkdown

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License CC0

NeedsCompilation no

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Contents

lc_fullname	2
lc_get_comid	3
lc_get_data	4
lc_get_metric_names	6
lc_get_params	7
lc_nlcd	8
sc_fullname	9
sc_get_comid	10
sc_get_data	11
sc_get_metric_names	13
sc_get_params	14
sc_nlcd	15
Index	17

lc_fullname	<i>Lookup Full Metric Name</i>
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Description

Function to retrieve a full metric name based on the short name using the LakeCat API.

Usage

```
lc_fullname(metric = NULL)
```

Arguments

metric Short metric name Syntax: metric=value1 Values: metric

Value

A lookup of the full name for a given LakeCat metric

Author(s)

Marc Weber

Examples

```
fullname <- lc_fullname(metric='clay')
```

lc_get_comid	<i>Get Lake COMIDs</i>
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Description

Function to return NHDPlusV2 Waterbody COMIDS using either a dataframe with coordinates and a specified CRS or an sf object. The function generates a vector of NHDPlus Waterbody COMID values a user can then pass to lc_get_data function

Usage

```
lc_get_comid(  
  dd = NULL,  
  xcoord = NULL,  
  ycoord = NULL,  
  crsys = NULL,  
  buffer = NULL  
)
```

Arguments

dd	Name of data frame object. Can be a simple data frame with coordinate columns in a known CRS or an sf points data frame
xcoord	The x coordinate column if using a raw data frame
ycoord	The y coordinate column if using a raw data frame
crsys	The epsg code if using a raw data frame
buffer	The amount of buffer to use to extend search for a waterbody (simply passed to nhdplusTools::get_waterbodies)

Value

A new sf data frame with a populated 'COMID' column

Author(s)

Marc Weber

Examples

```
## Not run:  
  
dd <- data.frame(x = c(-89.198,-114.125,-122.044),  
  y = c(45.502,47.877,43.730))  
  
comids <- lc_get_comid(dd, xcoord='x',  
  ycoord='y', crsys=4269)
```

```
dd <- data.frame(x = c(-89.198,-114.125,-122.044),
y = c(45.502,47.877,43.730)) |>
  sf::st_as_sf(coords = c('x', 'y'), crs = 4326)

comids <- lc_get_comid(dd)

## End(Not run)
```

lc_get_data

Get LakeCat data

Description

Function to return LakeCat metrics using the StreamCat API. The function allows a user to get specific metric data aggregated by area of interest, returned by comid(s), hydroregion(s), state(s), or county(ies).

Usage

```
lc_get_data(
  comid = NULL,
  metric = NULL,
  aoi = NULL,
  showAreaSqKm = NULL,
  showPctFull = NULL,
  state = NULL,
  county = NULL,
  region = NULL,
  conus = NULL,
  countOnly = NULL
)
```

Arguments

comid	Return metric information for specific COMIDs. Can be a comma-delimited list, a character vector, or any object that can be coerced to a comma-delimited list with paste . One of comid, county, state, or region is required unless conus='true'. Syntax: comid=<comid1>,<comid2>
metric	Name(s) of metrics to query. Must be character string with comma-delimited list of metrics. Not case-sensitive . Syntax: name=<name1>,<name2>
aoi	Specify the area of interest described by a metric. By default, all available areas of interest for a given metric are returned. <i>Case-sensitive</i> . Syntax: areaOfInterest=<value1>,<value2> Values: catchment watershed
showAreaSqKm	Return the area in square kilometers of a given area of interest. The default value is false. Values: true false
showPctFull	Return the pctfull for each dataset. The default value is false. Values: true false

state	Return metric information for COMIDs within a specific state. Use a state's abbreviation to query for a given state. One of comid, county, state, or region is required unless conus='true'. If specified <i>and valid</i> , comid and county are ignored. <i>Case-sensitive</i> . Syntax: state=<state1>,<state2>
county	Return metric information for COMIDs within a specific county. Users must use the FIPS code, not county name, as a way to disambiguate counties. One of comid, county, state, or region is required unless conus='true'. If specified <i>and valid</i> , comid is ignored. Syntax: county=<county1>,<county1>
region	Return metric information for COMIDs within a specified hydroregion. Hydroregions are specified using full name i.e. 'Region01', 'Region03N', 'Region10L'. One of comid, county, state, or region is required unless conus='true'. If specified <i>and valid</i> , comid, county, and state are ignored. <i>Case-sensitive</i> . Syntax: region=<regionid1>,<regionid2>
conus	Return all COMIDs in the conterminous United States. Character string (Not case-sensitive) or logical. The default value is false. If true, comid, county, state, and region are ignored. Values: truefalse
countOnly	Return a CSV containing only the row count (ROWCOUNT) and the column count (COLUMNCOUNT) that the server expects to return in a request. The default value is false. Values: truefalse

Value

A tibble of desired StreamCat metrics. If data are missing for all rows of a given metric, then the column for that metric will not exist. If data are missing for only some rows, then they will be specified with NA.

Author(s)

Marc Weber

Examples

```
## Not run:
df <- lc_get_data(comid='23794487', aoi='cat', metric='fert')

df <- lc_get_data(metric='pcturbmd2006', aoi='ws',
comid='24083377')

df <- lc_get_data(metric='pctgrs2006', aoi='ws', region='Region01')

df <- lc_get_data(metric='pctwdwet2006', aoi='ws', county='41003')

df <- lc_get_data(metric='pcturbmd2006', aoi='ws',
comid='24083377', showAreaSqKm=FALSE, showPctFull=TRUE)

df <- lc_get_data(metric='pcturbmd2006,damdens',
aoi='cat,ws', comid='23783629,23794487,23812618')

df <- lc_get_data(metric='pcturbmd2006,damdens',
```

```

aoi='cat,ws', comid=c('23783629','23794487','23812618'))

df <- lc_get_data(metric='pcturbmd2006,damdens',
aoi='cat,ws', comid='23783629,23794487,23812618',
countOnly=TRUE)

## End(Not run)

```

lc_get_metric_names	<i>Get LakeCat Metric Names</i>
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Description

Function to filter LakeCat metrics metrics by category, area of interest, dataset or year. Use 'lc_get_params(categories)' or 'lc_get_params(datasets)' to see all the valid category or dataset options

Usage

```
lc_get_metric_names(category = NULL, aoi = NULL, year = NULL, dataset = NULL)
```

Arguments

category	Filter LakeCat metrics based on the metric category
aoi	Filter LakeCat metrics based on the area of interest
year	Filter LakeCat metrics based on a particular year or years
dataset	Filter LakeCat metrics based on the dataset name

Value

A dataframe of metrics and description that match filter criteria

Author(s)

Marc Weber

Examples

```

## Not run:
metrics <- lc_get_metric_names(category='Natural')
metrics <- lc_get_metric_names(category = c('Anthropogenic','Natural'),
aoi=c('Cat','Ws')
## End(Not run)

```

lc_get_params	<i>Get LakeCat Parameters</i>
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Description

Function to return available LakeCat parameters using the StreamCat API.

Usage

```
lc_get_params(param = NULL)
```

Arguments

param	List of available parameters in the API for the following options: name, areaofInterest, region, state, county. State and county return a data frame that includes FIPS codes, names and state abbreviations Syntax: param=<value1>,<value2> Values: name area
-------	--

Value

A list of all the current LakeCat values for a given parameter

Author(s)

Marc Weber

Examples

```
## Not run:
params <- lc_get_params(param='variable_info')
params <- lc_get_params(param='metric_names')
params <- sc_get_params(param='categories')
params <- lc_get_params(param='aoi')
params <- lc_get_params(param='state')
params <- lc_get_params(param='county')
params <- sc_get_params(param='datasets')

## End(Not run)
```

lc_nlcd

*Get NLCD Data***Description**

Function to specifically retrieve all NLCD metrics for a given year using the StreamCat API.

Usage

```
lc_nlcd(
  year = "2019",
  aoi = NULL,
  comid = NULL,
  showAreaSqKm = NULL,
  showPctFull = NULL,
  countOnly = NULL
)
```

Arguments

year	Years(s) of NLCD metrics to query. Only valid NLCD years are accepted (i.e. 2001, 2004, 2006, 2008, 2011, 2013, 2016, 2019) Syntax: year=<year1>,<year2>
aoi	Specify the area of interest described by a metric. By default, all available areas of interest for a given metric are returned. Syntax: areaOfInterest=<value1>,<value2> Values: catchment watershed riparian_catchment riparian_watershed other
comid	Return metric information for specific COMIDs Syntax: comid=<comid1>,<comid2>
showAreaSqKm	Return the area in square kilometers of a given area of interest. The default value is false. Values: true false
showPctFull	Return the pctfull for each dataset. The default value is false. Values: true false
countOnly	Return a CSV containing only the row count (ROWCOUNT) and the column count (COLUMNCOUNT) that the server expects to return in a request. The default value is false. Values: true false

Value

A tibble of desired StreamCat metrics

Author(s)

Marc Weber

Examples

```
## Not run:

df <- lc_nlcd(comid='23783629', year='2019', aoi='ws')

df <- lc_nlcd(year='2016', aoi='cat',
comid='23783629,23794487,23812618', showAreaSqKm=FALSE, showPctFull=TRUE)

df <- lc_nlcd(year='2016', aoi='cat',
comid='23783629,23794487,23812618', countOnly=TRUE)

df <- lc_nlcd(year='2016, 2019', aoi='cat,ws',
comid='23783629,23794487,23812618')

## End(Not run)
```

sc_fullname	<i>Lookup Full Metric Name</i>
-------------	--------------------------------

Description

Function to retrieve a full metric name based on the short name using the StreamCat API.

Usage

```
sc_fullname(metric = NULL)
```

Arguments

metric Short metric name Syntax: metric=value1 Values: metric

Value

A lookup of the full name for a given StreamCat metric

Author(s)

Marc Weber

Examples

```
fullname <- sc_fullname(metric='clay')
```

sc_get_comid

Get COMIDs

Description

Function to return NHDPlusV2 COMIDS using either a dataframe with coordinates and a specified CRS or an sf object. The function generates a vector of COMID values a user can then pass to sc_get_data function

Usage

```
sc_get_comid(dd = NULL, xcoord = NULL, ycoord = NULL, crsys = NULL)
```

Arguments

dd	Name of data frame object. Can be a simple data frame with coordinate columns in a known CRS or an sf points data frame
xcoord	The x coordinate column if using a raw data frame
ycoord	The y coordinate column if using a raw data frame
crsys	The epsg code if using a raw data frame

Value

A new sf data frame with a populated 'COMID' column

Author(s)

Marc Weber

Examples

```
## Not run:

dd <- data.frame(x = c(-122.649,-100.348,-75.186,-106.675),
  y = c(45.085, 35.405,42.403,38.721))

comids <- sc_get_comid(dd, xcoord='x',
  ycoord='y', crsys=4269)

dd <- sf::st_point_on_surface(sf::read_sf(system.file("shape/nc.shp", package="sf")))

comids <- sc_get_comid(dd)

comids <- sc_get_comid(dd, xcoord='x',
  ycoord='y', crsys=4269)

dd <- sf::read_sf(system.file("shape/nc.shp", package="sf"))
comids <- sc_get_comid(dd)
```

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

sc_get_data

Get StreamCat data

Description

Function to return StreamCat catchment and watershed metrics using the StreamCat API. The function allows a user to get specific metric data aggregated by area of interest, returned by comid(s), hydroregion(s), state(s), or county(ies).

Usage

```
sc_get_data(
  comid = NULL,
  metric = NULL,
  aoi = NULL,
  showAreaSqKm = NULL,
  showPctFull = NULL,
  state = NULL,
  county = NULL,
  region = NULL,
  conus = NULL,
  countOnly = NULL
)
```

Arguments

comid	Return metric information for specific COMIDs. Can be a comma-delimited list, a character vector, or any object that can be coerced to a comma-delimited list with paste . One of comid, county, state, or region is required unless conus='true'. Syntax: comid=<comid1>,<comid2>
metric	Name(s) of metrics to query. Must be character string with comma-delimited list of metrics, or, if metric='all' then all metrics will be queried. Not case-sensitive . Syntax: name=<name1>,<name2>
aoi	Name(s) of areas of interest to query. If a metric does not have data for a given AOI, no data is returned for that AOI. Certain metrics that have no AOI specified for StreamCat need the AOI to be specified as 'other'. These metrics include: BankfullDepth, BankfullWidth, ThalwagDepth (sic), CHEM_V2_1, CONN, HABT, HYD, ICI, IWI, TEMP, WettedWidth, prg_bmml, and all the mast, msst, mwst metrics. <i>Case-sensitive</i> . Syntax: areaOfInterest=<value1>,<value2> Values: cat wsl catrp100 wsrp100 other
showAreaSqKm	Return the area in square kilometers of a given area of interest. The default value is false. Values: true false

showPctFull	Return the pctfull for each dataset. The default value is false. Values: true/false
state	Return metric information for COMIDs within a specific state. Use a state's abbreviation to query for a given state. One of comid, county, state, or region is required unless conus='true'. If specified <i>and valid</i> , comid and county are ignored. <i>Case-sensitive</i> . Syntax: state=<state1>,<state2>
county	Return metric information for COMIDs within a specific county. Users must use the FIPS code, not county name, as a way to disambiguate counties. One of comid, county, state, or region is required unless conus='true'. If specified <i>and valid</i> , comid is ignored. Syntax: county=<county1>,<county1>
region	Return metric information for COMIDs within a specified hydroregion. Hydroregions are specified using full name i.e. 'Region01', 'Region03N', 'Region10L'. One of comid, county, state, or region is required unless conus='true'. If specified <i>and valid</i> , comid, county, and state are ignored. <i>Case-sensitive</i> . Syntax: region=<regionid1>,<regionid2>
conus	Return all COMIDs in the conterminous United States. Character string (Not case-sensitive) or logical. The default value is false. If true, comid, county, state, and region are ignored. Values: true/false
countOnly	Return a CSV containing only the row count (ROWCOUNT) and the column count (COLUMNCOUNT) that the server expects to return in a request. The default value is false. Values: true/false

Value

A data frame of StreamCat metrics. If data are missing for all rows of a given metric, then the column for that metric will not exist. If data are missing for only some rows, then they will be specified with NA.

Author(s)

Marc Weber

Examples

```
## Not run:
df <- sc_get_data(comid='179', aoi='cat', metric='fert')

df <- sc_get_data(metric='pctgrs2006', aoi='ws', region='Region01')

df <- sc_get_data(metric='pctwdwet2006', aoi='ws', county='41003')

df <- sc_get_data(metric='pcturbmd2006', aoi='wsrp100',
comid='1337420')

df <- sc_get_data(metric='pcturbmd2006,damdens',
aoi='cat,ws', comid='179,1337,1337420')

df <- sc_get_data(metric='pcturbmd2006,damdens',
aoi='cat,ws', comid='179,1337,1337420',
showAreaSqKm='true', showPctFull='true')
```

```
df <- sc_get_data(metric='pcturbmd2006,damdens',
  aoi='cat,ws', comid='179,1337,1337420', countOnly='true')

df <- sc_get_data(metric='thalwagdepth', comid='179,1337,1337420', aoi='other')

df <- sc_get_data(metric='thalwagdepth', comid=c('179','1337','1337420'), aoi='other')

df <- sc_get_data(comid='179', aoi='ws', metric='all')

## End(Not run)
```

sc_get_metric_names *Get StreamCat Metric Names*

Description

Function to filter StreamCat metrics by category, area of interest, dataset or year. Use 'sc_get_params(categories)' or 'sc_get_params(datasets)' to see all the valid category or dataset options

Usage

```
sc_get_metric_names(category = NULL, aoi = NULL, year = NULL, dataset = NULL)
```

Arguments

category	Filter StreamCat metrics based on the metric category
aoi	Filter StreamCat metrics based on the area of interest
year	Filter StreamCat metrics based on a particular year or years
dataset	Filter StreamCat metrics based on the dataset name

Value

A dataframe of metrics and description that match filter criteria

Author(s)

Marc Weber

Examples

```
## Not run:
metrics <- sc_get_metric_names(category='Wildfire')
metrics <- sc_get_metric_names(category = c('Deposition','Climate'),
  aoi=c('Cat','Ws'))
metrics <- sc_get_metric_names(aoi='Other',
  dataset=c('Canal Density','Predicted Channel Widths Depths'))
```

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

sc_get_params

Get StreamCat Parameters

Description

Function to return available StreamCat parameters using the StreamCat API.

Usage

```
sc_get_params(param = NULL)
```

Arguments

param	List of available parameters in the API for the following options: name, areaofInterest, region, state, county. State and county return a data frame that includes FIPS codes, names and state abbreviations Syntax: param=<value1>,<value2> Values: name area
-------	--

Value

A list of all the current StreamCat values for a given parameter

Author(s)

Marc Weber

Examples

```
## Not run:
params <- sc_get_params(param='variable_info')
params <- sc_get_params(param='metric_names')
params <- sc_get_params(param='categories')
params <- sc_get_params(param='aoi')
params <- sc_get_params(param='state')
params <- sc_get_params(param='county')
params <- sc_get_params(param='datasets')
## End(Not run)
```

sc_nlcd	<i>Get NLCD Data</i>
---------	----------------------

Description

Function to retrieve all NLCD metrics for a given year using the StreamCat API.

Usage

```
sc_nlcd(
  year = "2019",
  comid = NULL,
  aoi = NULL,
  showAreaSqKm = NULL,
  showPctFull = NULL,
  state = NULL,
  county = NULL,
  region = NULL,
  conus = NULL,
  countOnly = NULL
)
```

Arguments

year	Years(s) of NLCD metrics to query. Only valid NLCD years are accepted (i.e. 2001, 2004, 2006, 2008, 2011, 2013, 2016, 2019) Syntax: year=<year1>,<year2>
comid	Return metric information for specific COMIDs Syntax: comid=<comid1>,<comid2>
aoi	Specify the area of interest described by a metric. By default, all available areas of interest for a given metric are returned. Syntax: areaOfInterest=<value1>,<value2> Values: catchmentwatershedriparian_catchmentriparian_watershedlther
showAreaSqKm	Return the area in square kilometers of a given area of interest. The default value is false. Values: truefalse
showPctFull	Return the pctfull for each dataset. The default value is false. Values: truefalse
state	Return metric information for COMIDs within a specific state. Use a state's abbreviation to query for a given state. Syntax: state=<state1>,<state2>
county	Return metric information for COMIDs within a specific county. Users must use the FIPS code, not county name, as a way to disambiguate counties. Syntax: county=<county1>,<county1>
region	Return metric information for COMIDs within a specified hydroregion. Syntax: region=<regionid1>,<regionid2>
conus	Return all COMIDs in the conterminous United States. The default value is false. Values: truefalse
countOnly	Return a CSV containing only the row count (ROWCOUNT) and the column count (COLUMNCOUNT) that the server expects to return in a request. The default value is false. Values: truefalse

Value

A tibble of desired StreamCat metrics

Author(s)

Marc Weber

Examples

```
## Not run:
df <- sc_nlcd(year='2001', aoi='cat',comid='179,1337,1337420')

df <- sc_nlcd(year='2001', aoi='ws', region='Region01')

df <- sc_nlcd(year='2001', aoi='ws', region='Region01',
countOnly=TRUE)

df <- sc_nlcd(year='2001', aoi='ws', region='Region01',
showAreaSqKm=FALSE, showPctFull=TRUE)

df <- sc_nlcd(year='2001, 2006', aoi='cat,ws',
comid='179,1337,1337420')

## End(Not run)
```

Index

lc_fullname, [2](#)
lc_get_comid, [3](#)
lc_get_data, [4](#)
lc_get_metric_names, [6](#)
lc_get_params, [7](#)
lc_nlcd, [8](#)

paste, [4](#), [11](#)

sc_fullname, [9](#)
sc_get_comid, [10](#)
sc_get_data, [11](#)
sc_get_metric_names, [13](#)
sc_get_params, [14](#)
sc_nlcd, [15](#)