**Population Modeling in Ecology**

**Semester**: Spring 2023

**Day/Time**: Monday from 1–4 PM Mountain Time

**Instructor**: Gabe Barrile (gbarrile@uwyo.edu)

Software Installation to Complete Before the Course

We will use three free programs in this course:  [Program R](https://www.r-project.org/), [RStudio](https://rstudio.com), and [Program MARK](http://www.phidot.org/software/mark/index.html).  You are responsible for installing each prior to the workshop.  These are three separate installations detailed below.  In step 4 you'll also install several R packages needed for the workshop.  If you run into trouble, please contact the instructors.

1st step:  Install Program R

R is a free and open-source programming language and software environment for statistical computing and graphics.  The exercises for this workshop will be based in R.

* [Windows](https://cran.r-project.org/bin/windows/base/)
  + Click "Download R 4.1.2 for Windows" and install.  Default installation settings are okay.
* [Mac OS](https://cran.r-project.org/bin/macosx/)
  + Click the ".pkg" file that matches your version of Mac OS and install.  R-4.1.2 is the latest version, but prior versions may work if your OS version isn't compatible with the latest R version.  Default installation settings are okay.

2nd step:  Install RStudio

RStudio is a free and open-source integrated development environment (IDE) for R.  You can opt to run R directly without an IDE, but we recommend RStudio.

* [Windows or Mac](https://www.rstudio.com/products/rstudio/download/)
  + Scroll down past the table comparing license options to the section called "All Installers."
  + Click the link that corresponds to your OS and install.  Default installation settings are okay.

3rd step:  Install Program MARK

Program MARK is a free program for parameter estimation from marked individuals (e.g., capture-mark-recapture).  We will run MARK from within R, but you must have the standalone Program MARK installed.

* [Windows](http://www.phidot.org/software/mark/downloads/)
  + Click "setup.exe" and install.  You may get a security prompt.  Default settings are okay.
* [Mac OS](http://www.phidot.org/software/mark/downloads/)
  + MARK was written for Windows, but scroll down to the Apple logo for Mac options.  We will be running MARK using the RMark interface, so that option may work for you.

4th step:  Install add-on R Packages

Please install these R packages ahead of time.  If installed previously, please update.

Launch RStudio, and run the following line in the R console to install.

install.packages(c("AICcmodavg", "cowplot", "ggplot2", "raster", "reshape", "rgdal", "RMark", "unmarked"))