

Shiny Applications for Long-Term Trend Data

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R Shiny Background

R Shiny: What is it?

R package for building interactive web applications straight from R

Uses:

1. Host standalone web apps on a webpage
2. Embed web apps into R Markdown documents
3. Build dashboards to analyze data locally

<https://shiny.rstudio.com/>



R Shiny: Web hosting on shinyapps.io

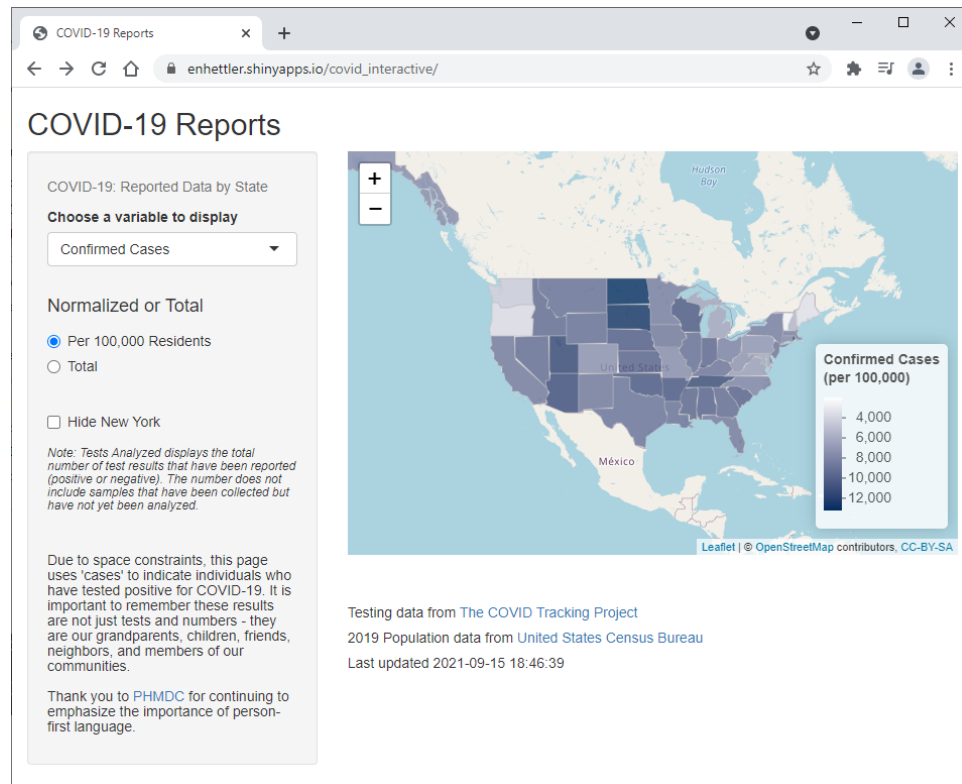
<http://www.shinyapps.io>: Online system for deploying Shiny applications to the Web (free or paid options)

FREE	STARTER	BASIC	STANDARD	PROFESSIONAL
\$0 /month	\$9 /month (or \$100/year)	\$39 /month (or \$440/year)	\$99 /month (or \$1,100/year)	\$299 /month (or \$3,300/year)
New to Shiny? Deploy your applications for FREE.	More applications. More active hours!	Take your users to the next level!	Password protection? Authenticate your users!	Professional has it all! Personalize your domains.
5 Applications	25 Applications	Unlimited Applications	Unlimited Applications	Unlimited Applications
25 Active Hours	100 Active Hours	500 Active Hours	2,000 Active Hours	10,000 Active Hours
✔ Community Support	✔ Premium Email Support	✔ Performance Boost	✔ Authentication	✔ Authentication
✔ RStudio Branding		✔ Premium Email Support	✔ Performance Boost	✔ Account Sharing
			✔ Premium Email Support	✔ Performance Boost
				✔ Custom Domains
				✔ Premium Email Support

R Shiny Examples

R Shiny: Web Application Example

COVID Tracking: Built in mid-March 2020 to better visualize COVID cases across the United States



➡ Hosted on shinyapps.io

R Shiny: Internal Dashboard Example

Wisconsin DNR Employee Engagement Survey: 90 questions, 10 demographic groups, 13 question sections

*Lots of data to visualize so interactive dashboard is very useful

Results from 2020 Employee Engagement Survey

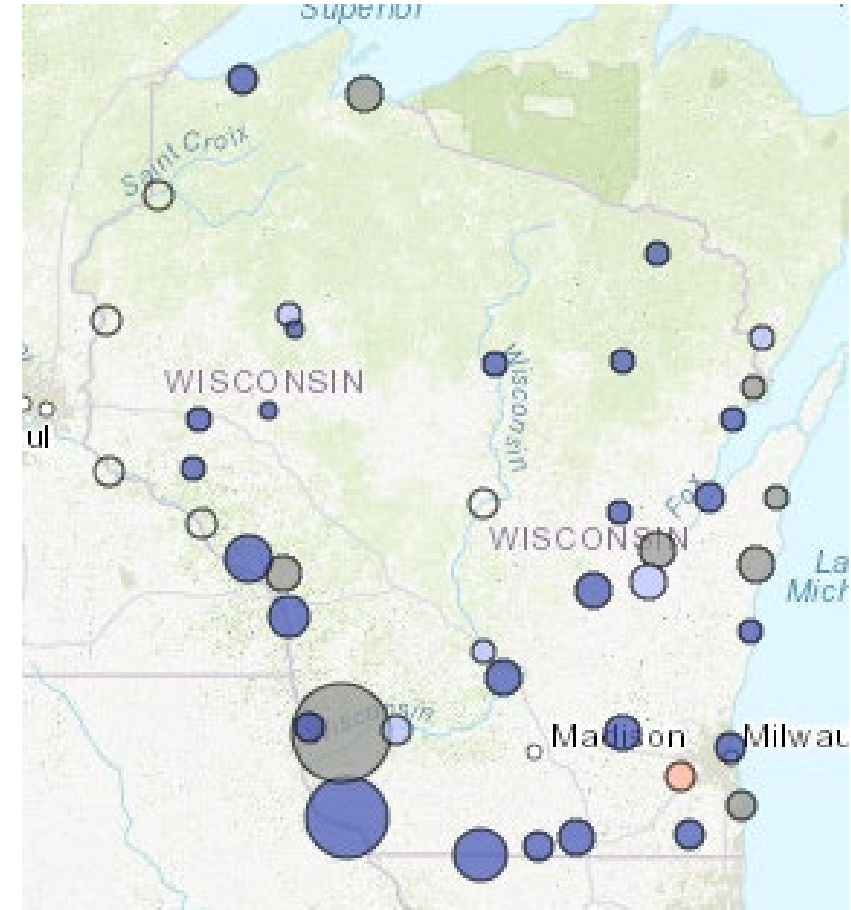


Wisconsin Department of Natural Resources Long-Term Trends Viewer

Analysis of River Water Quality Data

Wisconsin: ~45 long-term trends sites to track and analyze water quality trends over time

- Decades of data
- Estimates for total phosphorus, orthophosphate, nitrate, total Kjeldahl nitrogen, ammonia, chlorophyll a, total suspended solids, chlorides, and silica
- Estimates for concentration and flux



Analysis of River Water Quality Data

Long-term trends data evaluated using the Weighted Regressions on Time, Discharge, and Season (WRTDS) method: Normalizes results based over time, discharge, and season

Capabilities of LTT Viewer

- Flow normalization
- Uncertainty in trends
- Season/flow specific trends
- Data gaps

Analysis performed using Exploration of Graphics for RivEr Trends (**EGRET**) and **dataRetreival** packages in R

Long-Term Trends Viewer: Summary

Hosted online: <https://wisconsindnr.shinyapps.io/riverwq/>

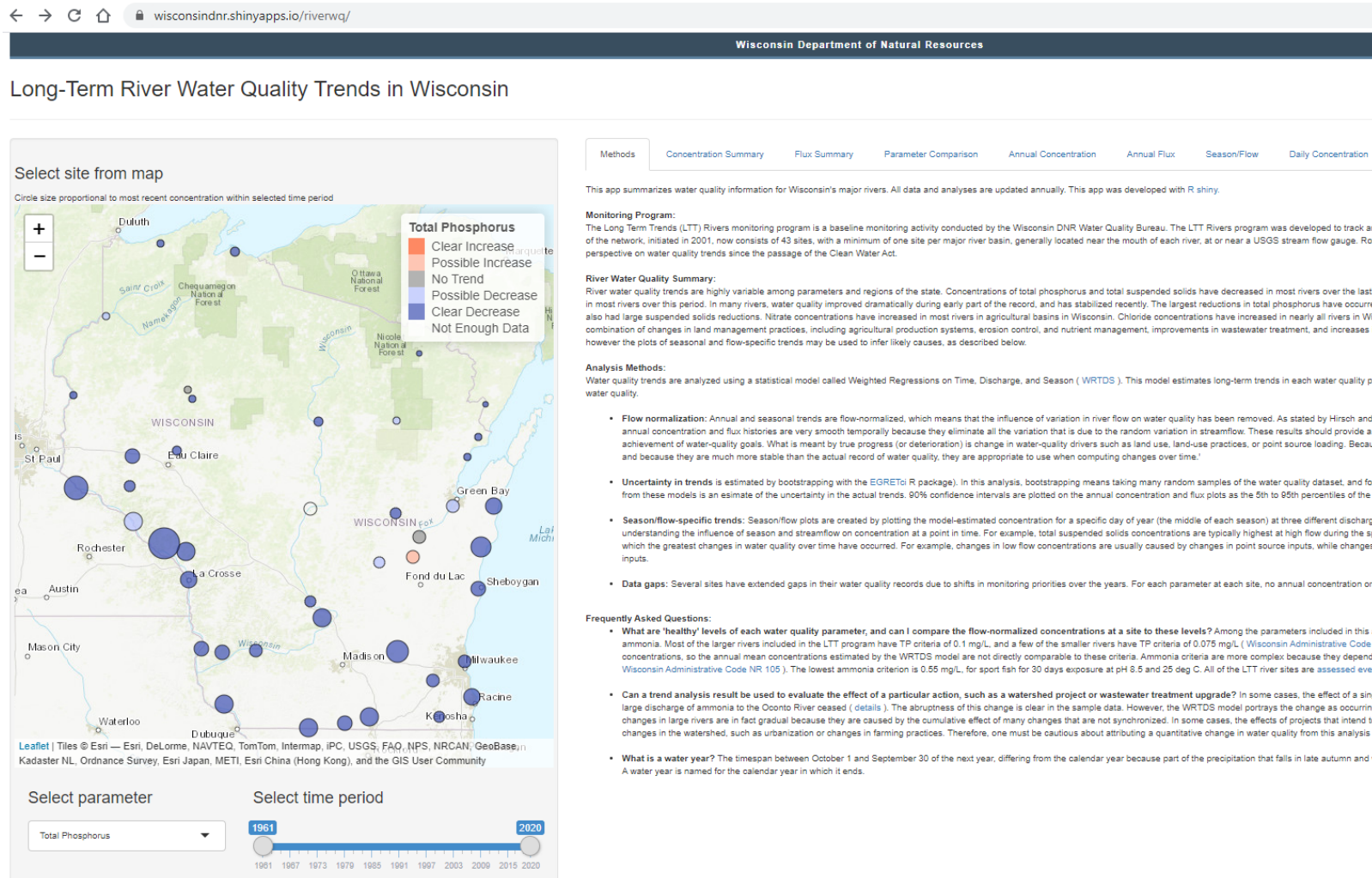


This app summarizes water quality information for Wisconsin's major rivers. All data and analyses are updated annually. This app was developed with R shiny.

Components of system:

1. Concentration Summary
2. Flux Summary
3. Parameter Comparison
4. Annual Comparison
5. Annual Flux
6. Season/Flow
7. Daily Concentration

Long-Term Trends Viewer: Interface



Live Demonstration

<https://wisconsin.dnr.shinyapps.io/riverwq/>

CONNECT WITH US

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"WILD WISCONSIN:
OFF THE RECORD"