

# rbison vignette - wrapper to the USGS BISON API

## About the package

**rbison** is an R package to search and retrieve data from the USGS BISON service. **rbison** wraps R code around the BISON API to allow you to talk to the BISON database from R.

BISON has occurrence data for the US only.

BISON is a node of the Global Biodiversity Information Facility (GBIF) - i.e., you can get data that's available in BISON via GBIF instead if you want.

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## Info

See [here](#) for API docs for the BISON API.

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## Quick start

### Install rbison

```
# install.packages('devtools'); library(devtools); install_github('rbison',  
# 'ropensci')  
library(rbison)  
library(sp)  
library(plyr)  
library(httr)  
library(rjson)  
library(gridExtra)  
library(mapproj)  
library(ggplot2)  
library(maps)  
library(rgeos)  
library(rgdal)
```

Notice that the function **bisonmap** automatically selects the map extent to plot for you, being one of the contiguous lower 48 states, or the lower 48 plus AK and HI, or a global map

If some or all points outside the US, a global map is drawn, and throws a warning. . You may want to make sure the occurrence lat/long coordinates are correct.

### get data

```
out <- bison(species = "Helianthus annuus", count = 10)
```

inspect summary

```
bison_data(out)
```

	total	observation	fossil	specimen	literature	unknown	living	centroid
1	4424	13	102	1303	1106	1892	8	1106

map occurrences

```
bisonmap(out)
```



Figure 1: plot of chunk unnamed-chunk-1

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All points within the US (including AK and HI)

get data

```
out <- bison(species = "Bison bison", count = 600)
```

inspect summary

```
bison_data(out)
```

	total	observation	fossil	specimen	unknown
1	781	38	4	722	17

map occurrences

```
bisonmap(out)
```



Figure 2: plot of chunk six

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All points within the contiguous 48 states

get data

```
out <- bison(species = "Aquila chrysaetos", count = 600)
```

inspect summary

```
bison_data(out)
```

	total	observation	fossil	specimen	literature	unknown	centroid
1	41780	39334	30	1664	118	634	904

map occurrences

```
bisonmap(out)
```



Figure 3: plot of chunk nine

---

With any data returned from a bison call, you can choose to plot county or state level data

Counties - using last data call for Aquila

```
bisonmap(out, tomap = "county")
```

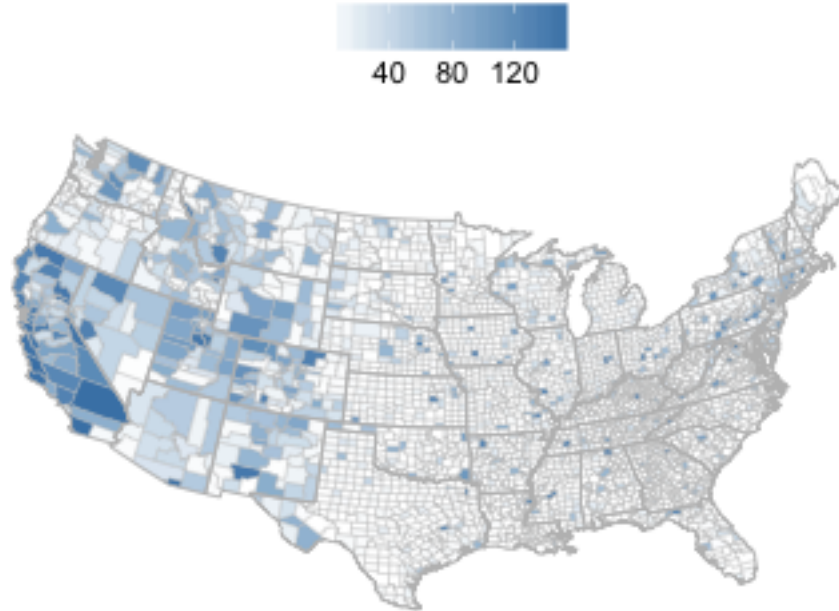


Figure 4: plot of chunk ten

States - using last data call for Aquila

```
bisonmap(out, tomap = "state")
```

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Constrain search with county IDs or bounding boxes

**Constrain search to a certain county.** Check out [this site](#) to get state and county fips codes. Fips codes are like so: First two digits are the state code - last three are the county code. For example the *06* in 06037 is the state of California, and the *037* is the Los Angeles county.

```
out <- bison(species = "Helianthus annuus", countyFips = 6037)
```

```
# Inspect summary
bison_data(out)
```

```
total observation fossil specimen literature unknown centroid
1      23           1      3      12           1      6      1
```

```
# By default, the query only returned 10 records
bison_data(out, "data_df")
```

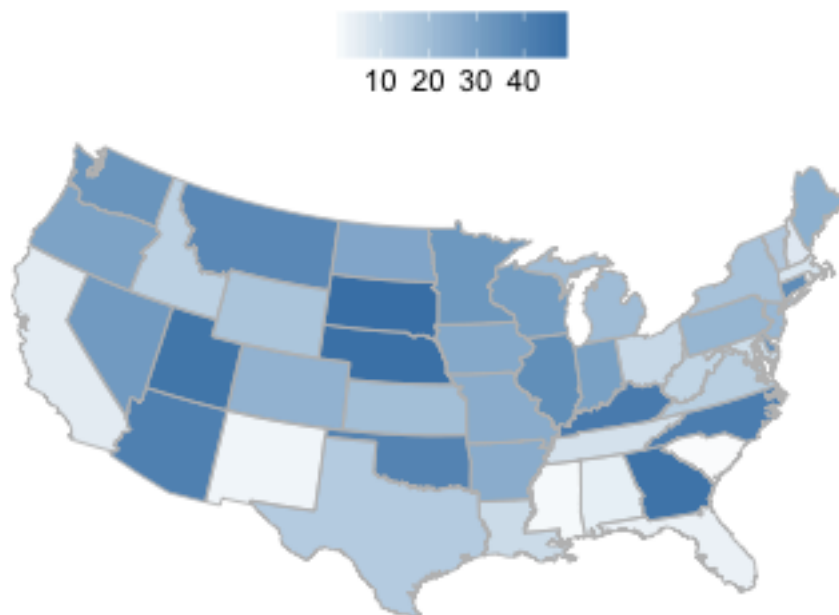


Figure 5: plot of chunk eleven

	id	name	longitude	latitude
1	832095838	Helianthus annuus	-118.4	33.39
2	687026030	Helianthus annuus	-118.2	34.09
3	40886954	Helianthus annuus	-118.9	34.80
4	40886955	Helianthus annuus	-118.9	34.80
5	67195635	Helianthus annuus	-118.8	34.70
6	67195791	Helianthus annuus	-118.5	34.30
7	67195582	Helianthus annuus	-118.4	34.04
8	40886953	Helianthus annuus	-118.1	34.70
9	40886951	Helianthus annuus	-118.1	34.70
10	40886950	Helianthus annuus	-118.1	34.70

	provider
1	USDA PLANTS
2	iNaturalist.org
3	US National Plant Germplasm System
4	US National Plant Germplasm System
5	<NA>
6	<NA>
7	<NA>
8	US National Plant Germplasm System
9	US National Plant Germplasm System
10	US National Plant Germplasm System

Or specify county by its actual name - probably much easier.

```
out <- bison(species = "Helianthus annuus", county = "Los Angeles")
```

```
# Inspect summary
```

```
bison_data(out)
```

```
total observation fossil specimen literature unknown centroid
1      23           1       3       12           1       6       1
```

```
# By default, the query only returned 10 records
```

```
bison_data(out, "data_df")
```

	id	name	longitude	latitude
1	832095838	Helianthus annuus	-118.4	33.39
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3	40886954	Helianthus annuus	-118.9	34.80
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5	67195635	Helianthus annuus	-118.8	34.70
6	67195791	Helianthus annuus	-118.5	34.30
7	67195582	Helianthus annuus	-118.4	34.04
8	40886953	Helianthus annuus	-118.1	34.70
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10	40886950	Helianthus annuus	-118.1	34.70

	provider
1	USDA PLANTS
2	iNaturalist.org
3	US National Plant Germplasm System
4	US National Plant Germplasm System
5	<NA>
6	<NA>
7	<NA>
8	US National Plant Germplasm System
9	US National Plant Germplasm System
10	US National Plant Germplasm System

bison will help you if you spell the name wrong, or use a partial name. The results are not printed below, but you would get a prompt asking you to pick between the two counties that start with *Los*.

```
bison(species = "Helianthus annuus", county = "Los")
```

**Constrain search to a amorphous area.** Check out the Wikipedia page [here](#) for an in depth look at the options, terminology, etc.

```
out <- bison(species = "Helianthus annuus", aoi = "POLYGON((-111.06360117772908 38.84001566645886,-110.8
```

```
# Inspect summary
```

```
bison_data(out)
```

```
total literature centroid
1      1           1       1
```

```
# The data
bison_data(out, "data_df")
```

```
      id      name longitude latitude  provider
1 832098012 Helianthus annuus   -110.7    38.99 USDA PLANTS
```

**Constrain search to a certain aoibbox.** An aoibbox uses the format minx,miny,maxx,maxy.

```
out <- bison(species = "Helianthus annuus", aoibbox = "-120.31,35.81,-110.57,40.21")
```

```
# Inspect summary
bison_data(out)
```

```
total observation fossil specimen literature unknown centroid
1   145           6      8       34          25       72       25
```

```
# The data, by default, the query only returned 10 records
bison_data(out, "data_df")
```

```
      id      name longitude latitude  provider
1 1800986531 Helianthus annuus   -112.1    37.18    BISON
2 1800986532 Helianthus annuus   -112.1    37.18    BISON
3 1800986533 Helianthus annuus   -112.1    37.18    BISON
4 1800986534 Helianthus annuus   -112.1    37.18    BISON
5 1800986645 Helianthus annuus   -111.8    37.13    BISON
6 1800986646 Helianthus annuus   -111.8    37.13    BISON
7  832096828 Helianthus annuus   -118.4    38.54 USDA PLANTS
8  832098025 Helianthus annuus   -111.8    38.75 USDA PLANTS
9  832098012 Helianthus annuus   -110.7    38.99 USDA PLANTS
10 832098018 Helianthus annuus   -113.1    39.05 USDA PLANTS
```