EJAM 2.32.0

Quick Start Guide

Source: vignettes/2_quickstart.Rmd

A Brief Intro to Using EJAM in RStudio

This document is about analysts or coders using the EJAM R package in RStudio. After you install the EJAM R package, this document explains how you can run an EJAM analysis and view results right away using R.

This document is not about using EJAM as a web application, but you can launch a local web app after installing the EJAM R package.

Load EJAM

To start using EJAM in RStudio/R, you first attach/load the R package using `library()` or `require()`.

```
library(EJAM)
```

Analyze Places with `ejamit()`

To quickly try EJAM in RStudio:

```
# EJAM analysis of 100 places, for everyone within 3 miles
out <- ejamit(testpoints_100, radius = 3)

pts <- sitepoints_from_any(c("30.97740, -83.36900", "32.5158
out2 <- ejamit(pts, radius = 2)
```

To quickly try EJAM with an example input file (spreadsheet with latitude and longitude of each point)

```
myfile <- system.file("testdata/latlon/testpoints_10.xlsx",

out <- ejamit(myfile, radius = 3)
```

If you already have your own spreadsheet of point locations to analyze, then in RStudio you can just use the `ejamit()` function without specifying the locations or radius – EJAM will prompt you to select the file and a radius.

EJAM 2.32.0

Note: The file should be an Excel file or .csv file and the first sheet (tab) needs to be just a table of one header row (with at least two columns named lat and lon), and one row per site (point). No extra rows, no merged cells, etc.

If you need examples of spreadsheets (and other input files you can try), you can find the ones installed with the EJAM package in your local folder, like this in the RStudio console:

```
## See where the folder is and see what files are there:
testdata()

# or see just the latlon files:
dir(system.file("testdata/latlon", package = "EJAM"))
```

Pick a Radius

You can specify the radius in miles. EJAM will analyze all residents within that many miles of each point (site).

```
radius <- 3 # radius (in miles).  5 km = 3.106856 miles, 10
```

Converting between miles and kilometers – If you know you want to analyze for 5 kilometers, for example, you can turn it into miles.

```
5000 / meters_per_mile
#> [1] 3.106856
convert_units(5, 'km', 'miles')
#> [1] 3.106856
```

Map your sites before analyzing them

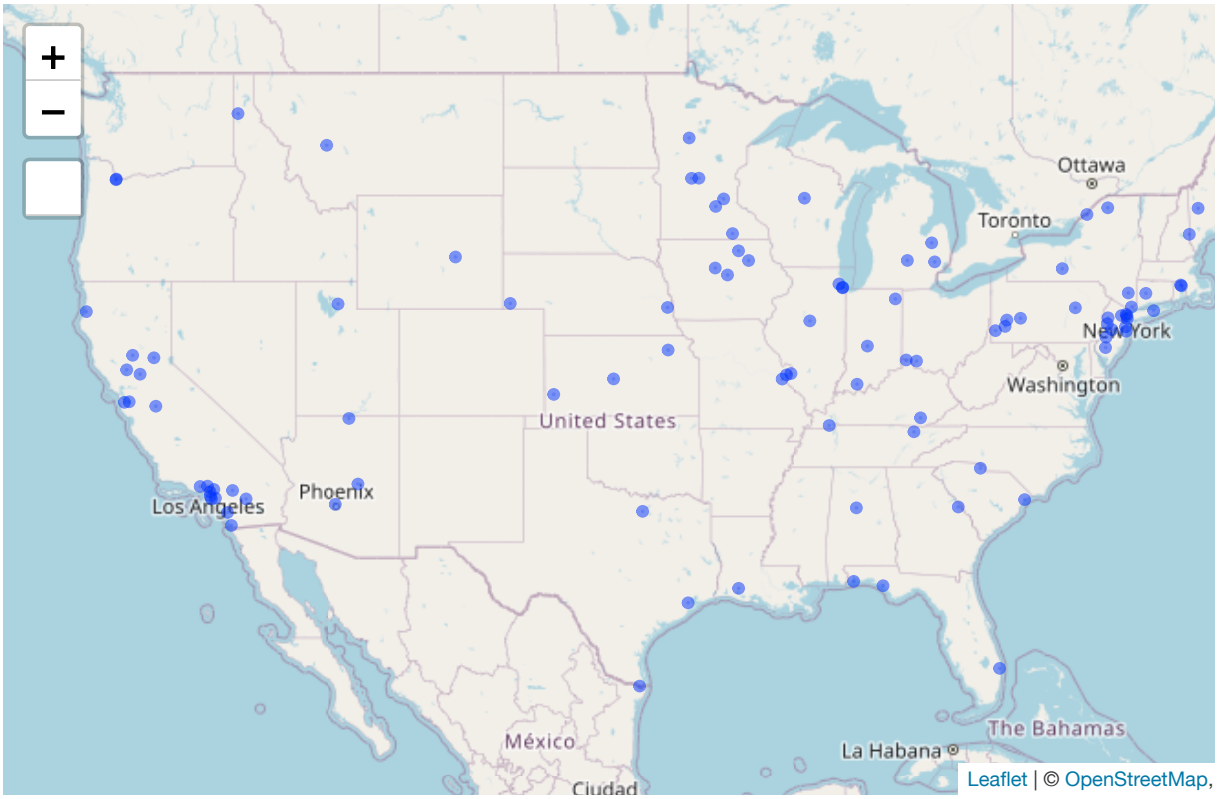
This creates an interactive map. Click a point on the map to see a pop-up with details about that point.

```
# input to EJAM
pts <- testpoints_100
mapfast(pts)
```

Map results with `ejam2map()`

This also creates an interactive map. Click a point on the map to see a popup with details about people near that point.

EJAM 2.32.0



Report via `ejam2report()` (interactive html file)

```
out <- testoutput_ejamit_100pts_1miles
ejam2report(out)

y <- ejam2report(out, sitenumber = 1, analysis_title = "Site
```

EJAM 2.32.0

This report provides environmental and socioeconomic information for user-defined areas, and combines that data into environmental justice and supplemental indexes.

Summary of EJ Analysis

Residents within 1 mile of any of the 100 selected points
Population: 358,470

Environmental and Socioeconomic Indicators Data

SELECTED VARIABLES	VALUE	STATE AVERAGE	PERCENTILE IN STATE	USA AVERAGE	PERCENTILE IN USA
POLLUTION AND SOURCES					
Particulate Matter (µg/m^3)	8.49	8.2	55	8.08	58
Ozone (ppb)	58.97	59	44	61.63	31
Diesel Particulate Matter (µg/m^3)	0.28	0.28	55	0.26	63
Air Toxics Cancer Risk* (lifetime risk per million)	27.77	25.99	16	25.24	5
Air Toxics Respiratory HI*	0.31	0.33	19	0.31	31
Toxic Releases to Air	22357.52	4945.12	62	4611.75	96
Traffic Proximity (daily traffic count/distance to road)	250.93	209.74	69	212.09	79
Lead Paint (% Pre-1960 Housing)	0.39	0.32	58	0.3	65
Superfund Proximity (site count/km distance)	0.21	0.15	55	0.13	86
RMP Facility Proximity (facility count/km distance)	0.97	0.44	77	0.43	87
Hazardous Waste Proximity (facility count/km distance)	3.37	2.06	72	1.93	83
Underground Storage Tanks (count/km^3)	6.19	4.38	67	3.95	81
Wastewater Discharge (toxicity-weighted concentration/m distance)	0.82	17.42	63	21.81	91
SOCIOECONOMIC INDICATORS					
Demographic Index	43%	32%	69	35%	68
Supplemental Demographic Index	18%	14%	71	14%	73
People of Color	45%	35%	66	39%	62
Low Income	41%	29%	70	31%	71
Unemployment Rate	7%	6%	65	6%	70
Limited English Speaking Households	4%	4%	57	5%	73
Less Than High School Education	17%	11%	69	12%	76
Under Age 5	7%	6%	64	6%	67
Over Age 64	12%	17%	35	17%	36
Low Life Expectancy	21%	19%	68	20%	70

Summary table of environmental and demographic indicators as raw value, average and percentile (in State and in US overall)

EJAM 2.32.0

locations in the state or nation. For more information and calculation details on the EJ and supplemental indexes, please visit the EJScreen website.

EJ INDEXES

The EJ indexes help users screen for potential EJ concerns. To do this, the EJ index combines data on low income and people of color populations with a single environmental indicator.

SELECTED VARIABLES	VALUE	PERCENTILE IN STATE	PERCENTILE IN USA
EJ INDEXES			
Particulate Matter	26.33	67	75
Ozone	17.12	59	61
Diesel Particulate Matter	25.13	66	71
Air Toxics Cancer Risk	16.23	57	70
Air Toxics Respiratory HI	17.09	56	69
Toxic Releases to Air	27.14	69	77
Traffic Proximity	27.91	71	73
Lead Paint	25.18	66	74
Superfund Proximity	25.99	63	74
RMP Facility Proximity	34.04	77	80
Hazardous Waste Proximity	31.75	74	77
Underground Storage Tanks	27.43	68	74
Wastewater Discharge	23.7	67	72
SUPPLEMENTAL EJ INDEXES			
Particulate Matter	10.99	67	78
Ozone	7.21	57	63
Diesel Particulate Matter	10.42	68	76
Air Toxics Cancer Risk	6.61	58	71
Air Toxics Respiratory HI	6.81	56	71
Toxic Releases to Air	11.57	71	80
Traffic Proximity	11.63	74	78
Lead Paint	11.08	66	76
Superfund Proximity	10.86	63	78
RMP Facility Proximity	14.38	78	84
Hazardous Waste Proximity	13.31	76	82
Underground Storage Tanks	11.71	70	77
Wastewater Discharge	9.99	68	74

SELECTED VARIABLES	VALUE
BREAKDOWN BY RACE	
% White	54.8%
% Black	11.7%
% Asian	3.1%
% Hispanic	25.5%
% American Indian	0.4%
% Hawaiian/Pacific Islander	0.2%
% Other Race	0.3%
% Two or more races	4%
BREAKDOWN BY GENDER	
% Male	49.9%
% Female	50.1%
LIMITED ENGLISH SPEAKING BREAKDOWN	
Speak Spanish	69.8%
Speak Other Indo-European Languages	12.9%
Speak Asian-Pacific Island Languages	13.5%
Speak Other Languages	3.8%

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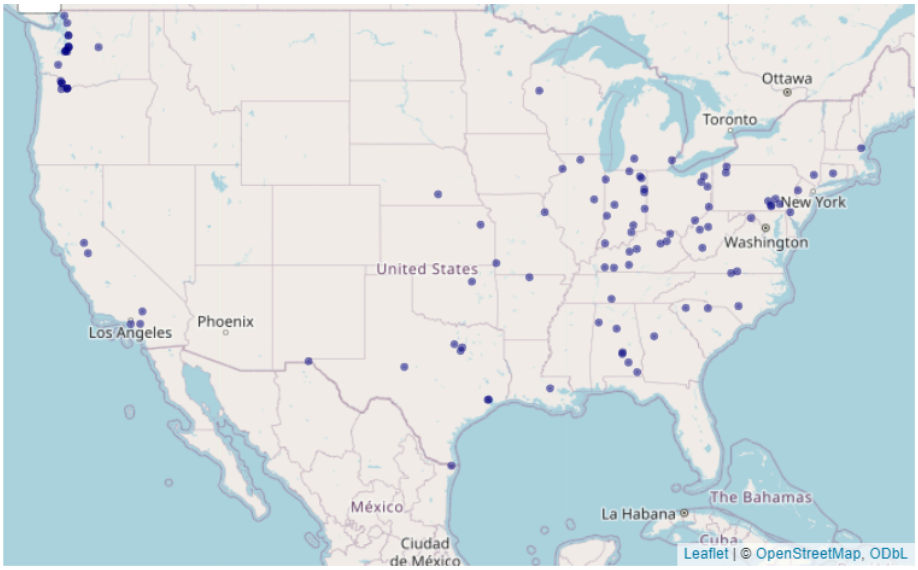

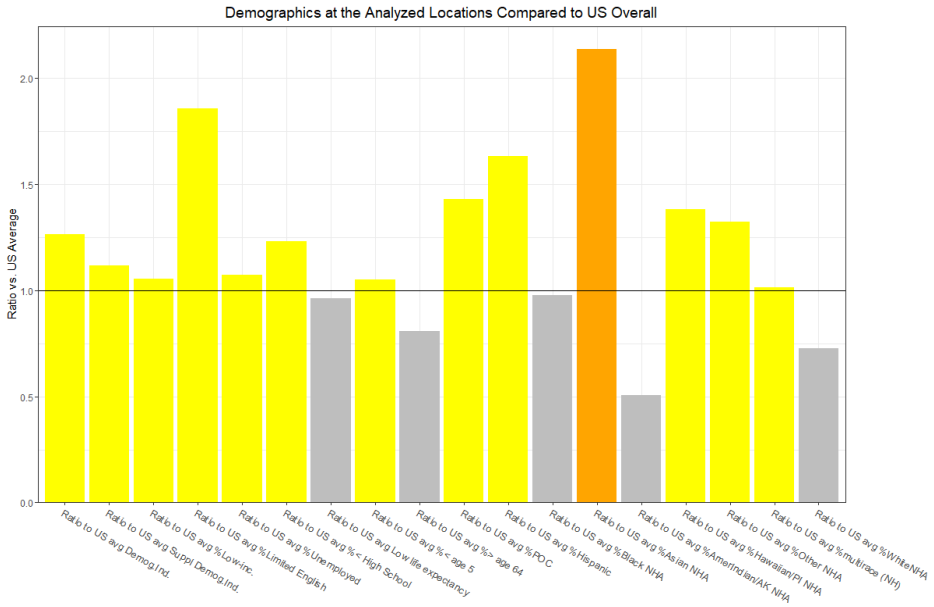

Barplot comparing demographic indicators as ratios to US average

Table of Results in RStudio console

As an alternative to the pdf report created by `ejam2report()`, this gives you a quick, simple list of results for all the indicators:

```
ejam2table_tall(out)
ejam2table_tall(out, sitenumber = 1)
```

Barplot

```
out <- testoutput_ejamit_100pts_1miles

# Check long list of indicators for any that are elevated
```

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```
ejam2barplot(out,
  varnames = names_these_ratio_to_state_avg,
  main = "Envt & Demog Indicators at Selected Sites Compared


# Demographics only

# vs nationwide avg
ejam2barplot(testoutput_ejamit_100pts_1miles)

# vs statewide avg
ejam2barplot(testoutput_ejamit_1000pts_1miles,
  varnames = c(names_d_ratio_to_state_avg, names_d_subgroups
  main = "Demographics at Selected Sites Compared to State A


# Environmental only

ejam2barplot(testoutput_ejamit_100pts_1miles,
  varnames = c(names_e_ratio_to_avg, names_e_ratio_to_state_
  main = "Environmental Indicators at Selected Sites Compare
```

```
# see more examples at ?ejam2barplot
```

View Results Spreadsheet via `ejam2excel()` (to Launch Excel)

```
out <- testoutput_ejamit_100pts_1miles
ejam2excel(out, launchexcel = T, save_now = F)
```

Save Results as a Spreadsheet file

```
ejam2excel(out, save_now = T)
```

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	d	_msg	Report	Map	report	Population			ation		Index	Demog Index	inc.	Limit Engli
1														
2	1	TRUE		https://ej	https://ejscreen.epa	7,725	-74.89137	40.66478	NJ	New Jersey	0.6	0.6	0.5	
3	2	TRUE		https://ej	https://ejscreen.epa	88	-98.70086	38.39657	KS	Kansas	0.3	0.6	0.5	
4	3	TRUE		https://ej	https://ejscreen.epa	31,094	-79.84964	40.34971	PA	Pennsylvania	1.3	1.3	1.6	
5	4	TRUE		https://ej	https://ejscreen.epa	37,195	-118.2534	34.23836	CA	California	0.9	0.7	0.5	
6	5	TRUE		https://ej	https://ejscreen.epa	7,195	-85.13566	41.35163	IN	Indiana	0.5	1.0	1.0	
7	6	TRUE		https://ej	https://ejscreen.epa	31	-93.21535	42.21061	IA	Iowa	0.4	0.6	0.6	
8	7	TRUE		https://ej	https://ejscreen.epa	67,034	-118.1169	33.83575	CA	California	0.9	0.6	0.4	
9	8	TRUE		https://ej	https://ejscreen.epa	7,557	-92.68472	43.06623	IA	Iowa	0.7	1.0	1.2	
10	9	TRUE		https://ej	https://ejscreen.epa	1,374	-75.90884	44.33037	NY	New York	0.5	0.8	1.0	
11	10	TRUE		https://ej	https://ejscreen.epa	5,674	-93.78311	44.60739	MN	Minnesota	0.3	0.6	0.5	
12	11	TRUE		https://ej	https://ejscreen.epa	279	-74.9059	44.5622	NY	New York	0.4	0.5	0.8	
13	12	TRUE		https://ej	https://ejscreen.epa	66,014	-118.1327	34.00255	CA	California	2.0	1.6	1.3	
14	13	TRUE		https://ej	https://ejscreen.epa	24,229	-106.3146	42.84871	WY	Wyoming	0.7	0.9	1.1	
15	14	TRUE		https://ej	https://ejscreen.epa	2	-121.8589	39.28161	CA	California	0.5	0.6	0.3	
16	15	TRUE		https://ej	https://ejscreen.epa	42,058	-84.61388	39.1072	OH	Ohio	0.7	0.9	1.0	
17	16	TRUE		https://ej	https://ejscreen.epa	1,759	-74.93169	40.44519	NJ	New Jersey	0.3	0.4	0.3	
18	17	TRUE		https://ej	https://ejscreen.epa	34,568	-73.07089	41.55228	CT	Connecticut	1.3	1.4	1.4	
19	18	TRUE		https://ej	https://ejscreen.epa	52,484	-117.1038	32.65896	CA	California	1.9	1.6	1.5	
20	19	TRUE		https://ej	https://ejscreen.epa	4	-103.6774	41.18806	NE	Nebraska	0.7	1.1	1.3	
21	20	TRUE		https://ej	https://ejscreen.epa		-84.23925	36.3733	TN	Tennessee	0.0		0.0	
22	21	TRUE		https://ej	https://ejscreen.epa	99,096	-87.66383	41.76596	IL	Illinois	2.2	1.7	1.9	
23	22	TRUE		https://ej	https://ejscreen.epa	50	-122.1453	38.73719	CA	California	0.5	0.6	0.7	
24	23	TRUE		https://ej	https://ejscreen.epa	175	-111.0095	34.32081	AZ	Arizona	0.4	0.6	0.5	
25	24	TRUE		https://ej	https://ejscreen.epa	6,755	-76.46687	41.02889	PA	Pennsylvania	0.9	1.1	1.6	
26	25	TRUE		https://ej	https://ejscreen.epa	313	-89.25015	40.55129	IL	Illinois	0.4	0.4	0.1	
27	26	TRUE		https://ej	https://ejscreen.epa	208	-94.5924	45.56802	MN	Minnesota	0.3	0.5	0.4	
28	27	TRUE		https://ej	https://ejscreen.epa	86,125	-122.6473	45.54008	OR	Oregon	0.6	0.7	0.7	

Excel output showing 1 row per site and 1 column per indicator such as total population nearby

---

More about points

Use one point

```
pts <- data.frame(lon = -92.380556, lat = 31.316944)
```

Use a few points

```
pts <- sitepoints_from_any(c(
  "34.8799123, -92.1",
  "30.2906971, -91.8",
  "30,         -95"
))
## or
pts  <- data.frame(
  lon = c(-92.1,      -91.8),
  lat = c(34.8799123, 30.2906971)
)

pts
#>      lon      lat
#> 1 -92.1 34.87991
#> 2 -91.8 30.29070
```

Create a random sample of points representative of the average facility, average resident, or average area

You can create a set of random points with function `testpoints_n()` that can be weighted to represent the average resident, average regulated facility, average point on a map weighted by square meters, etc.

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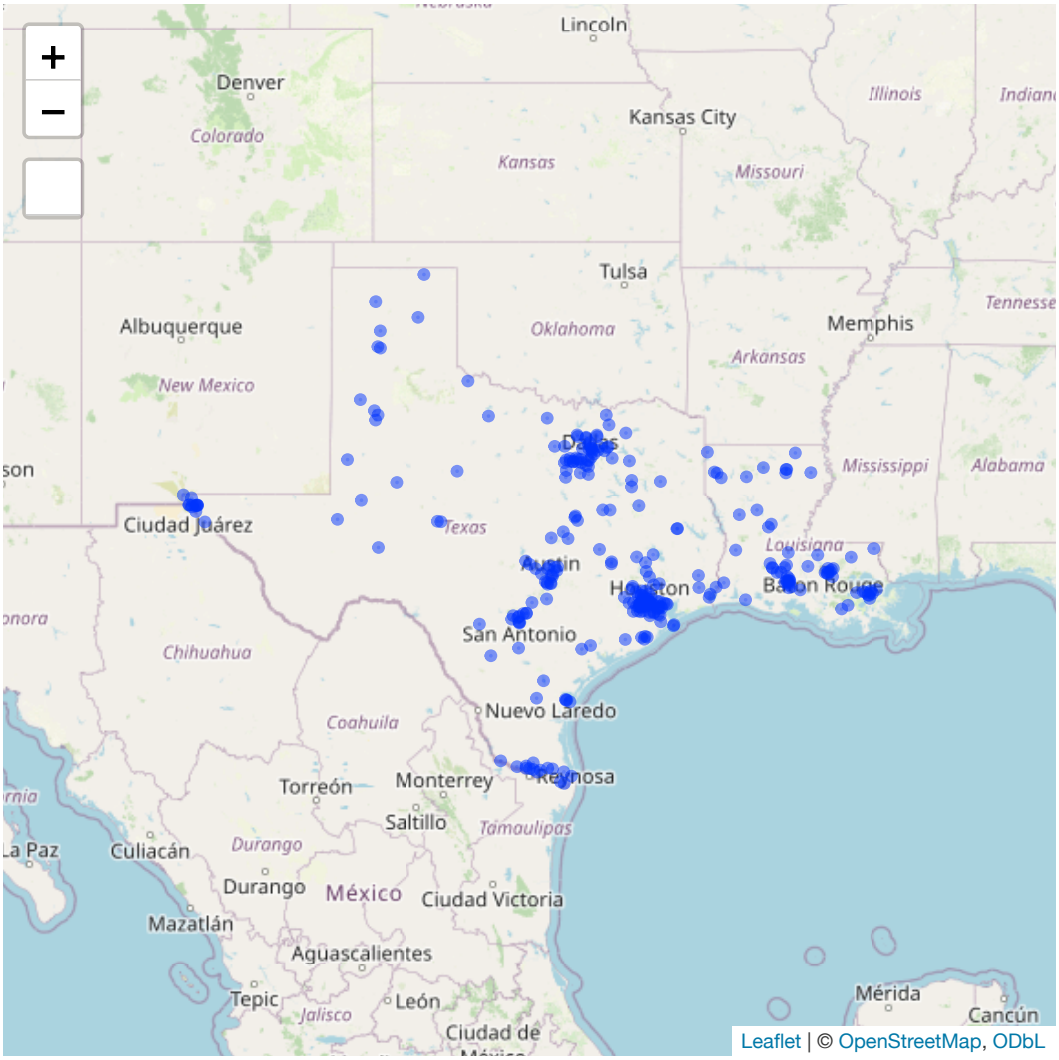
Create random test data points in States of LA and TX

```
# p1k <- testpoints_n(1000)
# mapfast(p1k)

mapfast(testpoints_n(300, ST = c('LA','TX'), weighting = 'bg
#> Including only these States:
#>   REGION ST statename
#> 1      6 LA Louisiana
#> 2      6 TX     Texas
```




```
# weighting = "frs" better represents regulated facilities,
# but requires loading the (large) frs dataset
```

Documentation of Functions and Data

- README

EJAM 2.32.0

```
?EJAM
# or
help("EJAM", package='EJAM')

?ejamit()
```

On this page

- A Brief Intro to Using EJAM in RStudio
  - Load EJAM
  - Analyze Places with ejamit()
  - Pick a Radius
  - Map your sites before analyzing them
  - Map results with ejam2map()
  - Report via ejam2report() (interactive html file)
  - Table of Results in RStudio console
  - Barplot
  - View Results Spreadsheet via ejam2excel() (to Launch Excel)
  - More about points
- Documentation of Functions and Data