Package 'cdlTools'

June 27, 2020

Title Tools to Download and Work with USDA Cropscape Data

Version 0.15

Date 2020-06-23

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URL https://www.github.com/jlisic/cdlTools

BugReports https://www.github.com/jlisic/cdlTools/issues

Description Downloads USDA National Agricultural Statistics Service (NASS) cropscape data for a specified state. Utilities for fips, abbreviation, and name conversion are also provided. Full functionality requires an internet connection, but data sets can be cached for later off-line use.

License Unlimited

LazyData true

Imports raster, utils, httr

RoxygenNote 6.0.1

NeedsCompilation yes

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Repository CRAN

Date/Publication 2020-06-27 15:50:02 UTC

R topics documented:

`census2010FIPS` *U.S. Census 2010 FIPS Data*

Description

U.S. Census 2010 FIPS Data containing county names, state and county FIPS codes, and state abbreviations.

Usage

```
census2010FIPS
```

Format

A data frame with 3235 rows and 5 variables.

State State two letter abbreviation

State.ANSI State FIPS code

County.ANSI County FIPS code

County.Name County Name

ANSI.Cl FIPS class code

Source

http://www2.census.gov/geo/docs/reference/codes/files/national_county.txt

corn *CDL corn classes*

Description

An array of CDL enumerations that contain corn. The corn enumeration contains:

- 1 - Corn
- 225 - Double Crop, Winter Wheat and Corn
- 226 - Double Crop, Oats and Corn
- 237 - Double Crop, Barley and Corn
- 241 - Double Crop, Corn and Soybeans
- 251 - Non-Irrigated Corn

Usage

```
corn
```

Format

An object of class `numeric` of length 6.

Source

https://www.nass.usda.gov/Research_and_Science/Cropland/metadata/meta.php

cotton *CDL cotton classes*

Description

An array of CDL enumerations that contain cotton. The cotton enumeration contains:

- 2 - Cotton
- 232 - Double Crop, Lettuce and Cotton
- 238 - Double Crop, Winter Wheat and Cotton
- 239 - Double Crop, Soybeans and Cotton

Usage

```
cotton
```

Format

An object of class `numeric` of length 4.

Source

https://www.nass.usda.gov/Research_and_Science/Cropland/metadata/meta.php

---

createComparableCDL *Create comparable raster images*

Description

createComparableCDL uses a base index within a raster list, and sets all other raster images within the list to the same resolution, projection, and extent. The raster function resample is used to tranform raster images, therefore this function may be quite slow without tuning.

Usage

```
createComparableCDL(rasterList, filenames, baseIndex, progress = "")
```

Arguments

rasterList	A list of raster images.
filenames	An array of file names of raster images to coerce into a raster list, if rasterList is not provided.
baseIndex	The index of the raster list element that all other elements will match with respect to resolution, projection and extent.
progress	A string for the raster progress bar type, default "" is none, "text" provides text output, "window" provides a gui window if available.

Value

A list of raster images matching in extent, resolution, and projection.

Author(s)

Jonathan Lisic, <jlisic@gmail.com>

Examples

```
## Not run:
# download multiple years of Iowa Data
r <- getCDL('iowa',c(2006,2010))
# resample based on the 2006
r2 <- createComparableCDL(r,baseIndex=1)

## End(Not run)
```

`cultivated` *CDL cultivated classes*

Description

An array of CDL enumerations of cultivated land cover. Not all cultivated enumerations have labels as of this time, and are reserved for future land cover classes. The cultivated enumeration contains:

- 1 - Corn
- 2 - Cotton
- 3 - Rice
- 4 - Sorghum
- 5 - Soybeans
- 6 - Sunflower
- 7 - 7
- 8 - 8
- 9 - 9
- 10 - Peanuts
- 11 - Tobacco
- 12 - Sweet Corn
- 13 - Pop or Ornamental Corn
- 14 - Mint
- 15 - 15
- 16 - 16
- 17 - 17
- 18 - 18
- 19 - 19
- 20 - 20
- 21 - Barley
- 22 - Durum Wheat
- 23 - Spring Wheat
- 24 - Winter Wheat
- 25 - Other Small Grains
- 26 - Double Crop Winter Wheat and Soybeans
- 27 - Rye
- 28 - Oats
- 29 - Millet
- 30 - Speltz

- 31 - Canola
- 32 - Flaxseed
- 33 - Safflower
- 34 - Rape Seed
- 35 - Mustard
- 36 - Alfalfa
- 38 - Camelina
- 39 - Buckwheat
- 40 - 40
- 41 - Sugarbeets
- 42 - Dry Beans
- 43 - Potatoes
- 44 - Other Crops
- 45 - Sugarcane
- 46 - Sweet Potatoes
- 47 - Misc Vegs and Fruits
- 48 - Watermelons
- 49 - Onions
- 50 - Cucumbers
- 51 - Chick Peas
- 52 - Lentils
- 53 - Peas
- 54 - Tomatoes
- 55 - Caneberries
- 56 - Hops
- 57 - Herbs
- 58 - Clover or Wildflowers
- 61 - Fallow or Idle Cropland
- 66 - Cherries
- 67 - Peaches
- 68 - Apples
- 69 - Grapes
- 71 - Other Tree Crops
- 72 - Citrus
- 73 - 73
- 74 - Pecans
- 75 - Almonds

- 76 - Walnuts
- 77 - Pears
- 78 - 78
- 79 - 79
- 80 - 80
- 96 - 96
- 196 - 196
- 197 - 197
- 198 - 198
- 199 - 199
- 200 - 200
- 201 - 201
- 202 - 202
- 203 - 203
- 204 - Pistachios
- 205 - Triticale
- 206 - Carrots
- 207 - Asparagus
- 208 - Garlic
- 209 - Cantaloupes
- 210 - Prunes
- 211 - Olives
- 212 - Oranges
- 213 - Honeydew Melons
- 214 - Broccoli
- 215 - 215
- 216 - Peppers
- 217 - Pomegranates
- 218 - Nectarines
- 219 - Greens
- 220 - Plums
- 221 - Strawberries
- 222 - Squash
- 223 - Apricots
- 224 - Vetch
- 225 - Double Crop Winter Wheat and Corn
- 226 - Double Crop Oats and Corn

- 227 - Lettuce
- 228 - 228
- 229 - Pumpkins
- 230 - Double Crop Lettuce and Durum Wheat
- 231 - Double Crop Lettuce and Cantaloupe
- 232 - Double Crop Lettuce and Cotton
- 233 - Double Crop Lettuce and Barley
- 234 - Double Crop Durum Wheat and Sorghum
- 235 - Double Crop Barley and Sorghum
- 236 - Double Crop Winter Wheat and Sorghum
- 237 - Double Crop Barley and Corn
- 238 - Double Crop Winter Wheat and Cotton
- 239 - Double Crop Soybeans and Cotton
- 240 - Double Crop Soybeans and Oats
- 241 - Double Crop Corn and Soybeans
- 242 - Blueberries
- 243 - Cabbage
- 244 - Cauliflower
- 245 - Celery
- 246 - Radishes
- 247 - Turnips
- 248 - Eggplants
- 249 - Gourds
- 250 - Cranberries
- 251 - Non-Irrigated Corn
- 252 - Non-Irrigated Soybeans
- 253 - Non-Irrigated Winter Wheat
- 254 - Double Crop Barley and Soybeans
- 255 - Non-Irrigated Double Crop Winter Wheat and Soybeans

Usage

```
cultivated
```

Format

An object of class `numeric` of length 133.

Source

https://www.nass.usda.gov/Research_and_Science/Cropland/metadata/meta.php

durumWheat *CDL durum wheat classes*

Description

An array of CDL enumerations that contain durum wheat. The durum wheat enumeration contains:

- 22 - Durum Wheat
- 230 - Double Crop Lettuce and Durum Wheat
- 234 - Double Crop Durum Wheat and Sorghum

Usage

```
durumWheat
```

Format

An object of class `numeric` of length 3.

Source

https://www.nass.usda.gov/Research_and_Science/Cropland/metadata/meta.php

fips *FIPS code conversion function.*

Description

`fips` converts U.S. state names and abbreviations to and from FIPS codes.

Usage

```
fips(x, to = "FIPS")
```

Arguments

`x`	A vector, data frame or matrix of character strings or numeric FIPS codes. Character input can be the two-letter postal abbreviation, the full name of a state, or a FIPS code in character format. The string is case insensitive. FIPS codes are the only numeric input supported.
`to`	A character string of output type: "FIPS" will return a numeric fips code. "Abbreviation" will return a two letter state abbreviation. "Name" will return the full state name with spaces. The default output is a numeric FIPS code.

Details

The Federal Information Processing Standard (FIPS) provides a set of standard numeric codes for refering to U.S. states. This function converts between FIPS codes, state two letter abbreviations, and full state names.

Value

The output type specified by the "to" argument. If no match can be made, the program returns NA.

Author(s)

Jonathan Lisic, <jlisic@gmail.com>

Examples

```
fips("ia")
fips('northcarolina', to='Abbreviation')
fips('North Carolina')
fips(44,to='Name')
```

---

getCDL *Get CDL raster data*

Description

getCDL retrieves CDL state raster objects for a set of years.

Usage

```
getCDL(x, year, alternativeUrl, location, https = TRUE,
  ssl.verifypeer = TRUE)
```

Arguments

x	Is either a two digit state FIPS code, a two letter abbreviation, or a state name.
year	A numerical vector. A set of years of CDL data to download.
alternativeUrl	An optional string containing an alternative url.
location	An optional string containing a location to store the file.
https	An optional boolean to turn on and off https, default is on.
ssl.verifypeer	An optional boolean to turn on and off ssl verfication, default is on.

Value

A list of CDL raster objects of interested county for a set of years.

Author(s)

Jonathan Lisic, <jlisic@gmail.com>

Joseph Stachelek, <stachel2@msu.edu>

Examples

```
## Not run:
# Get data for California, 2013 and 2015
# by FIPS
getCDL(6,c(2013,2015))
# Get data for California, 2013 and 2015
getCDL("California",c(2013,2015))
# Get all the west coast from 2009 to 2016
getCDL(c("CA","OR","WA"),2013:2016)

## End(Not run)
```

---

matchCount *Counts distinct pixel pairs in CDL raster images*

Description

matchCount counts distinct pixel pairs for CDL raster images with same extents and resolution.

Usage

```
matchCount(x, y, m = 256)
```

Arguments

x	A CDL raster image.
y	A CDL raster image.
m	A bound for the max enumeration of CDL categories. The default is 256.

Value

A matrix with pixel counts by unique ordered CDL crop pairs in x and y.

Author(s)

Jonathan Lisic, <jlisic@gmail.com>

Examples

```
## Not run:
z1 <- matrix( rep(c(1,4),8), nrow=4)
z2 <- matrix( rep(c(1:4),4), nrow=4)

r1 <- raster(z1)
r2 <- raster(z2)

a <- matchCount(r1,r2)

## End(Not run)
```

---

nothing *CDL nothing class*

Description

An array of CDL enumerations that contain the nothing class. The nothing enumeration contains:

- 0 - Background

Usage

```
nothing
```

Format

An object of class `numeric` of length 1.

Source

https://www.nass.usda.gov/Research_and_Science/Cropland/metadata/meta.php

---

pasture *CDL pasture classes*

Description

An array of CDL enumerations that contain pasture. The pasture enumeration contains:

- 37 - Other Hay/Non Alfalfa
- 38 - Camelina
- 39 - Buckwheat
- 62 - Pasture/Grass
- 171 - Grassland Herbaceous

Usage

```
pasture
```

Format

An object of class `numeric` of length 5.

Source

https://www.nass.usda.gov/Research_and_Science/Cropland/metadata/meta.php

---

projCDL *The default projection of CDL data*

Description

The proj4 string used for all CDL data. "+proj=aea +lat_1=29.5 +lat_2=45.5 +lat_0=23 +lon_0=-96 +x_0=0 +y_0=0 +datum=NAD83 +units=m +no_defs +ellps=GRS80 +towgs84=0,0,0"

Usage

```
projCDL
```

Format

An object of class `character` of length 1.

Source

https://www.nass.usda.gov/Research_and_Science/Cropland/metadata/meta.php

---

soybeans *CDL soybeans classes*

Description

An array of CDL enumerations that contain soybeans. The soybeans enumeration contains:

- 5 - Soybeans
- 26 - Double Crop Winter Wheat and Soybeans
- 239 - Double Crop Soybeans and Cotton
- 240 - Double Crop Soybeans and Oats
- 241 - Double Crop Corn and Soybeans
- 252 - Non-Irrigated Soybeans
- 254 - Double Crop Barley and Soybeans
- 254 - Double Crop Barley and Soybeans
- 255 - Non-Irrigated Double Crop Winter Wheat and Soybeans

Usage

```
soybeans
```

Format

An object of class `numeric` of length 9.

Source

https://www.nass.usda.gov/Research_and_Science/Cropland/metadata/meta.php

---

springWheat *CDL spring wheat classes*

Description

An array of CDL enumerations that contain spring wheat. The spring wheat enumeration contains:

- 23 - Spring Wheat

Usage

```
springWheat
```

Format

An object of class `numeric` of length 1.

Source

https://www.nass.usda.gov/Research_and_Science/Cropland/metadata/meta.php

---

stateNames *U.S. Census 2010 State FIPS Data*

Description

U.S. Census 2010 State FIPS Data containing names, FIPS codes, and abbreviations.

Usage

```
stateNames
```

Format

An object of class `data.frame` with 54 rows and 3 columns.

Details

STATE State two letter abbreviation

STATENAME State name

STATEFP State FIPS code

Source

http://www2.census.gov/geo/docs/reference/codes/files/national_county.txt

---

updateNamesCDL *Label CDL classes.*

Description

updateNamesCDL converts numeric CDL categories to class labels.

Usage

```
updateNamesCDL(y)
```

Arguments

y	A numeric array of integers associated with CDL categories.

Value

An array of strings labeling each CDL class. If the CDL class is unspecified then the original integer is returned.

Author(s)

Jonathan Lisic, <jlisic@gmail.com>

Examples

```
updateNamesCDL(0:255)
```

varNamesCDL *Enumerated CDL classes*

Description

A list of enumerated CDL classes and class descriptions.

Usage

```
varNamesCDL
```

Format

An object of class `character` of length 278.

Source

https://www.nass.usda.gov/Research_and_Science/Cropland/metadata/meta.php

water *CDL water classes*

Description

An array of CDL enumerations that contain water. The water enumeration contains:

- 83 - Water
- 111 - Open Water

Usage

```
water
```

Format

An object of class `numeric` of length 2.

Source

https://www.nass.usda.gov/Research_and_Science/Cropland/metadata/meta.php

`winterWheat` *CDL winter wheat classes*

Description

An array of CDL enumerations that contain winter wheat. The winter wheat enumeration contains:

- 24 - Winter Wheat
- 26 - Double Crop Winter Wheat and Soybeans
- 225 - Double Crop Winter Wheat and Corn
- 236 - Double Crop Winter Wheat and Sorghum
- 238 - Double Crop Winter Wheat and Cotton
- 253 - Non-Irrigated Winter Wheat
- 255 - Non-Irrigated Double Crop Winter Wheat and Soybeans

Usage

```
winterWheat
```

Format

An object of class `numeric` of length 7.

Source

https://www.nass.usda.gov/Research_and_Science/Cropland/metadata/meta.php

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