

Package ‘StreamCatTools’

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Type Package

Title 'StreamCatTools'

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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>.

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

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NeedsCompilation no

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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_nni

*Get NNI***Description**

Function to get all NNI data available for a given year.

Usage

```
lc_get_nni(
  year,
  aoi = NULL,
  comid = NULL,
  showAreaSqKm = TRUE,
  showPctFull = NULL,
  countOnly = NULL
)
```

Arguments

year	Years(s) of NNI metrics to query. Only valid NNI years are accepted (1987:2017) 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: catchmentwatershed
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 true. Values: truefalse
showPctFull	Return the pctfull for each dataset. 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)

Selia Markley

Examples

```
df <- lc_get_nni(year='1987, 1990, 2005, 2017', aoi='cat,ws',
comid='23783629,23794487,23812618')

df <- lc_get_nni(year='2015', aoi='cat',
comid='23783629', countOnly=TRUE)

df <- lc_get_nni(comid='23783629', year='2011, 2012', aoi='ws')
```

lc_get_params

*Get LakeCat Parameters***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_plotnni	<i>Plot National Nutrient Inventory data for lakes</i>
------------	--

Description

Function to plot time series of nitrogen and phosphorus budgets for a given lake COMID. This function allows a user to return a time series of major inputs, outputs, and derived metrics of nitrogen and phosphorus. Plot is returned as an object

Usage

```
lc_plotnni(comid, include.nue = FALSE)
```

Arguments

comid	Identifier of lake COMID user wants to plot NNI data for. Must be a character string with the COMID digit. Syntax: com=<COMID>
include.nue	Include time series of nitrogen use efficiency in the returned plot. The default value is false. Values: true/false

Value

Return plot as an object.

Author(s)

Selia Markley

Examples

```
## Not run:
p <- lc_plotnni(comid='23794487')
p <- lc_plotnni(comid='23794487', include.nue=TRUE)

## 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, ThalwegDepth (sic), CHEM_V2_1, CONN, HABT, HYD, ICI, IWI, TEMP, WettedWidth, prg_bmmi, and all the mast, msst, mwst metrics. <i>Case-sensitive</i> . Syntax: areaOfInterest=<value1>,<value2> Values: cat wslcatrp100 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	<i>Get StreamCat Metric Names</i>
---------------------	-----------------------------------

Description

Function to filter StreamCat metrics 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 merics and description that match filter criteria

Author(s)

Marc Weber

Examples

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

## End(Not run)
```

sc_get_nni	<i>Get NNI</i>
------------	----------------

Description

Function to get all NNI data available for a given year.

Usage

```
sc_get_nni(
  year,
  aoi = NULL,
  comid = NULL,
  showAreaSqKm = TRUE,
  state = NULL,
  county = NULL,
  region = NULL,
  conus = NULL,
  showPctFull = NULL,
  countOnly = NULL
)
```

Arguments

- year Years(s) of NNI metrics to query. Only valid NNI years are accepted (1987:2017)
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

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 true. Values: true/false
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: 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)

Selia Markley

Examples

```
## Not run:

df <- sc_get_nni(year='1987, 1990, 2005, 2017', aoi='cat,ws',
comid='179,1337,1337420')

df <- sc_get_nni(year='2015', aoi='cat',
comid='179', countOnly=TRUE)

df <- sc_get_nni(comid='179', year='2011, 2012', aoi='ws')

df <- sc_get_nni(year='2015, 2016, 2017', county='41003', aoi='ws')

## 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_plotnni

Plot National Nutrient Inventory data for streams

Description

Function to plot time series of nitrogen and phosphorus budgets for a given stream COMID. This function allows a user to return a time series of major inputs, outputs, and derived metrics of nitrogen and phosphorus. Plot is returned as an object

Usage

```
sc_plotnni(comid, include.nue = FALSE, include.inset = TRUE)
```

Arguments

comid	Identifier of stream COMID user wants to plot NNI data for. Must be a character string with the COMID digit. Syntax: com=<COMID>
include.nue	Include time series of nitrogen use efficiency in the returned plot. The default value is false. Values: true/false
include.inset	Include inset map that shows the location of the COMID and its basin. The default value is true. Values: true/false

Value

Return plot as an object.

Author(s)

Selia Markley

Examples

```
## Not run:  
p <- sc_plotnni(comid='1337420')  
p <- sc_plotnni(comid='1337420', include.nue=TRUE)  
p <- sc_plotnni(comid='1337420', include.inset=FALSE)  
  
## End(Not run)
```

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