SWMPrats: A community of practice for NERRS data analysis

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May 4, 2015

Overview

- The genesis of SWMPrats.net
- Features of SWMPrats.net
  - SWMPr
  - widgets
  - forum
- Continuing work and engaging the larger community

Genesis of SWMPrats

As of April 30th, $>$ 58 million SWMP data records are available

An invaluable data source but...

- No recent comparative analyses between systems
- No simple tools for trend analysis at individual sites

These needs were identified in 2013 annual meeting, led to a workshop at the 2014 meeting to focus on time series analysis

Genesis of SWMPrats

One-day training workshop at 2014 annual meeting

- Attended by over 70 NERRS staff, representing 19 of 28 reserves
- General focus on time series analysis, simple applications with SWMP data
- Pre/post workshop materials, including an R package for SWMP

Genesis of SWMPrats

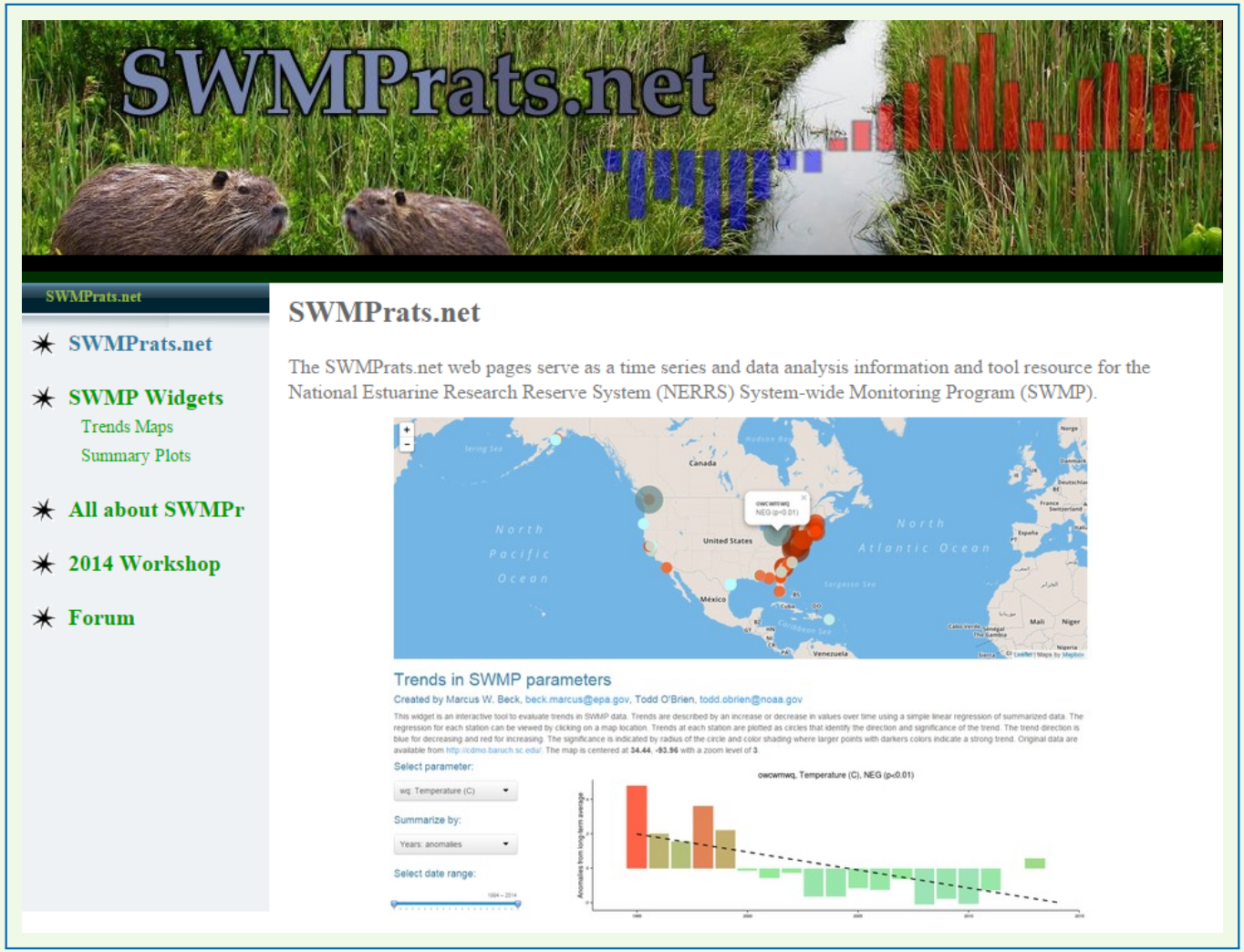
A working group was formed from this meeting

System-***W***ide ***M***onitoring ***P***rogram ***R***esources for the ***A***nalysis of ***T***ime ***S***eries

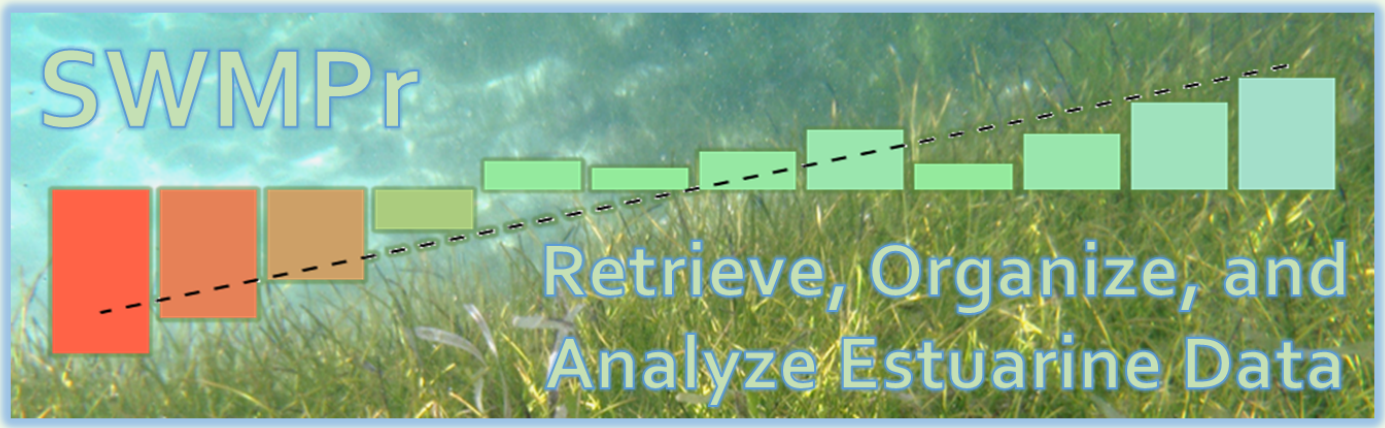
SWMPrats.net is our base of operations...

SWMPrats.net

A time series and data analysis information and tool resource



SWMPrats.net: The SWMPr package



SWMPr is an open-source R package described on the website, v2.0.0 is now available

```
> # install/load from R
> install.packages('SWMPr')
> library(SWMPR)
```

Currently working on a manuscript to describe the package in detail

SWMPrats.net: The SWMPr package

The software addresses the tedious but necessary challenges of analyzing time series, specific to SWMP

What are some challenges?

- Dealing with 'bad' data
- Subsetting by date ranges, parameters
- Combining data from different sites
- Standardizing time steps
- ...and analysis

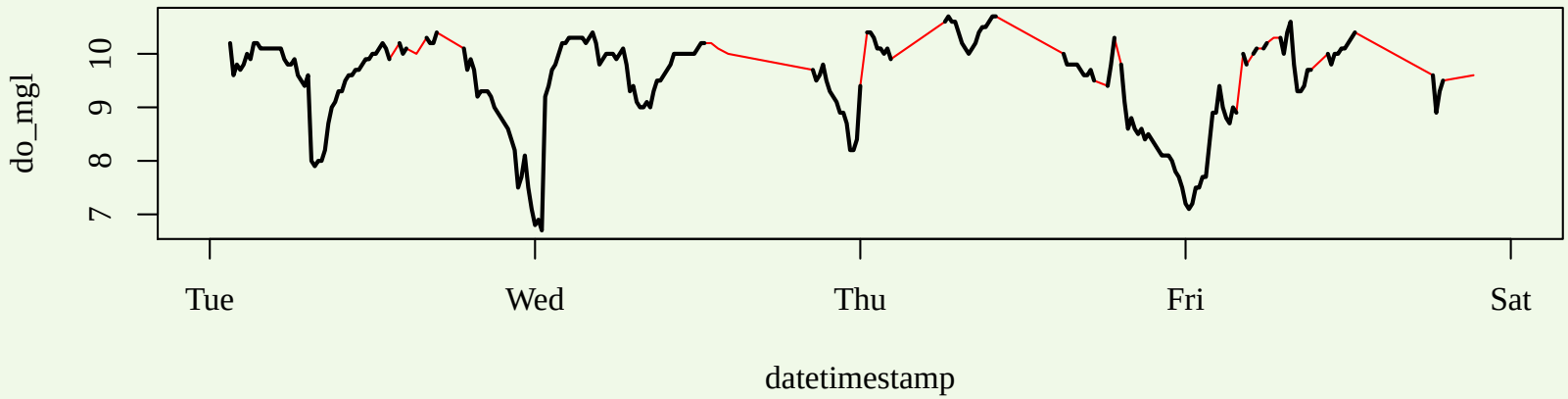
SWMPrats.net: The SWMPr package

Proof of concept, import and combine wq and weather data from Apalachicola Bay

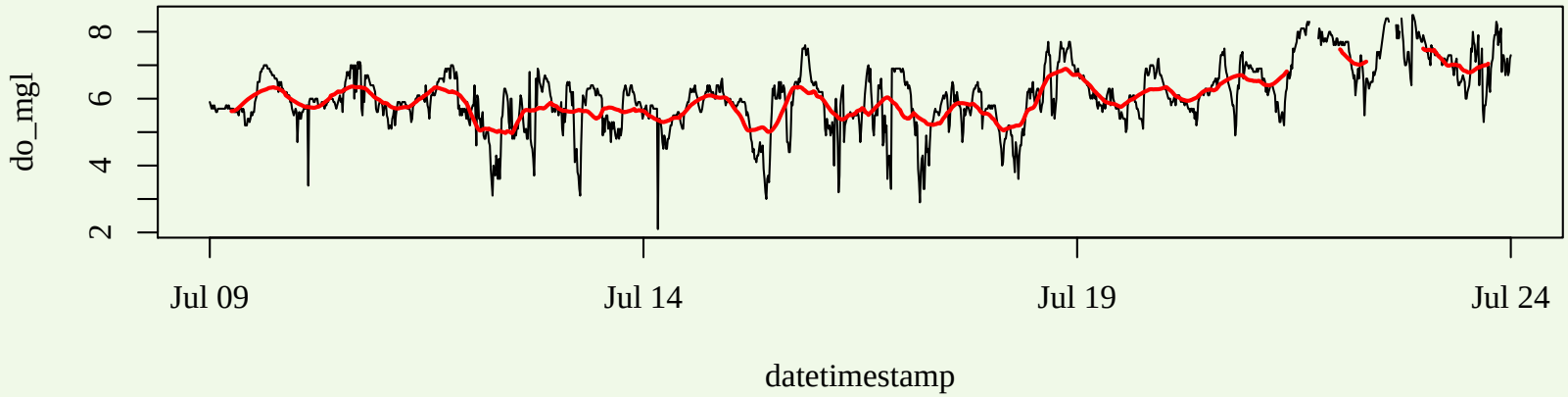
```
> # import data
> data(apaebmet)
> data(apacpwq)
> met <- apaebmet
> wq <- apacpwq
>
> # combine, two hours time step
> # only overlapping date ranges
> dat <- comb(met, wq, timestep = 120,
+   method = 'intersect')
```

Try this with Excel...

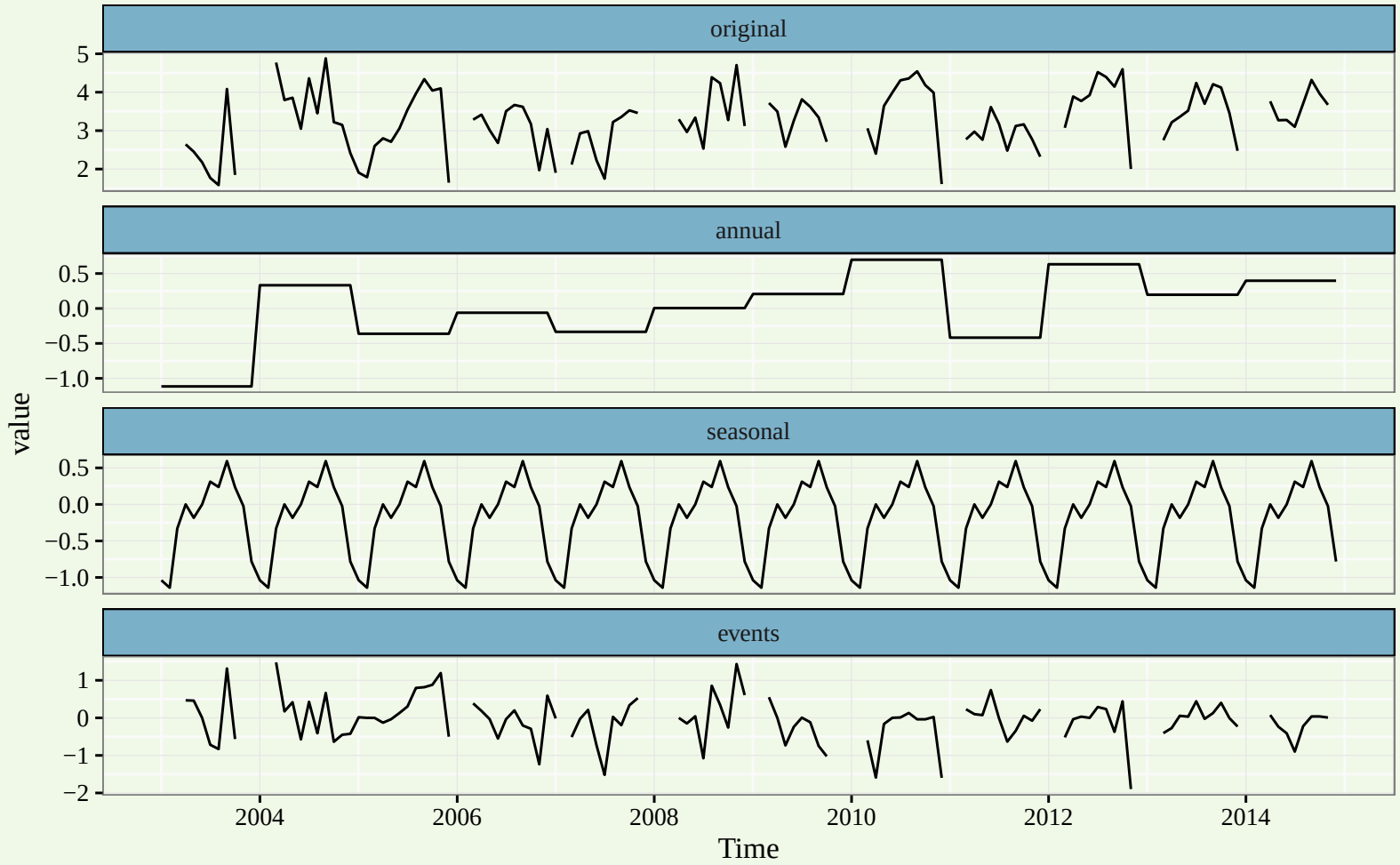
Example: fill missing data with `na.approx`



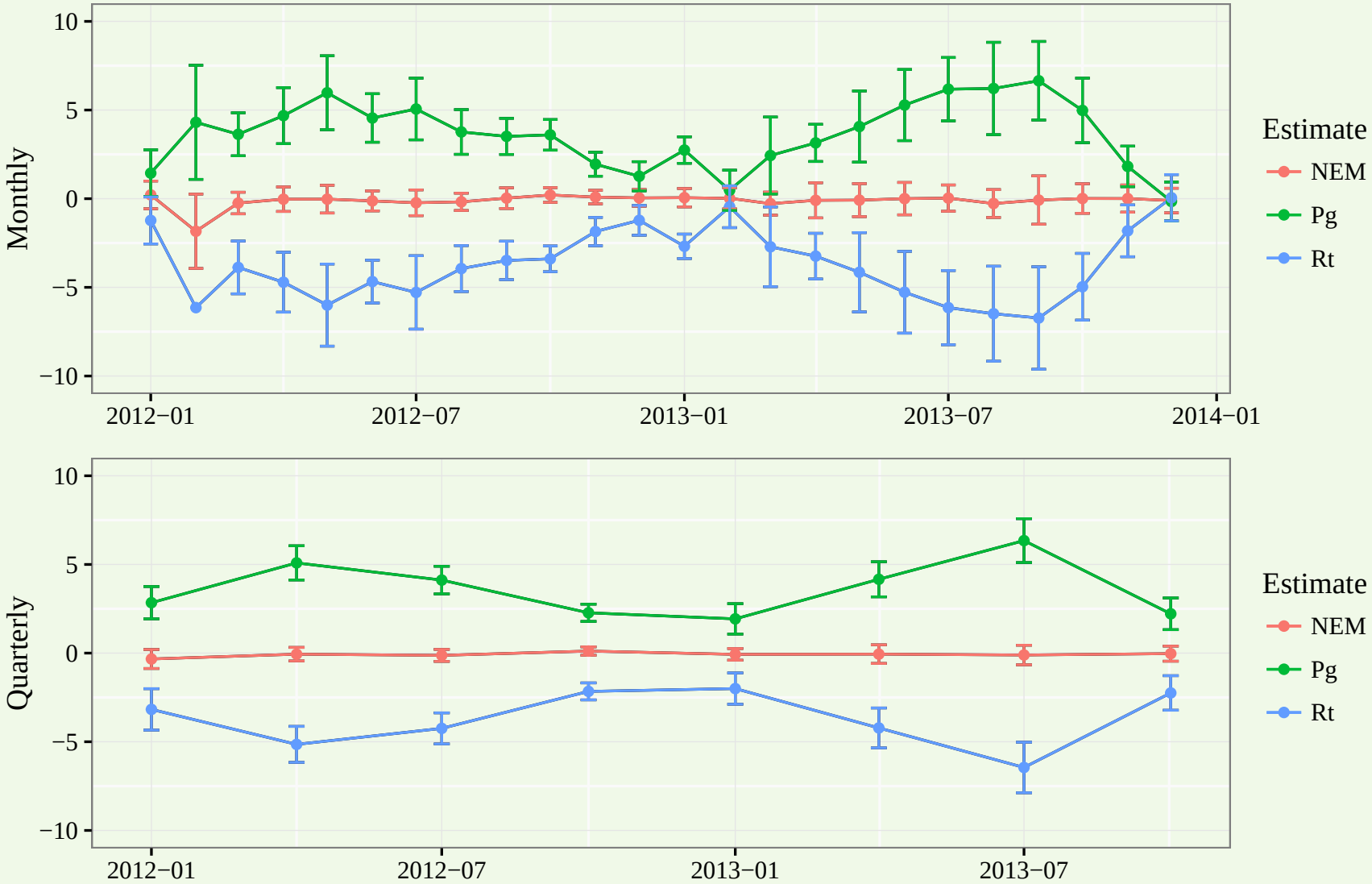
Example: smooth data with `smoother`



Example: time series decomposition with `decomp_cj` (chl-a at cbmocnut)



Example: estimate ecosystem metabolism with `ecometab` (apadbwq)



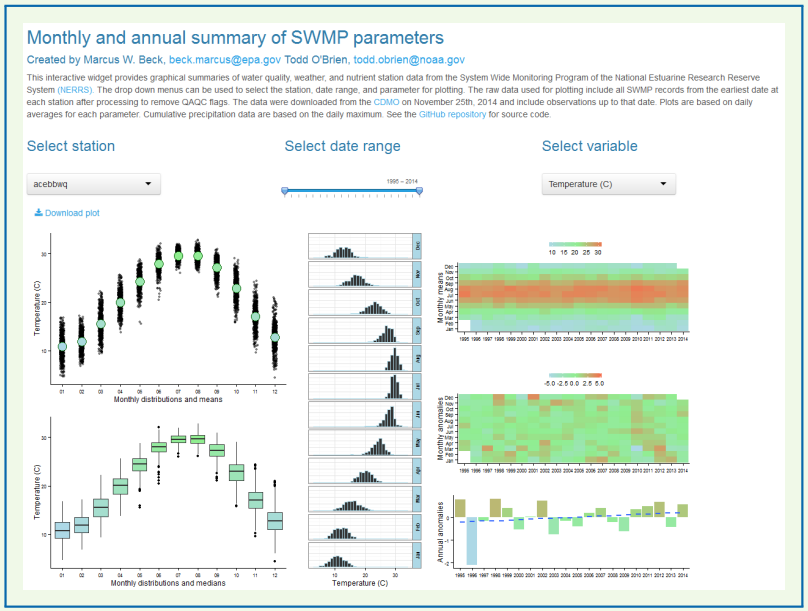
SWMPrats.net: Widgets

The most common question - what is the change over time at my site?

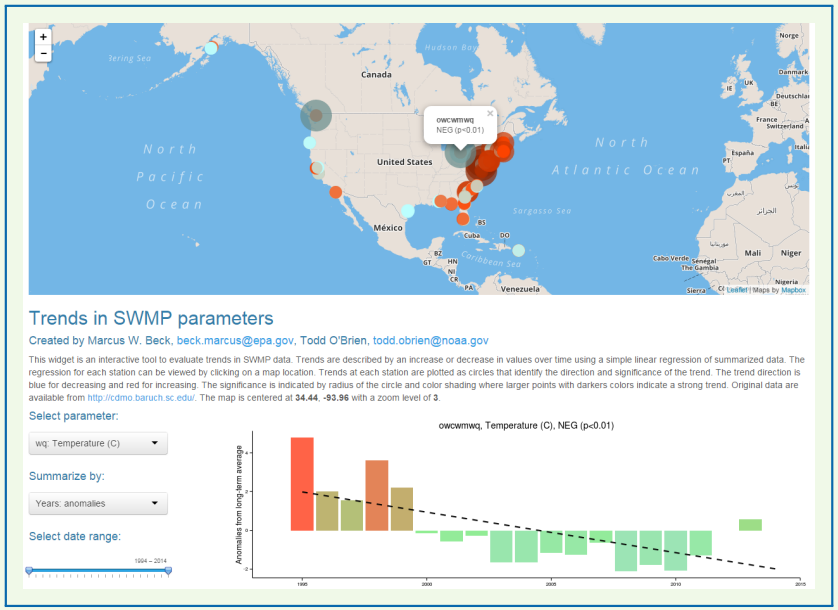
The functions in SWMPr can help, but it's easier to interact!

Two apps on SWMPrats.net can help visualize trends

Summary plots

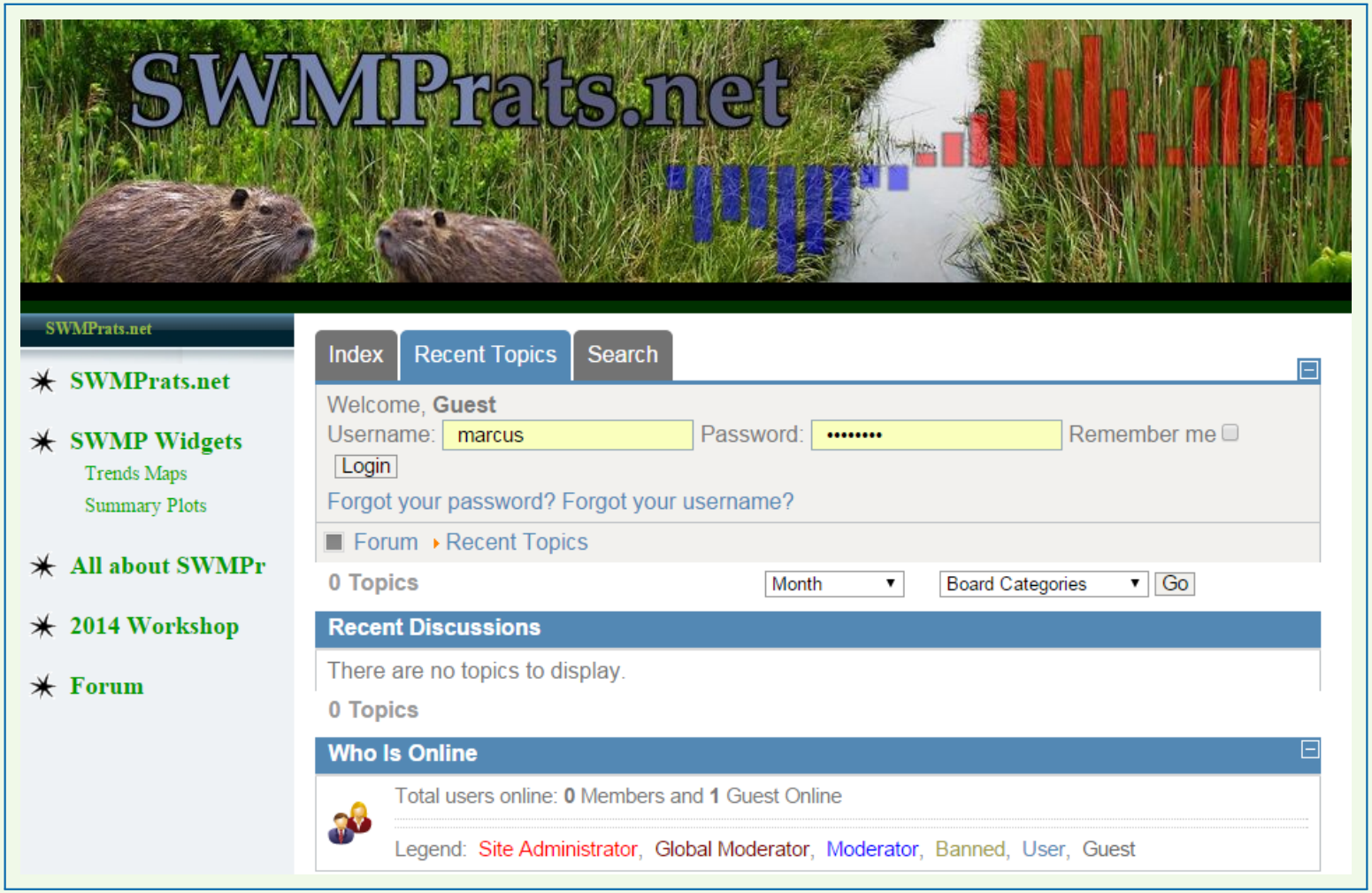


Trends map



SWMPrats.net: Forum

Last but not least, a discussion forum for all things analytical



Continuing work and engagement

SWMPrats.net is in its infancy but already seeing heavy use

- SWMPr downloaded 306 times from R network (as of April 30)
- Apps have been used 347 hours (as of April 30)

Continuing development of packages/apps - submit suggestions/bug reports via email or on GitHub (preferred)

Plan for greater engagement with the forum - soliciting moderators, suggested topics

Additional training workshops??

Continuing work and engagement

Contacts: beck.marcus@epa.gov, todd.obrien@noaa.gov

To get this presentation: https://github.com/fawda123/swmprats_pres

Summary app: http://swmprats.net/swmp-widgets/summary-plots

Trends map app: http://swmprats.net/swmp-widgets/trends-maps

Visit the development site for the most recent version of SWMPr: https://github.com/fawda123/SWMPr