Lakes, Landscapes, and R:

A framework for open science on freshwater cyanobacteria

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Twitter?

hashtag: #usiale2018 #rstats #cyanobacteria

me: @jhollist

Open Science?

Why open science?

- Often required
  - Government/Funders/Journals
- Benefits researchers
  - Mciernan et al. (2016) How open science helps researchers succeed
- Improves quality
  - The classic example: Reinhart and Rogoff
- Benefits to society
  - "Sharing of Data Leads to Progress on Alzheimerâ€™s"

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Open Science Solutions

- Open Access
- Open Data
- Open Source Code

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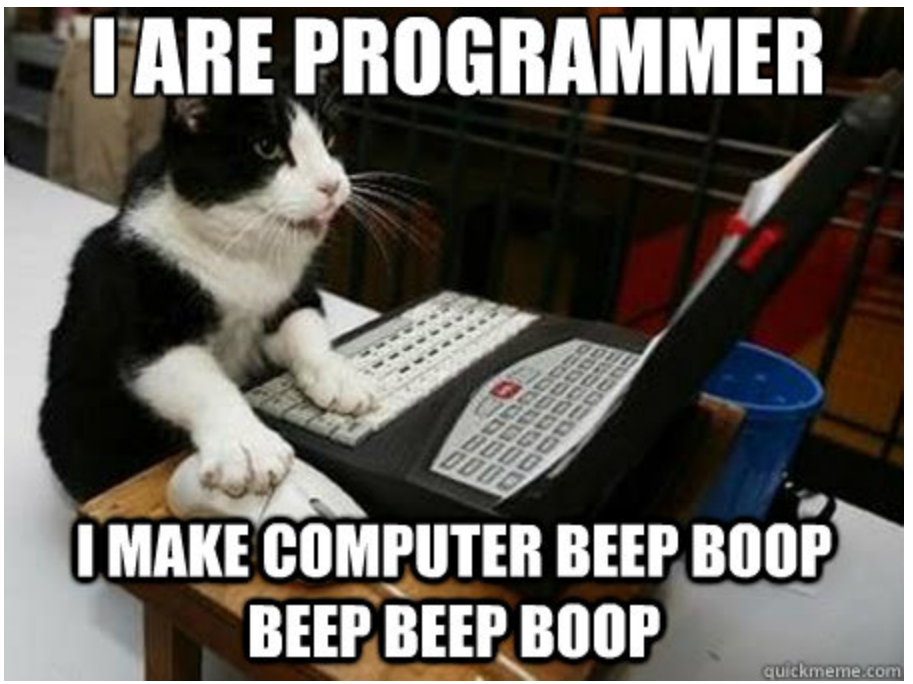
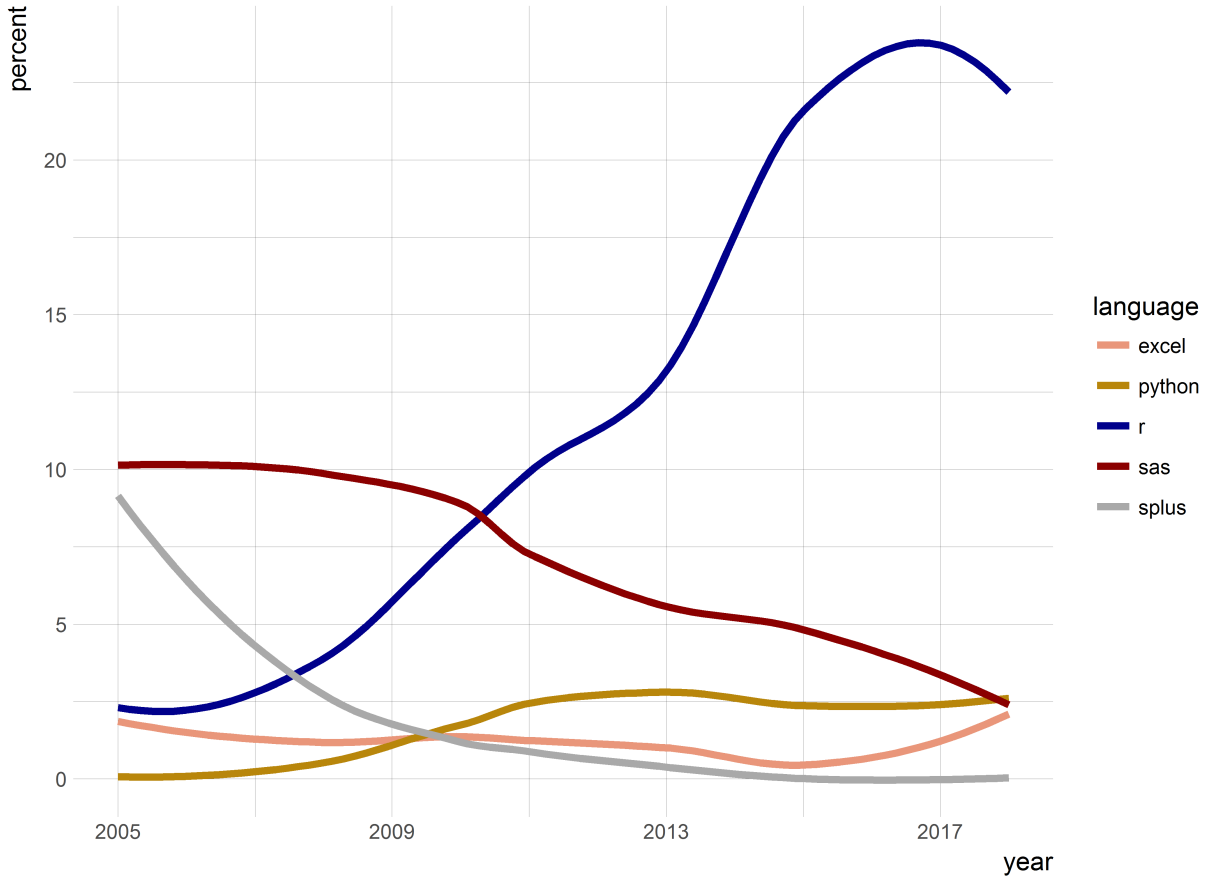


R in Landscape Ecology



Text mining facilitated by [rOpenSci's](#) awesome [`fulltext`](#) package

R in Landscape Ecology

- Foundations
  - `sp`, `rgdal`, `raster`, `rgeos`
  - `sf`, `stars`
- Speciality
  - `landsat`
  - `SDMtools`
  - `nlmr`
  - `landscapetools`

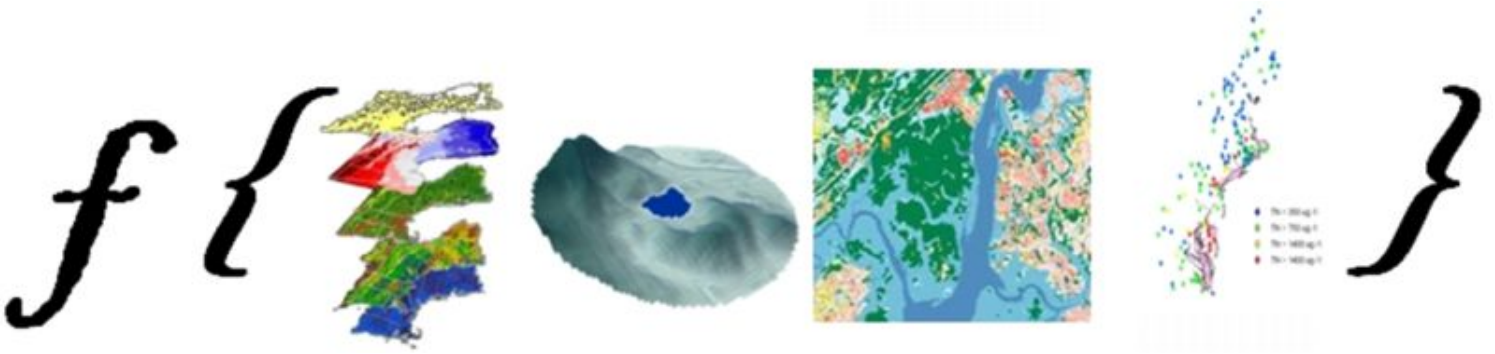
R, lakes, and cyanobacteria at USEPA

Who are we?

- Ecologists
- Computational focus
  - Enough to be dangerous
- 3 FTE
  - Myself
  - Betty Kreakie
  - Bryan Milstead
- 1 Post-doc
  - Stephen Shivers
- Alum
  - Farnaz Nojavan

What do we do?

- Apply computational approaches to understand water quality impacts in lakes
- Open Science
- Use R
  - Analysis
  - Sharing code
  - Solve common problems

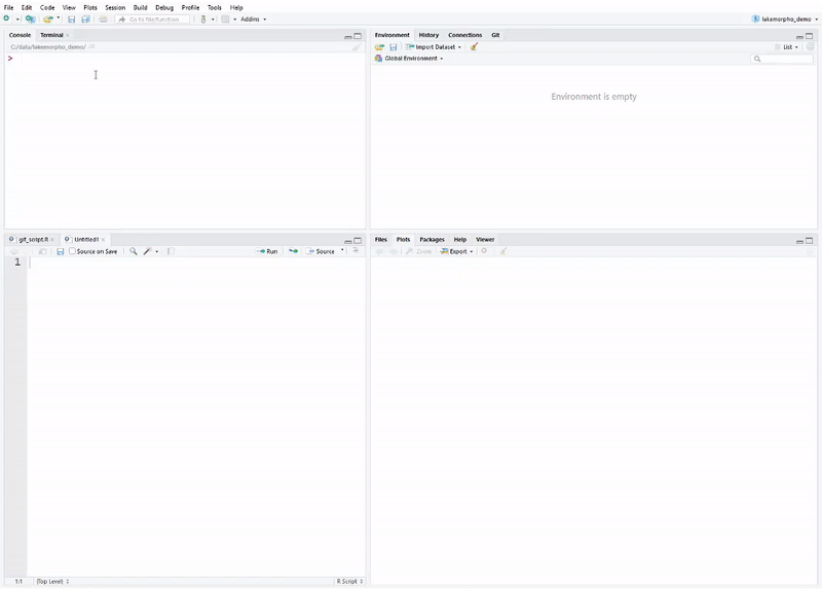


R to solve common problems

- `lakemorpho`
- `elevatr`
- `goatscape` (in development)

`lakemorpho`

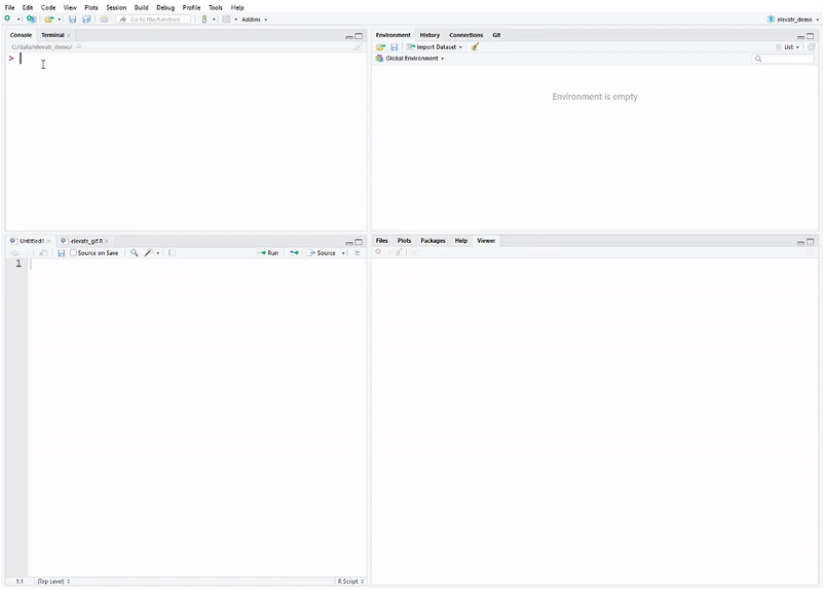
- Lake morphometry metrics in R
- `sp`, `rgdal`, `rgeos`, and `raster`
- Version 1.0
  - August 2014
- Version 1.1.0
  - December 2016
- `sf` support to be added
- National Lake Morphometry
- NHD Plus
- Hollister and Milstead (2010)
- Hollister *et. al.* (2011)
- Hollister and Stachelek (2017)



Package URL: https://cran.r-project.org/package=lakemorpho

`elevatr`

- Access elevation data in R
  - ~~Mapzen~~
    - closed!
    - Mostly replaced by https://www.nextzen.org/
    - Not yet incorporated
  - AWS
  - USGS
- Built off of `sp`, `rgdal`, `rgeos`, and `raster` suite
- Version 0.1.1
  - January 2017
- Version 0.1.3
  - March 2017
- Will be paired with `lakemorpho`
- `sf` support to be added



Package URL: https://cran.r-project.org/package=elevatr

goatscape

- New effort with Bryan Milstead
- What's in a name?
- Summarizes ancillary data for a user-defined landscape polygon
  - Census (via `censusapi`)
  - Landcover and Impervious (via `FedData`)
- Accepts arbitrary spatial data for the landscape
- Based on `sf`
- Tidy by design

Repository URL: https://github.com/usepa/goatscape

Thanks!

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Slides created via the R package **xaringan**.