Lakes, Landscapes, and R:

A framework for open research on freshwater cyanobacteria

Jeff Hollister and Bryan Milstead

2018-04-11

Twitter?

hashtag: #usiale2018 #rstats #cyanobacteria

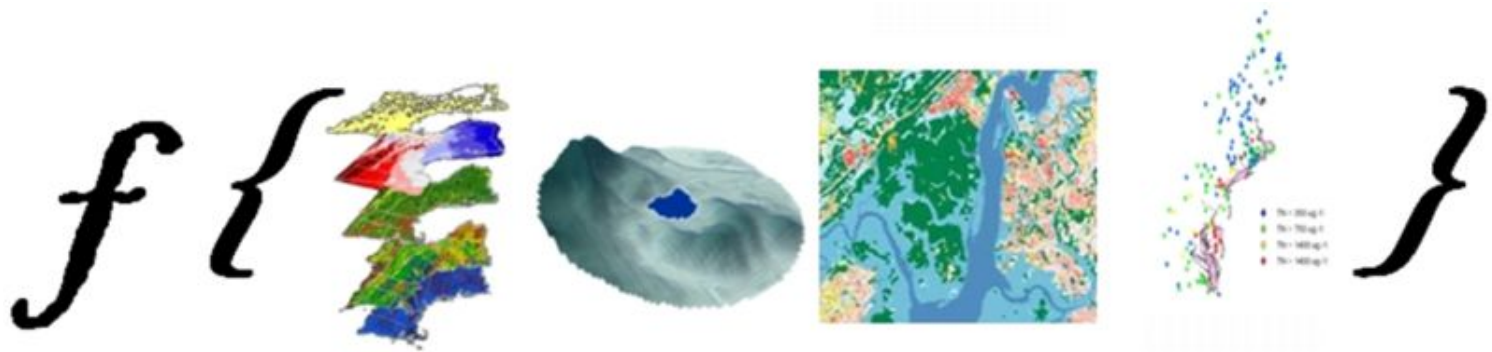me: @jhollist

Who, what, why, and how?

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

R Packages

Why R Packages

- Useful structure
- Infrastructure for sharing
  - GitHub
  - CRAN
- We are an R shop!
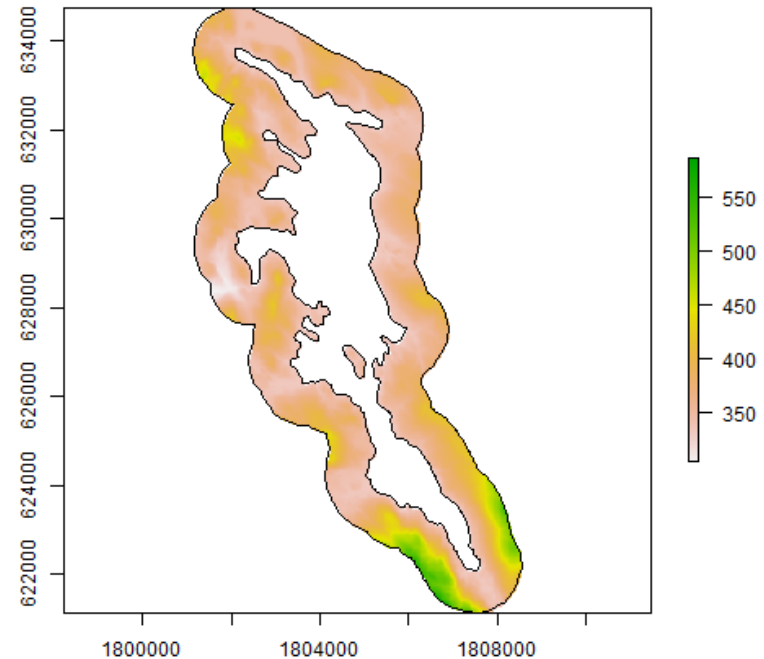
Packages to solve common problems

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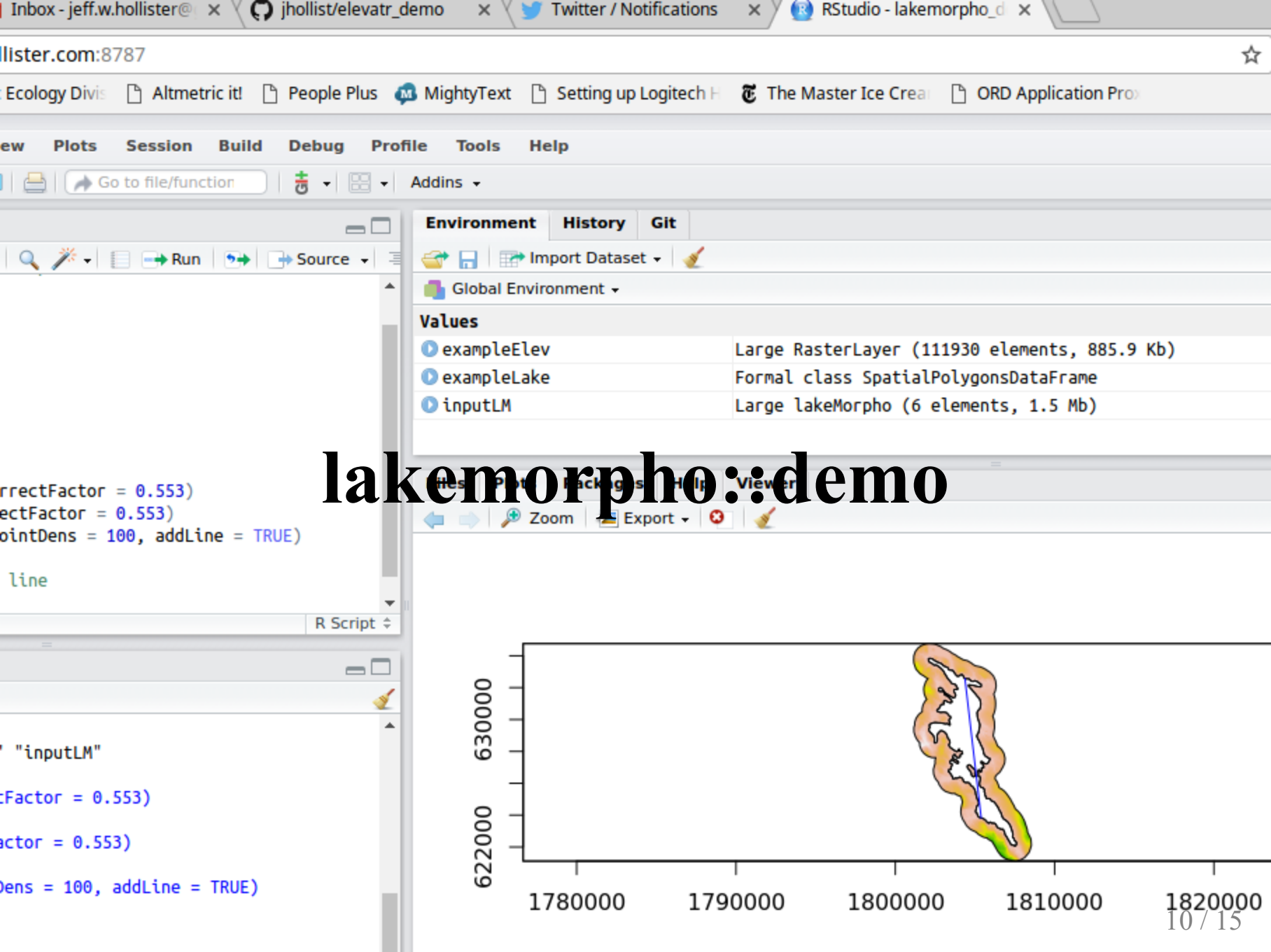- `elevatr`
- `goatscape` (in development)

`lakemorpho`

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

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

llister.com:8787

ew   Plots   **Session**   **Build**   **Debug**   **Profile**   **Tools**   **Help**

Go to file/function   Addins

Run   Source

Environment   **History**   **Git**

Import Dataset

Global Environment

Values

exampleElev	Large RasterLayer (111930 elements, 885.9 Kb)
exampleLake	Formal class SpatialPolygonsDataFrame
inputLM	Large lakeMorpho (6 elements, 1.5 Mb)

lakemorpho::demo

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R Script

Zoom   Export

"inputLM"

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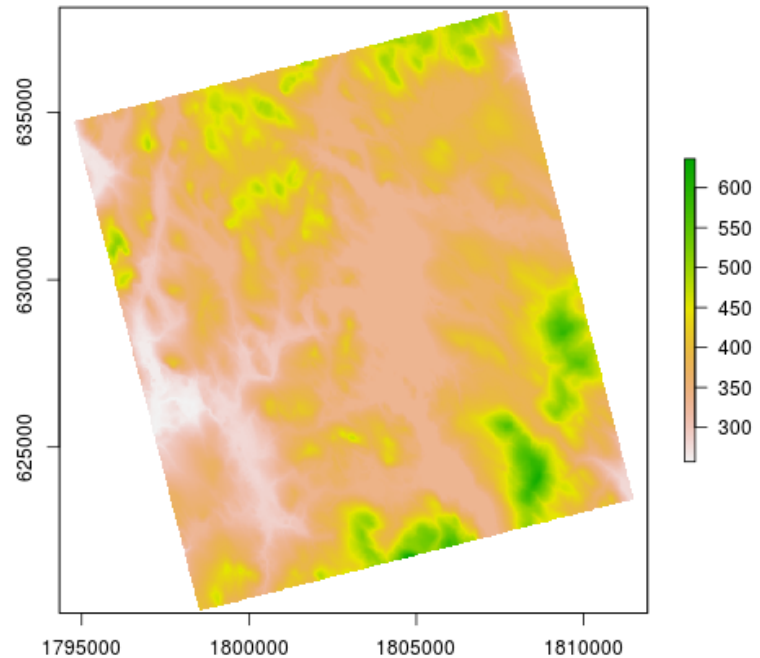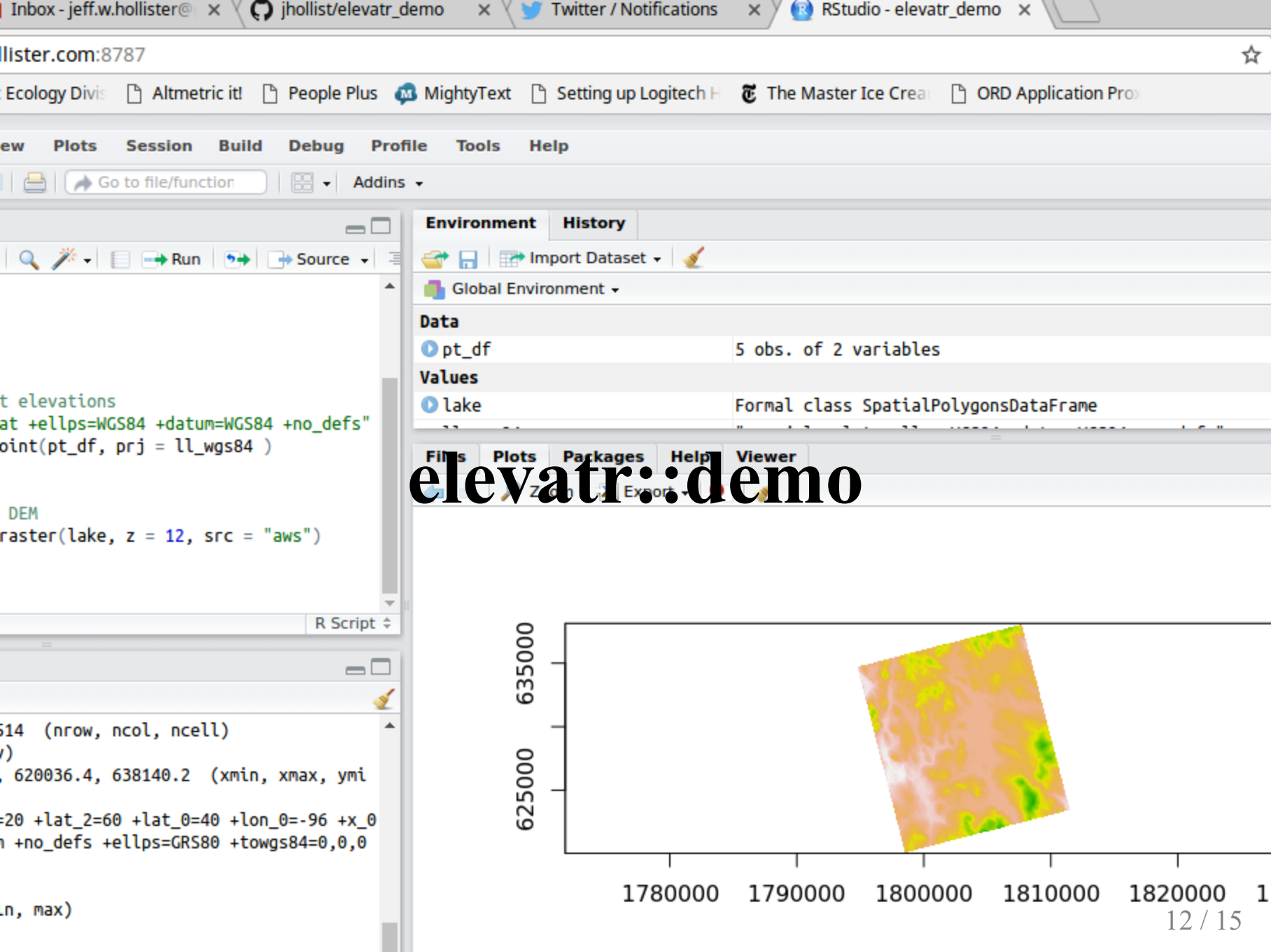
`elevatr`

- Access elevation data in R
  - Mapzen
  - AWS
  - USGS
- 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

Inbox - jeff.w.hollister@   jhollist/elevatr_demo   Twitter / Notifications   RStudio - elevatr_demo

llister.com:8787

Ecology Divis   Altmetric it!   People Plus   MightyText   Setting up Logitech   The Master Ice Crea   ORD Application Pro

ew   **Plots**   **Session**   **Build**   **Debug**   **Profile**   **Tools**   **Help**

Go to file/function   **Addins**

Environment   **History**

Import Dataset

Global Environment

Data

pt_df   5 obs. of 2 variables

Values

lake   Formal class SpatialPolygonsDataFrame

t elevations

at +ellps=WGS84 +datum=WGS84 +no_defs"

oint(pt_df, prj = ll_wgs84)

DEM

raster(lake, z = 12, src = "aws")

Files   **Plots**   **Packages**   **Help**   **Viewer**

elevatr::demo

Zoom   Export

514   (nrow, ncol, ncell)

)

, 620036.4, 638140.2   (xmin, xmax, ymi

=20 +lat_2=60 +lat_0=40 +lon_0=-96 +x_0

n +no_defs +ellps=GRS80 +towgs84=0,0,0

n, max)

R Script

`goatscape`

- New effort with Bryan Milstead
- What's in a name?
- Summarizes ancillary data for a user-defined landscape polygon
  - Census (via `censusapi`)
  - Landcover
  - Impervious
- Accepts arbitrary spatial data for the landscape
- Based on `sf` and tidy by design
- https://github.com/usepa/goatscape

Plug for other landscape packages

Thanks!

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