

Practical Stats Info for August 2020

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A. Practical Stats Courses

On our online training site: <https://practicalstats.teachable.com/>

Our Nondetects And Data Analysis (NADA) course is available online. It's a complete coverage of data analysis with nondetects and 'remarked data': summary statistics, regression, group testing, trend analysis and even some multivariate methods, all without substituting fabricated numbers like $\frac{1}{2}$ the detection limit. One year's access to the materials costs \$795. The R scripts included provide 37 new functions to make data analysis easier, and are a step forward from the NADA package in R.

Our Applied Environmental Statistics courses cover methods from simple statistics through trend analysis. They are also an introduction to using R software, the most widely used statistics software in the world. They are available in two parts, each \$650 USD for a 1-year access for one person. Or get both courses together in a bundle for \$1200 USD. See our online training site at the link above.

B. Our September Webinar

NADA2: Everything you can do today with nondetects

a Practical Stats webinar

will be available as a livestream displayed on our 'live' page

<https://www.practicalstats.com/training/live.html>

on Tuesday September 29, 2020 at 10 am Pacific, 1 pm Eastern time. Approx length 1.5 hours.

It will be available for viewing afterwards on our Training Site. This is an expanded version of the planned August webinar (which didn't happen) that I mentioned in our June newsletter.

Description:

What statistical analyses can you do today for data with nondetects without substituting numbers like $\frac{1}{2}$ the detection limit? It is essentially every analysis you do when there are no nondetects. Of course there's estimating means and other descriptive statistics. You may have moved on to computing confidence intervals on those statistics. But there's much more. In our NADA online course right now, and coming in early 2021 as the NADA2 package for R, are routines for drawing (while incorporating the information in nondetects) boxplots, scatterplots with fitted models, and probability plots to determine how well a standard distribution such as the normal, lognormal or

gamma fit the data. You can compute prediction and tolerance intervals, or perform hypothesis tests (parametric, nonparametric and permutation varieties). Follow that up with multiple comparison tests to determine which groups differ from others. You can compute correlation coefficients, build and evaluate regression models using AIC or other statistics to find the best model. You can perform trend analysis such as the seasonal Kendall test while adjusting for the effect of exogenous variables that are not time. You can even compute multivariate procedures such as cluster analysis, NMDS plots, PCA (Principal Components Analysis) and multivariate group and trend tests.

Are you still substituting fractions of the detection limit? You're likely getting back incorrect answers. Are you dropping variables because they have 'too many' values below detection limits? You're very likely to be missing important patterns and relationships. With all the money and effort it takes to plan a project, collect and chemically analyze your data, why stick in a fabricated number that you or someone else made up? Let me show you what is possible with modern software and stop limiting yourself to simplistic and cheap (quality) methods of data analysis.

C. Hardback Version of *Statistical Methods in Water Resources*

The new 2020 version of the classic textbook *Statistical Methods in Water Resources* is available as a free download from the USGS at <https://pubs.er.usgs.gov/publication/tm4A3>. What you may not know is that for a limited time, a hardback book version is also available from the USGS for about \$25, including shipping within the US. See <https://store.usgs.gov/product/533012>. It's unclear to me whether the hardback book will be shipped to addresses outside the United States.

'Til next time,

Dennis Helsel
ask@practicalstats.com
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-- Make sense of your data