

# Package ‘StreamCatTools’

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**Type** Package

**Title** 'StreamCatTools'

**Version** 0.9.1

**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)

**Suggests** dplyr, ggplot2, mapview, testthat, knitr, rmarkdown, devtools, xml2, magrittr, readr, tidyr, stringr, purrr

**Encoding** UTF-8

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

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

**VignetteBuilder** knitr,rmarkdown

**RoxygenNote** 7.3.3

**License** CC0

**NeedsCompilation** no

**Author** Marc Weber [aut, cre],  
Ryan Hill [ctb],  
Travis Hudson [ctb],  
Allen Brookes [ctb],  
David Rebhuhn [ctb],  
Michael Dumelle [ctb],  
Zachary Smith [ctb]

**Maintainer** Marc Weber <weber.marc@epa.gov>

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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
<b>Index</b>	<b>17</b>

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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 <a href="#">paste</a> . 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. <b>Not case-sensitive</b> . 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 <code>comid</code> , <code>county</code> , <code>state</code> , or <code>region</code> is required unless <code>conus='true'</code> . If specified <i>and valid</i> , <code>comid</code> and <code>county</code> are ignored. <i>Case-sensitive</i> . Syntax: <code>state=&lt;state1&gt;,&lt;state2&gt;</code>
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 <code>comid</code> , <code>county</code> , <code>state</code> , or <code>region</code> is required unless <code>conus='true'</code> . If specified <i>and valid</i> , <code>comid</code> is ignored. Syntax: <code>county=&lt;county1&gt;,&lt;county1&gt;</code>
region	Return metric information for COMIDs within a specified hydroregion. Hydroregions are specified using full name i.e. 'Region01', 'Region03N', 'Region10L'. One of <code>comid</code> , <code>county</code> , <code>state</code> , or <code>region</code> is required unless <code>conus='true'</code> . If specified <i>and valid</i> , <code>comid</code> , <code>county</code> , and <code>state</code> are ignored. <i>Case-sensitive</i> . Syntax: <code>region=&lt;regionid1&gt;,&lt;regionid2&gt;</code>
conus	Return all COMIDs in the conterminous United States. Character string ( <b>Not case-sensitive</b> ) or logical. The default value is <code>false</code> . If <code>true</code> , <code>comid</code> , <code>county</code> , <code>state</code> , and <code>region</code> are ignored. Values: <code>true</code> / <code>false</code>
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 <code>false</code> . Values: <code>true</code> / <code>false</code>

### 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     *Get LakeCat Metric Names*

---

### 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: namelarea
-------	---

## 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: catchmentwatershedriparian_catchmentriparian_watershedother
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: 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)**

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 <code>paste</code> . 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. <b>Not case-sensitive</b> . 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_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 ( <b>Not case-sensitive</b> ) 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 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: namelarea
-------	---

## 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

*Get NLCD Data***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_watershedother
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](#)