

Lakes, Landscapes, and R:

A framework for open science on freshwater cyanobacteria

Jeff Hollister and Bryan Milstead (USEPA)

US-IALE 2018

Chicago, IL

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Twitter?



hashtag: #usiale2018 #rstats #cyanobacteria

me: @jhollist

Open Science?

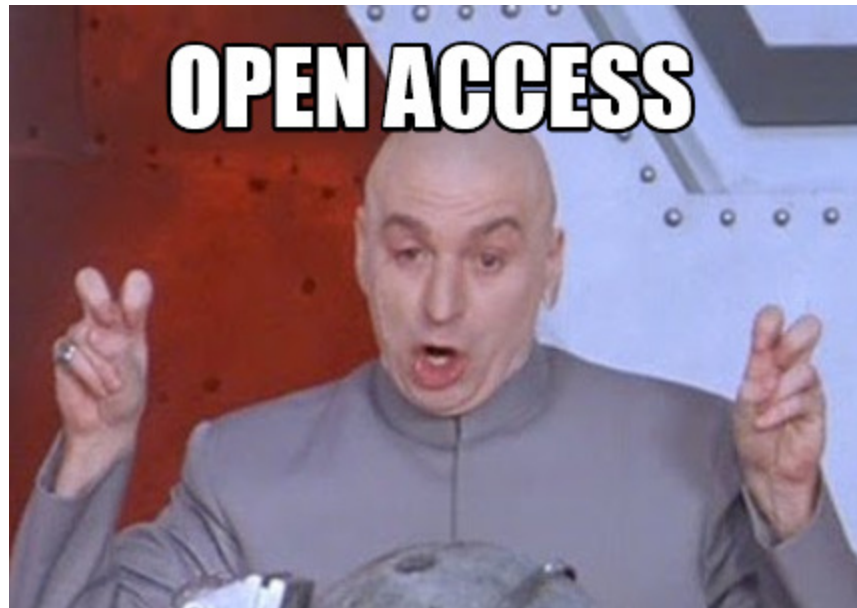
Why open science?

- 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"](#)



Open Science Solutions

- Open Access
- Open Data
- Open Source Code



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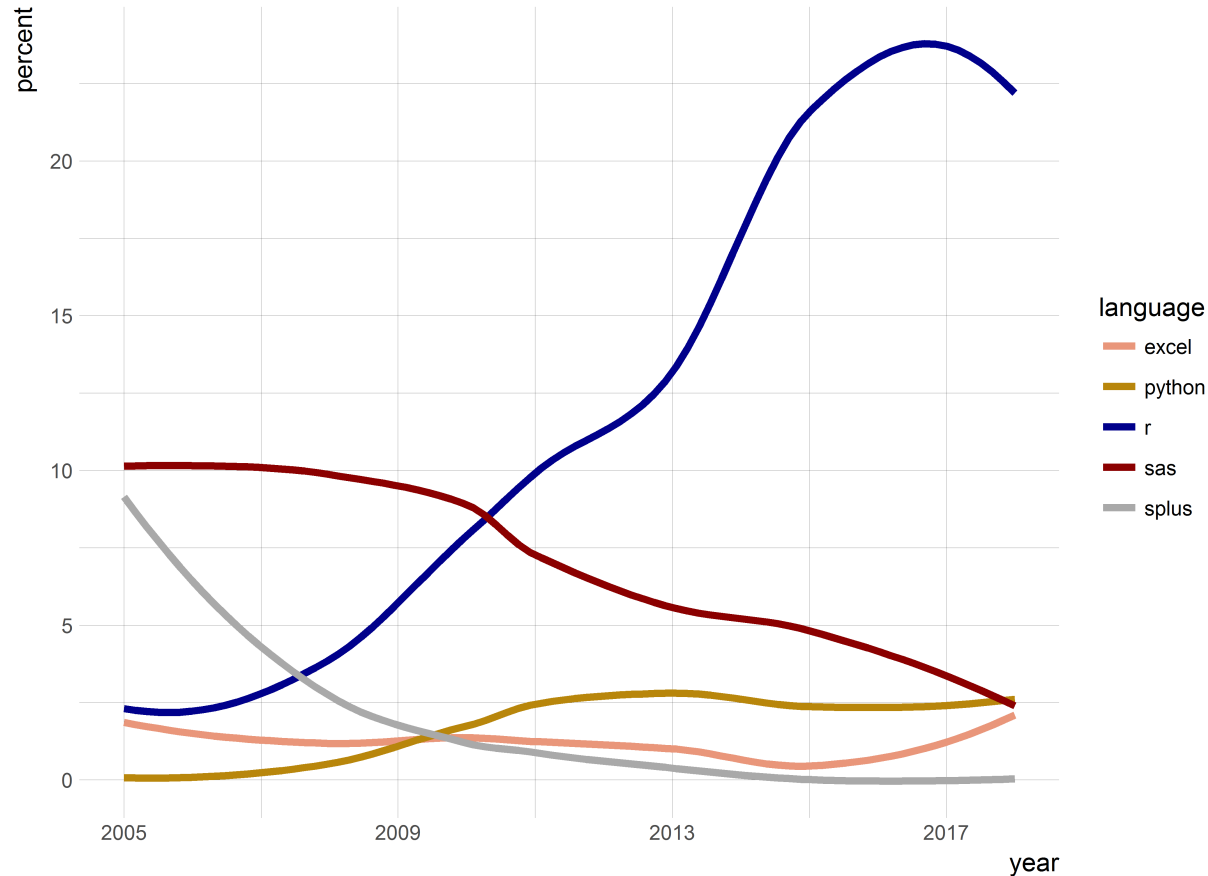


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R in Landscape Ecology



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

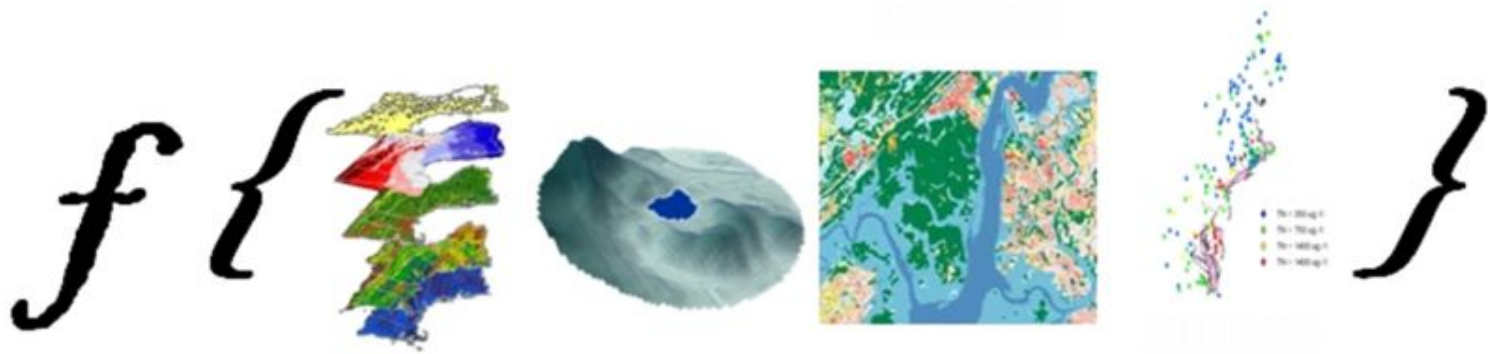
Who are we?

- 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



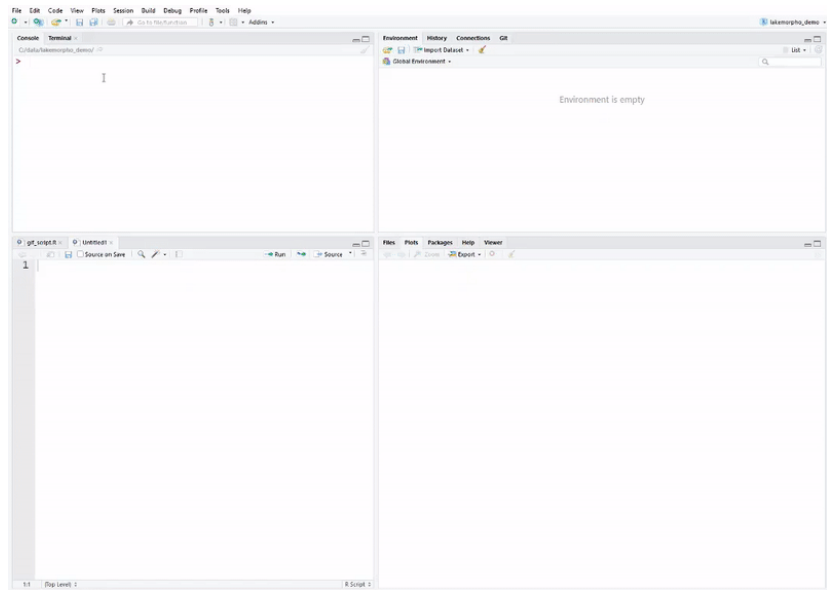
R to solve common problems

- lakemorpho
- elevatr
- goatscape (in development)



lakemorpho

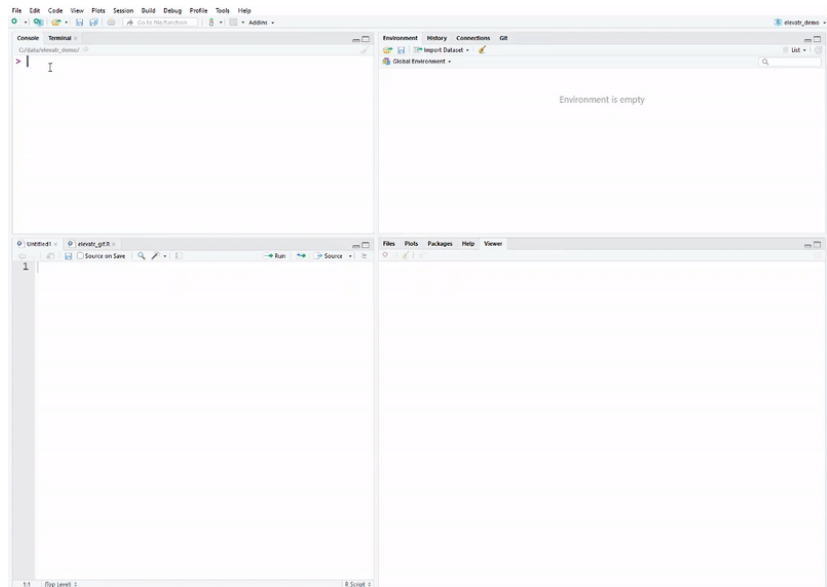
- Lake morphometry metrics in R
- `sp`, `rgdal`, `rgeos`, and `raster`
- Version 1.0
 - August 2014
- Version 1.1.0
 - December 2016
- `sf` support to be added
- [National Lake Morphometry](#)
- [NHD Plus](#)
- [Hollister and Milstead \(2010\)](#)
- [Hollister *et. al.* \(2011\)](#)
- [Hollister and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



Repository URL:

<https://github.com/usepa/goatscape>

Thanks!

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Slides created via the R package [xaringan](#).