JOINT MEETING

ALASKA CHAPTER AND NW SECTION

OF THE WILDLIFE SOCIETY

Alaska Pacific University – Rasmuson Hall

Anchorage, Alaska

March 26th – 30th, 2018

R OVERVIEW WORKSHOP

R Overview Workshop

The Wildlife Society, Alaska Chapter, Annual Meeting

Anchorage, Alaska

8:00am - 6:00pm

26 March, 2018

Overview: Conducting statistical analyses and creating figures and maps in R can be a daunting task. Especially because a statistical method may only be a couple lines of code, while 100 lines or more are needed to enter, clean, explore, and format the data for the analysis, and another 100 lines to process the output and create useful summaries. In this workshop we will get you better acquainted with the workflow of conducting analyses and producing summaries in R using RStudio. The goals of the workshop include: understanding what R can and cannot do, hands-on introduction to basic R language, learning how to get help or troubleshoot code, importing, exploring, and formatting code for analyses, conducting an example analysis, and summarizing results including creating publication quality figures and reproducible final reports using Rmarkdown/Knitr. The workshop is only one day, so we won't be able to cover each topic in depth, but our hope is to familiarize you with the R language, features of RStudio, general project workflow, troubleshooting error messages, and providing resources to help you continue to learn after the course is over. Please note: this is not a statistics course - students are expected to have a basic understanding of regression analysis and linear algebra.

Materials: Students will need to bring a laptop (PCs preferred, but Macs will be tolerated) with R and RStudio installed as well as several packages. Instructors will provide detailed instructions for how to install packages prior to the course. Wi-fi is available in the workshop room, but it can be SLOW - so students will need to come prepared with packages downloaded. Students are welcome to attend part of the day if they are existing R users looking to brush up on certain topics, but R is like any language - there are many ways to say the same thing and even experienced users may pick up a new trick or two.

Instructors: Sarah Thompson and Courtney Amundson are Research Wildlife Biologists at the USGS Alaska Science Center and have been using R extensively for about 10 years. We have taught a couple workshops in the past and look forward to making this one even better!

Tentative Schedule (subject to change!):

1) 8:00-9:00am: Introduction to R and Rstudio
   a) What is R? Why and when would you want to use R?
   b) Finding help
   c) RStudio
   d) R Packages (installing, loading, using)
   e) R commander? R and RStudio for Macs
   f) R projects. R file management
   g) Data types, functions, operations, loading data, saving data
2) 9:00am-10:00am: R Data
   a) Data summaries: Descriptive statistics, correlations (base)
   b) Basic plotting (base, lattice, ggplot2)
   BREAK: 10:00am-10:20am

3) 10:20am-12:30pm: Formatting and Visualization
   a) Data manipulation (plyr, dply, base)
   b) Intro to mapping and spatial visualization in R
   LUNCH: 12:30pm-1:30pm

4) 1:30-2:30pm: Standard statistical functions
   a) Regression models: generalized linear modeling, generalized additive modeling, mixed models (glm, mgcv, lmer, etc.)
   b) Primer on common model selection techniques (AIC, stepwise) (AICmodavg, MuMin)
   BREAK: 2:30-3:00

5) 3:00-4:00pm: Summarizing and plotting model output (base, lattice, ggplot2, fields)
6) 4:00-5:00pm: Applied tutorials/modules showing sample workflows, using previously covered materials, including Rmarkdown/Knitr to create reproducible final products/reports from code.

5:00-6:00pm: Open Hour: Advanced topics and Q&A (e.g., spatial data in R, advanced analysis techniques, specific formatting issues) *If students have specific concerns or desires on topics to cover please email the instructors at least 3 days BEFORE the course.