



Community Spotlight

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Investigating human impacts on stream ecology: Intro to R

By Kristen Kaczynski



Data Explorers

Module Description:

This week's featured resource is an adaptation of:

Amelia Nuding, Stephanie Hampton. March 2012, posting date.
Investigating human impacts on stream ecology: locally and nationally. *Teaching Issues and Experiments in Ecology*, Vol. 8:
https://tiee.esa.org/vol/v8/issues/data_sets/nuding/abstract.html

The adaptation retains the original dataset from Nuding and Hampton (2012), which includes measures of total nitrogen, total phosphorus, and a multi-metric macroinvertebrate index for a sampling of streams within the contiguous US. The data was collected as part of the EPA's Wadeable Streams Assessment in the early 2000s.

The major modification to the Nuding and Hampton (2012) module is that in this adaptation, students use R instead of Excel to summarize and visualize the stream data. Students are given the R code to perform some basic summary statistics and plot the total nitrogen data and then asked to modify the code to run the same analyses for the total phosphorus data. Students also predict and visualize the relationship between the macroinvertebrate index and total nitrogen.

Teaching Setting:

This adaptation was created for use in the 2-hr activity portion of an upper division Environmental Science course. Prerequisites for the course were general biology, soils, and hydrology, and some students had also already taken pollution science. No coursework in statistics or familiarity with R was required.

Citation:

Kaczynski, K. (2019). [Investigating human impacts on stream ecology: Intro to R. ESA Data Explorers FMN \(2019\)](#), QUBES Educational Resources.
[doi:10.25334/Q45M9H](https://doi.org/10.25334/Q45M9H)

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Related Materials and Opportunities:

Because this adaptation has students using R instead of Excel, students do not have to install any software on their devices! All of the data summarization and visualization for the stream ecology dataset can now be done in Rstudio (a graphical user interface for R programming), one of the many software tools hosted on QUBES. [Launch Rstudio from QUBES now](#) or [check out some of the other software tools](#) that are freely available on QUBES.

This adaptation was developed during the [Ecological Society of America \(ESA\) Data Explorers Faculty Mentoring Network \(FMN\)](#), which is just wrapping up this month. In the FMN, participants modified and implemented selected modules from ESA's *Teaching Issues and Experiments in Ecology (TIEE)* in their introductory biology or ecology courses to provide students with the opportunity to apply quantitative skills to real-world datasets. Throughout the FMN process, participants were mentored, supported, and provided with the infrastructure to find, customize, and share high quality teaching resources and strategies. You can [learn more about FMNs](#) and [subscribe to the QUBES newsletter](#) to receive updates later this summer about applications for Fall 2019 FMNs.

Have you already made modifications to an existing teaching resource and tried it out in your classroom? Consider publishing your adaptation as an Open Educational Resource on QUBES! Our new Knowledge Base article "[Adapting a Resource](#)" provides users with step-by-step instructions on how to publish their adaptation of an existing QUBES resource. Benefits of publishing your adaptation on QUBES include: a stable DOI, the ability to track number of views and downloads, interactive user feedback, and sharing your work with the community. If you run into any questions while submitting your adaptation, you can reach out to us [here](#). We look forward to seeing your work!

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