Macrosystems EDDIE:
Getting Started + Troubleshooting Tips

Developed by K.J. Farrell, C.C. Carey, and A.G. Hounshell
for use with the Macro-Scale Feedbacks
Macrosystems EDDIE module.
http://module4.macrosystemseddie.org
Module development supported by NSF EF 1702506.

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Macrosystems EDDIE
Environmental Data-Driven Inquiry & Exploration in Macrosystems Ecology

NSF

SERC the Science Education Resource Center at Carleton College

GLEON global lake ecological observatory network

R and RStudio

R

- Statistical environment

RStudio

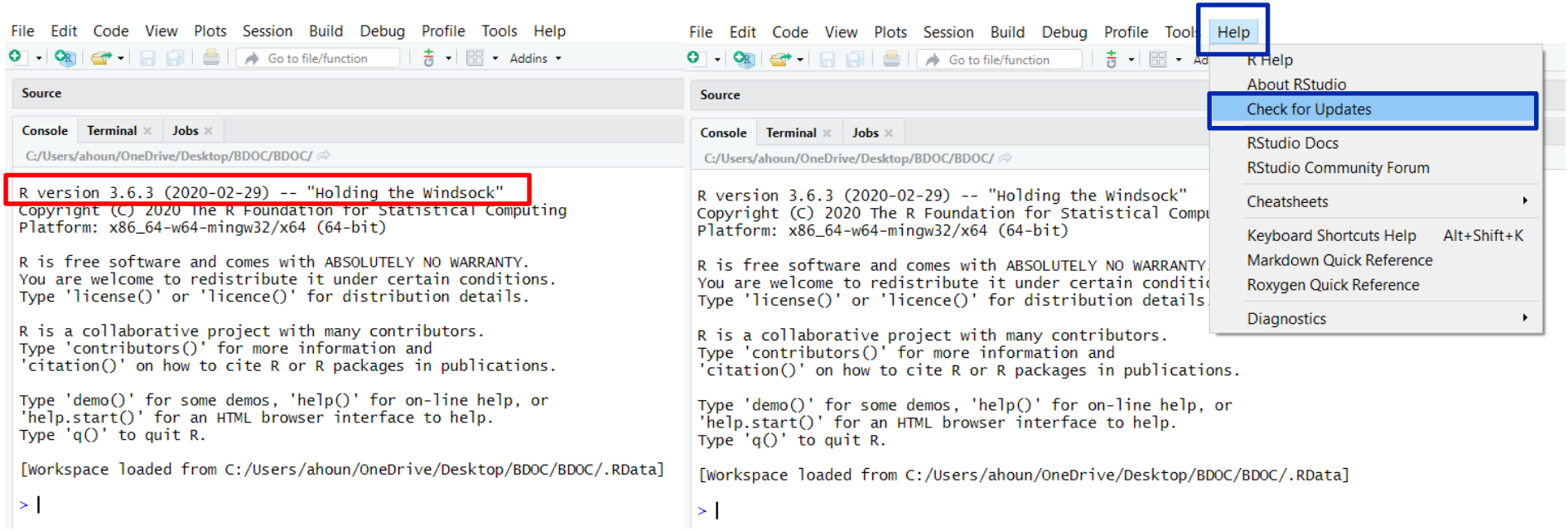
- Point and click program for using R in one place
  - Run code
  - Visualize plots
  - Access files

Check-in:

- Have you downloaded ***both*** R and RStudio?
- Look in your Applications (Mac) or in the Start menu (Windows) to confirm this-- both programs should be listed.
- If either program is missing, install it now!

Are R & RStudio up to date?

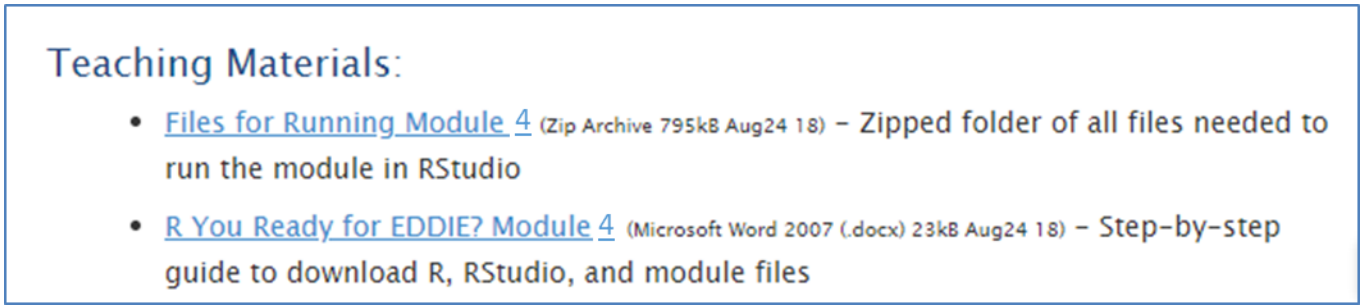
- Check that R and RStudio are both up-to-date, and download new versions if necessary
  - When you open RStudio, you will see your version of R. It should be at least **3.6.3**
  - Check for updates to RStudio by clicking Help, then Check for Updates



Download the module files

- Navigate to the Macrosystems EDDIE Module 4 website
  - http://module4.macrosystemseddie.org

- Scroll down to Teaching Materials and click Files for Running Module 4



- Save the .zip folder to your Desktop

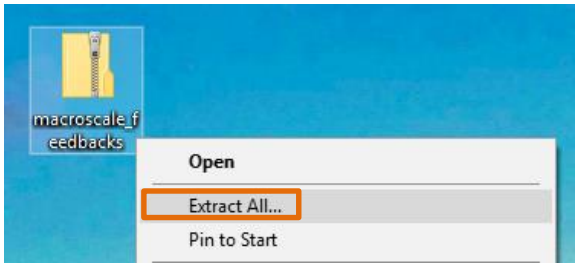
Unpack Files to Desktop: Windows

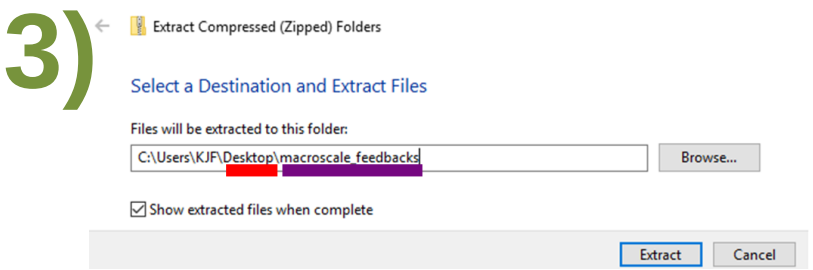
1) Download the zip folder directly from the Macrosystems EDDIE website to Desktop (or move folder from Downloads to Desktop)
2) Right click on the .zip folder and choose Extract All
3) Check that your files are:

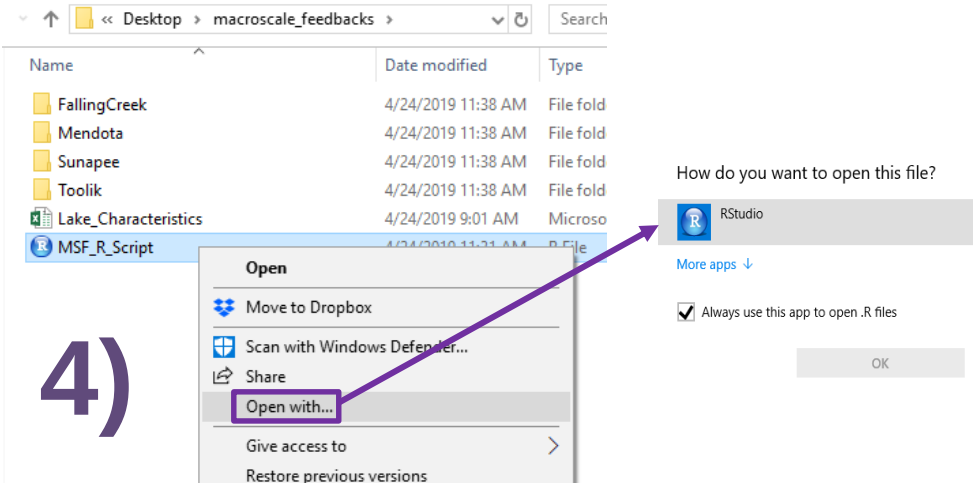
- being extracted to the Desktop
- called *exactly* macroscale_feedbacks.

Also check the box "Show extracted files when complete"

4) To open the module script in RStudio, right click on the file name (MSF_R_Script), then choose Open with… and RStudio







Unpack Files to Desktop: Mac

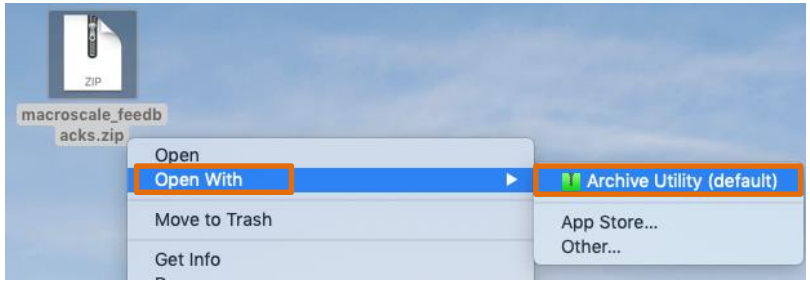
1) Download the zip folder directly from the Macrosystems EDDIE website to Desktop (or move folder from Downloads to Desktop)

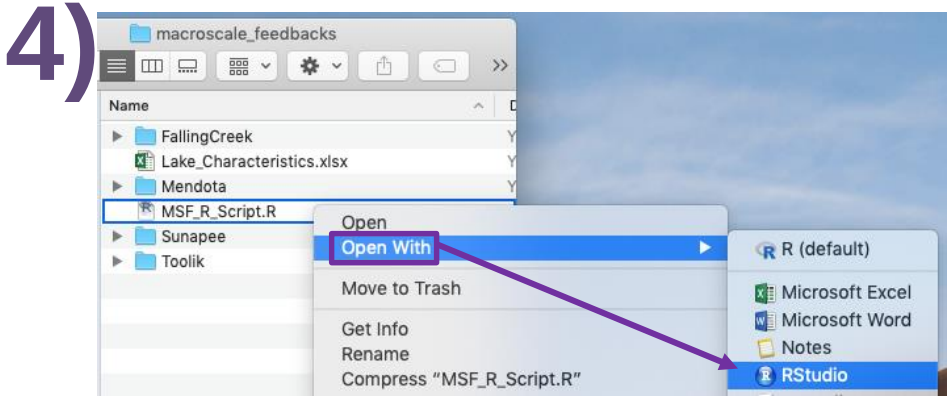
- **Note**: Your folder may have automatically been unzipped when you downloaded it. If it was, drag the ***un***zipped 'macroscale_feedbacks' folder from Downloads to the Desktop, and skip to step 4

2) Control + click on the .zip folder and choose Open with → Archive Utility to unzip the folder. Then double click on the unzipped folder

3) Check that your folder is:
- being extracted to the Desktop
- called *exactly* macroscale_feedbacks.

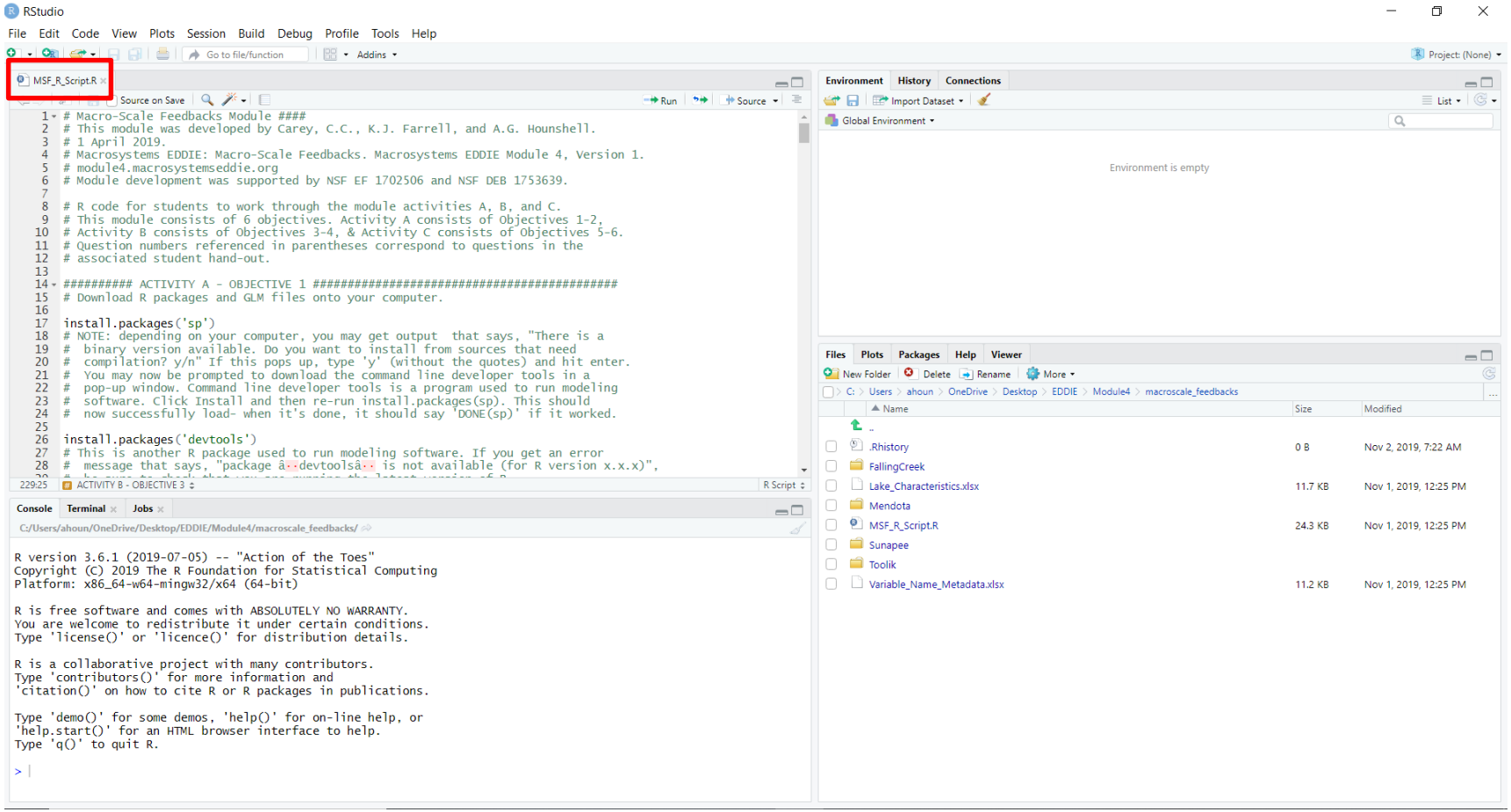
4) To open the module script in RStudio, control + click on the file name (MSF_R_Script), then choose Open with… and RStudio



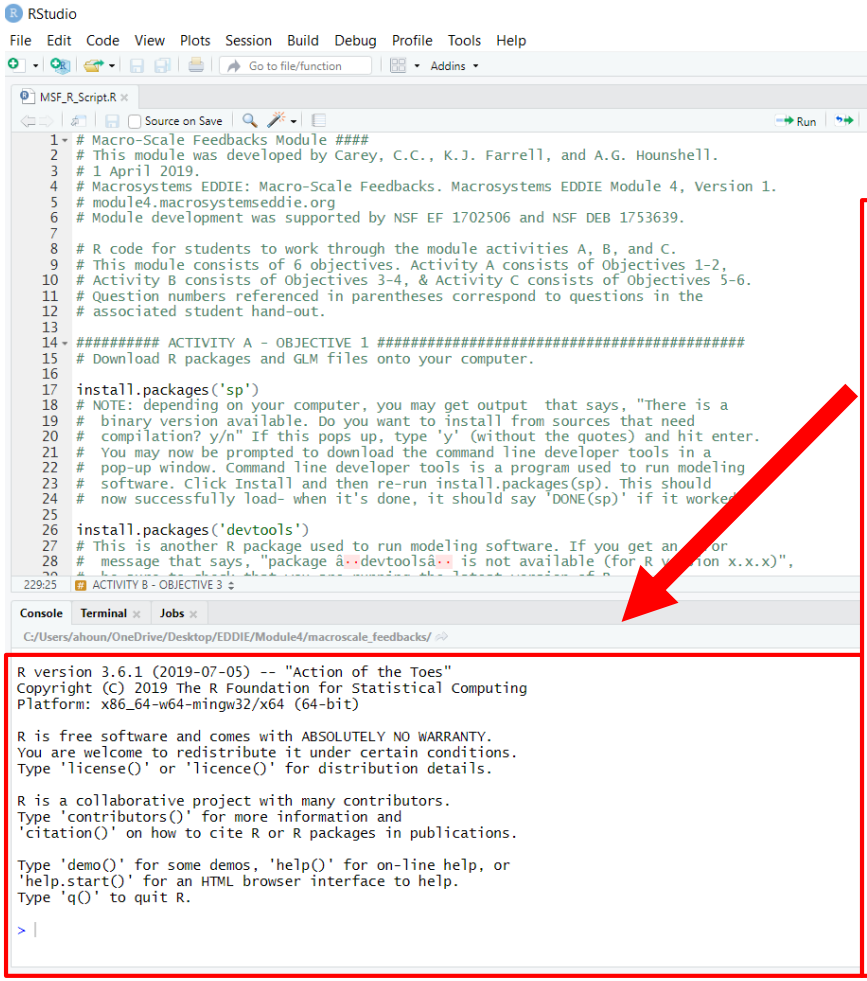


Opening Module Files in RStudio

- Congrats! You've opened the module script in RStudio!



RStudio Basics: Console



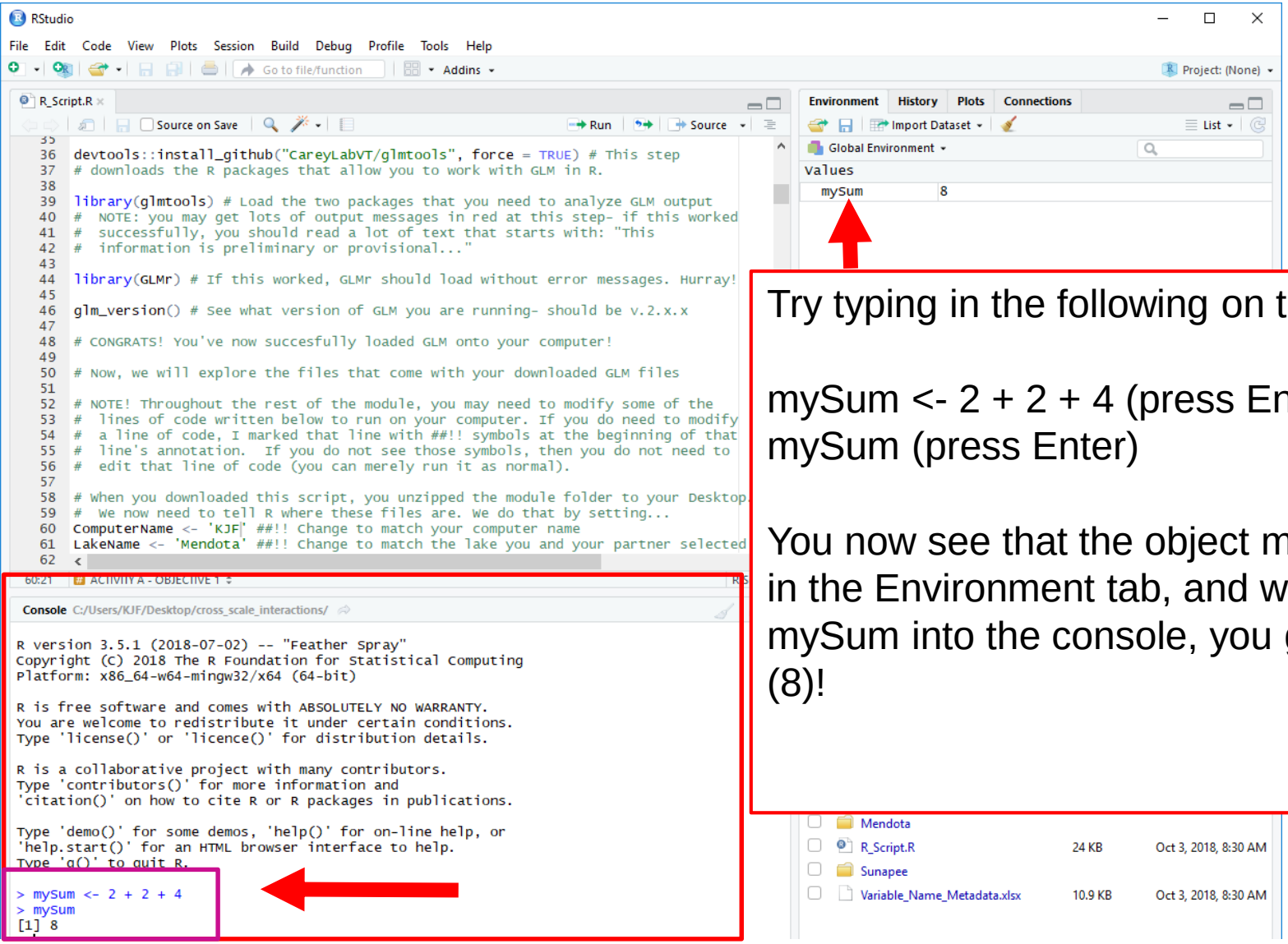
The Console appears in the bottom left panel, and shows the status of your scripts. As you run the module, you will check here for confirmation messages and error codes.

You can also use the console to do math and 'assign' objects, which lets you save things for later.

Try typing in the following on the console:

mySum <- 2 + 2 + 4 (press Enter)
mySum (press Enter)

RStudio Basics: Console

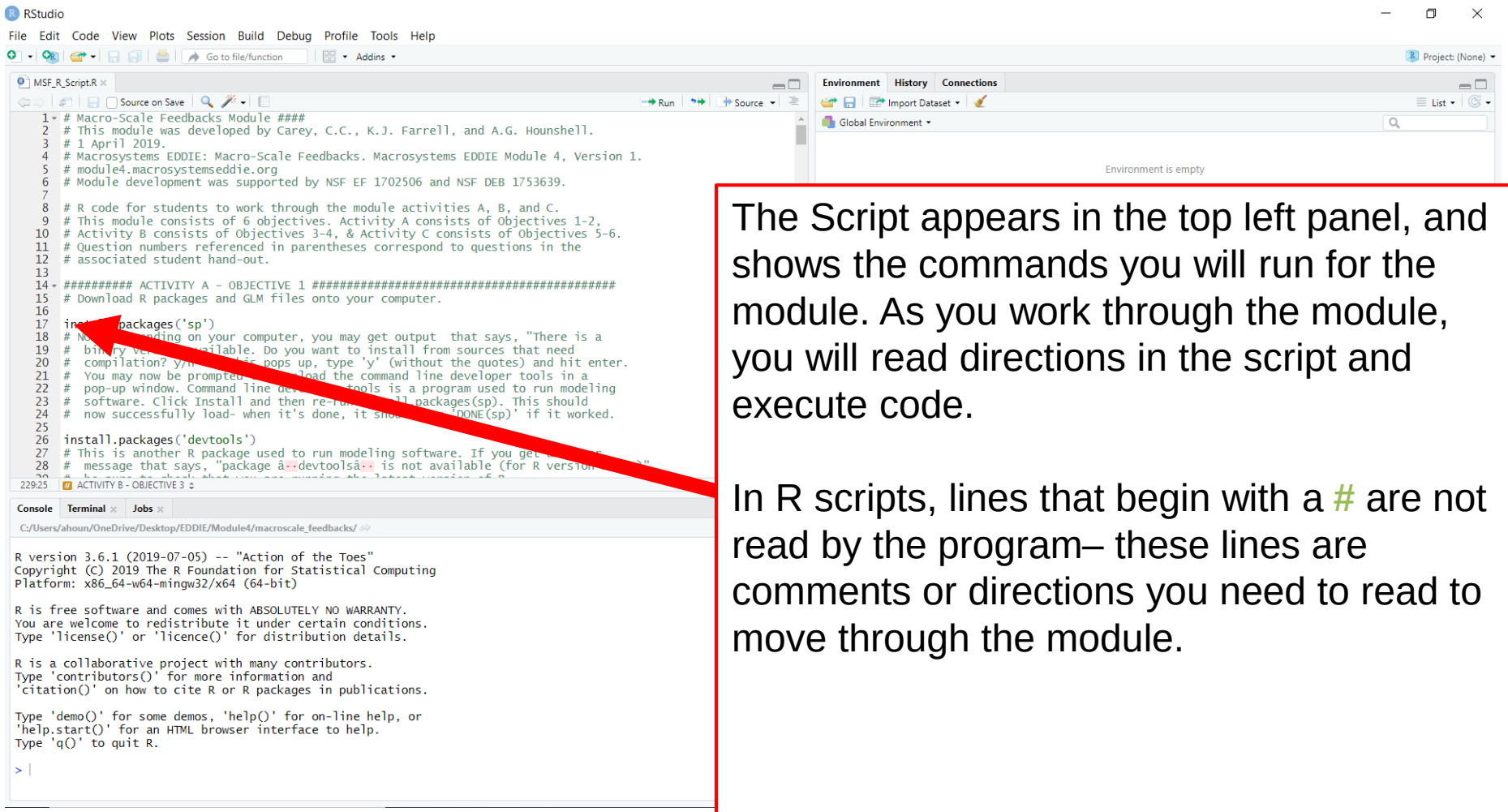


Try typing in the following on the console:

mySum <- 2 + 2 + 4 (press Enter)
mySum (press Enter)

You now see that the object mySum is saved in the Environment tab, and when you type mySum into the console, you get the answer (8)!

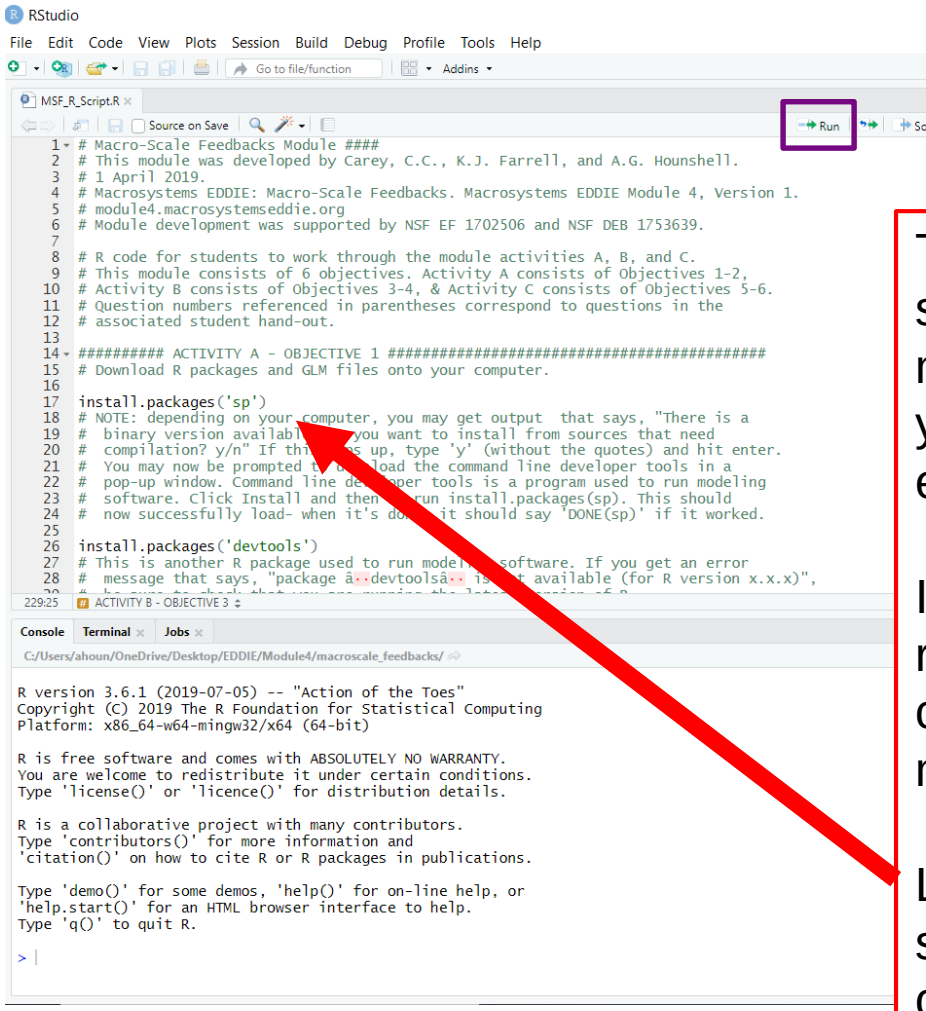
RStudio Basics: Script



The Script appears in the top left panel, and shows the commands you will run for the module. As you work through the module, you will read directions in the script and execute code.

In R scripts, lines that begin with a # are not read by the program– these lines are comments or directions you need to read to move through the module.

RStudio Basics: Script

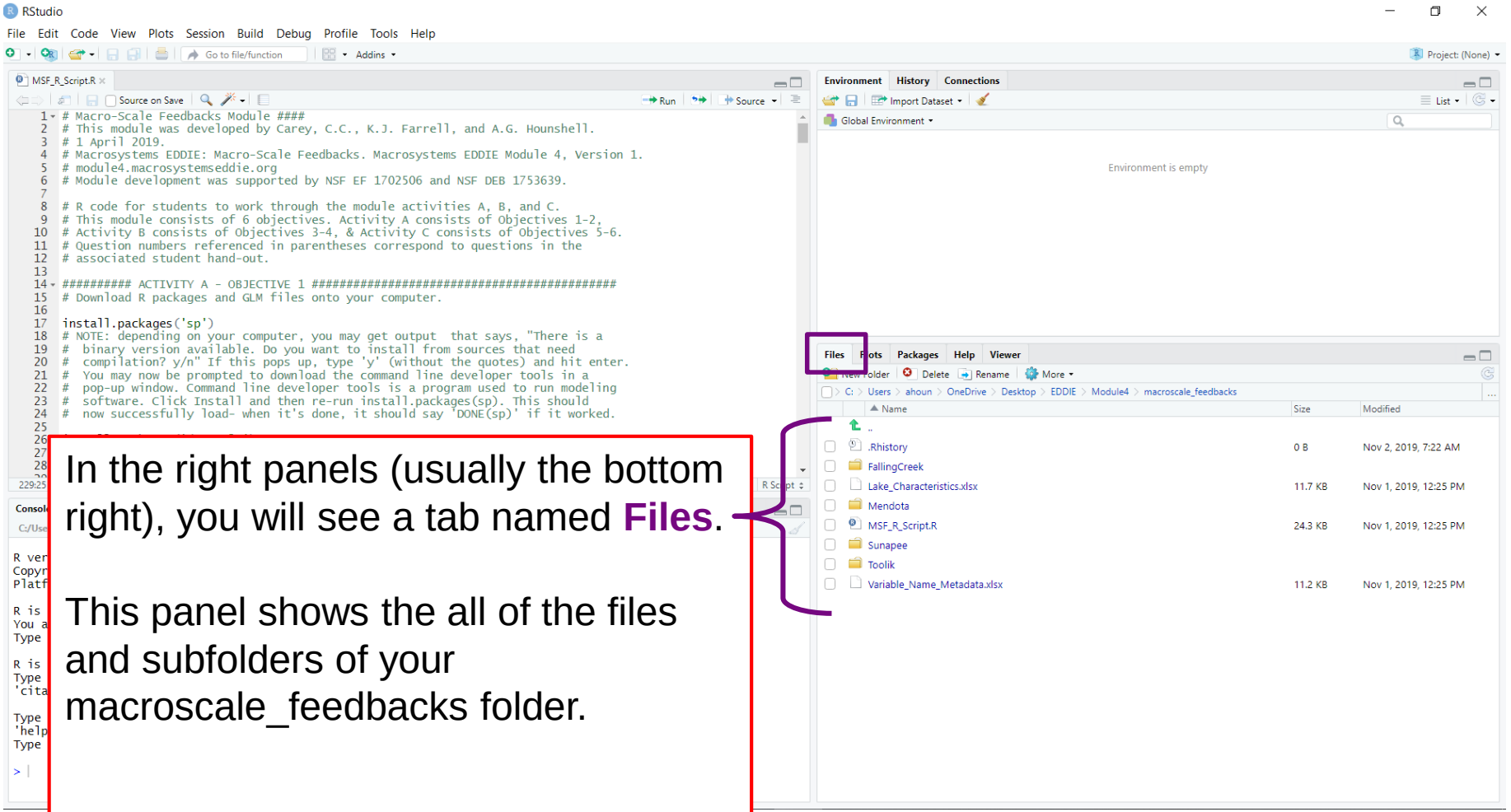


The Script appears in the top left panel, and shows the commands you will run for the module. As you work through the module, you will read directions in the script and execute code.

In R scripts, lines that begin with a # are not read by the program– these lines are comments or directions you need to read to move through the module.

Lines that do not begin with a # are lines of script that need to be run. You can run a line of script by putting your cursor inside the line, then pressing **Run** (or Ctrl + Enter)

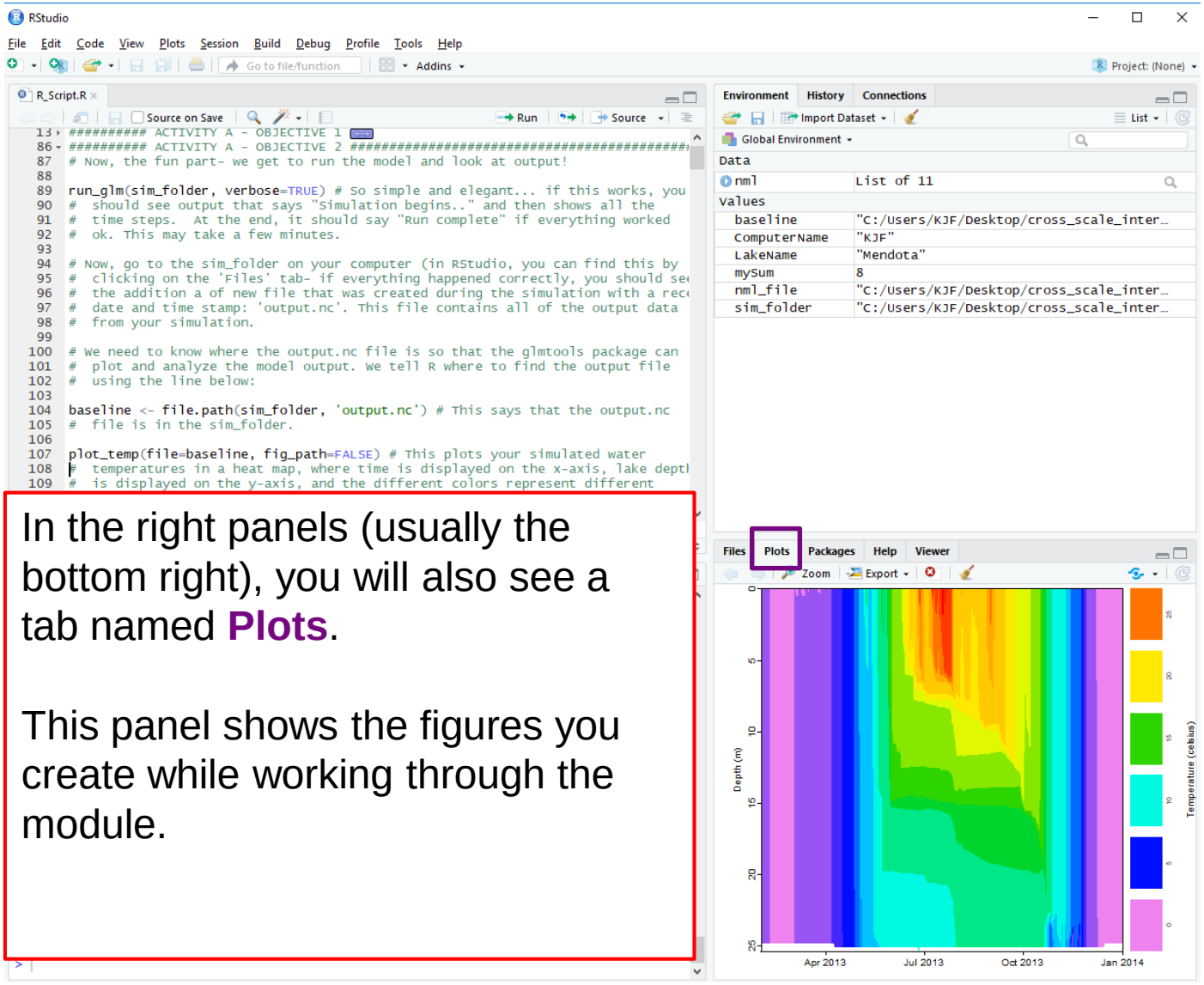
RStudio Basics: Files



In the right panels (usually the bottom right), you will see a tab named **Files**.

This panel shows the all of the files and subfolders of your macroscale_feedbacks folder.

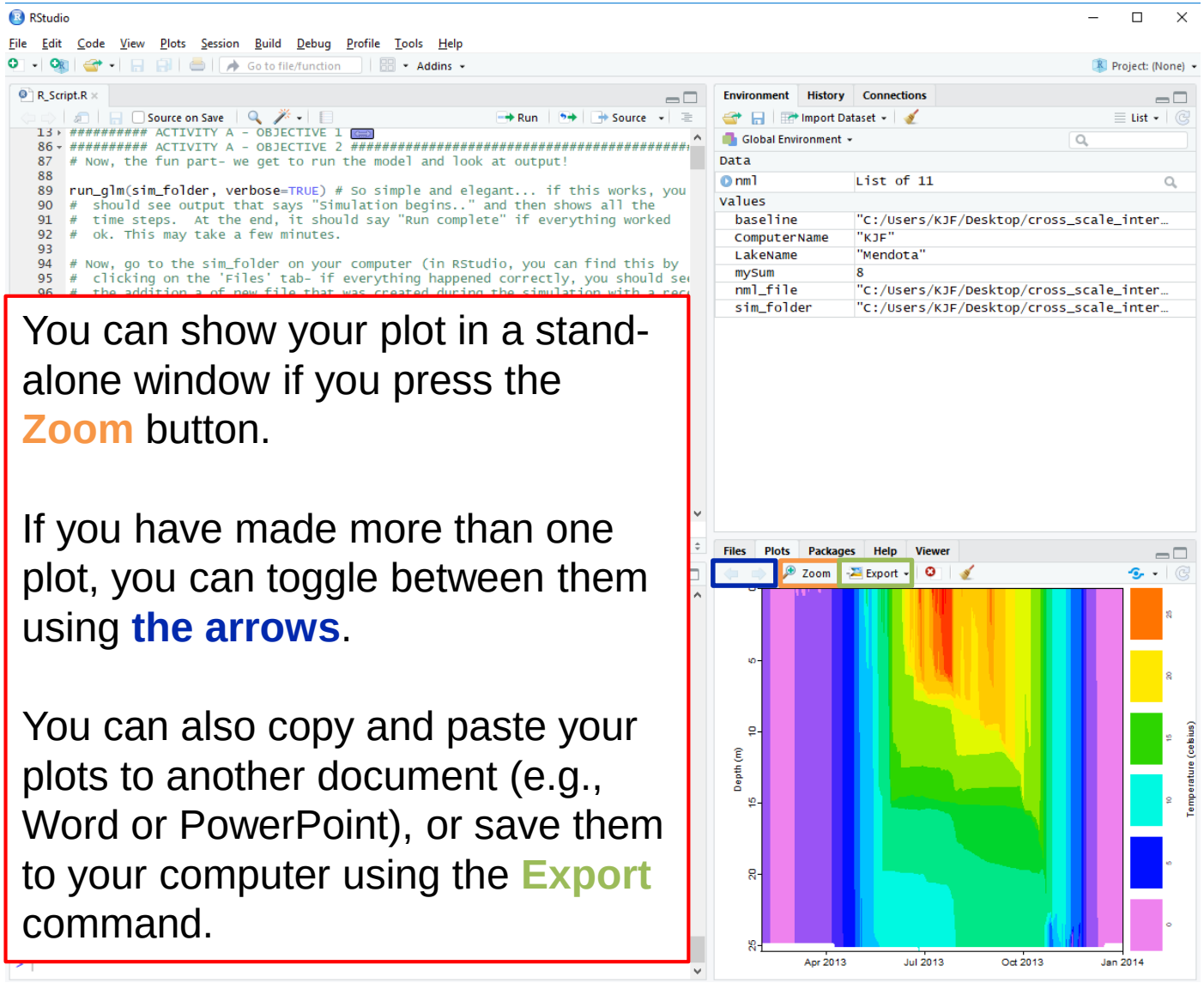
RStudio Basics: Plots



In the right panels (usually the bottom right), you will also see a tab named **Plots**.

This panel shows the figures you create while working through the module.

RStudio Basics: Plots



You can show your plot in a stand-alone window if you press the **Zoom** button.

If you have made more than one plot, you can toggle between them using **the arrows**.

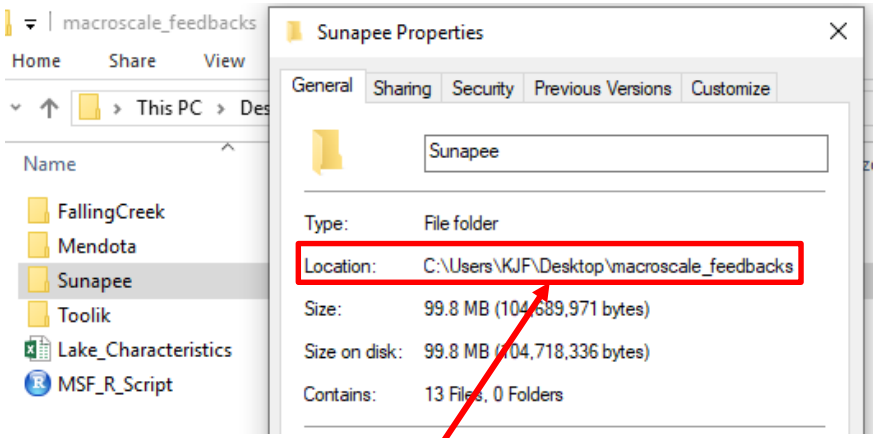
You can also copy and paste your plots to another document (e.g., Word or PowerPoint), or save them to your computer using the **Export** command.

Activity A: What's my sim_folder?

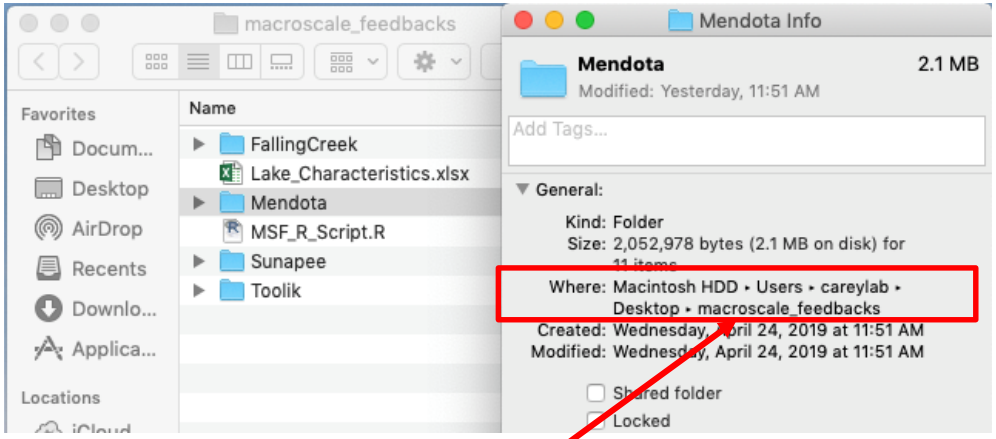
In Activity A, you need to set your sim_folder so that R knows where to find the module folders for your focal lake on *your* computer!

To find your folder path:

1) Navigate to the 'macroscale_feedbacks' folder on your Desktop
2) Right click on the folder that matches your model lake, then select Properties (Windows) or Get Info (Mac)
3) Look under Location (Windows) or Where (Mac) to find your folder path (examples below):
   - Windows: Users/KJF/Desktop/macroscale_feedbacks/Sunapee
   - Mac: Users -> careylab -> Desktop -> macroscale_feedbacks -> Mendota



In the R script, make sure you use the / dash, not \ (which is what Windows will show you!)



In the R script, make sure you use the / dash, not an arrow (which is what Mac will show you!)

Activity A: What's my sim_folder?

In the R script, you will need to change the part after Users/ to give the name of your computer (e.g., my computer name is cayelan, but yours will be different!) AND change the LakeName part to match the name of your model lake's folder (e.g., Mendota or Sunapee).

```
65   # your Desktop. Right click on the folder that matches your model lake
66   #  (Mendota, Sunapee, or FallingCreek), then select Properties (Windows) or
67   #  Get Info (Mac).
68   #  Look under Location (Windows) or Where (Mac) to find your folder path
69   #  (examples below):
70   #  Windows: C:/Users/KJF/Desktop/macroscale_feedbacks/LakeName
71   #  Mac: Users -> careylab -> Desktop -> macroscale_feedbacks -> LakeName
72
73 ##!! Edit this line to define the sim_folder location for your model lake.
74 sim_folder <- '/Users/cayelan/Desktop/macroscale_feedbacks/LakeName'
75   #  You will need to change the part after Users/ to give the name of your
76   #  computer (e.g., my computer name is cayelan, but yours will be different!)
77   #  AND change the word LakeName to be the name of your model lake (FallingCreek,
78   #  Mendota, Sunapee, or Toolik). Note that these computer file paths are case-sensitive.
79
80 # This line of code is sets your sim_folder as the working directory
81 setwd(sim_folder)
82 # The point of this step is to make sure that any new files you create (e.g.,
83 # figures of output) end up together in this folder.
```

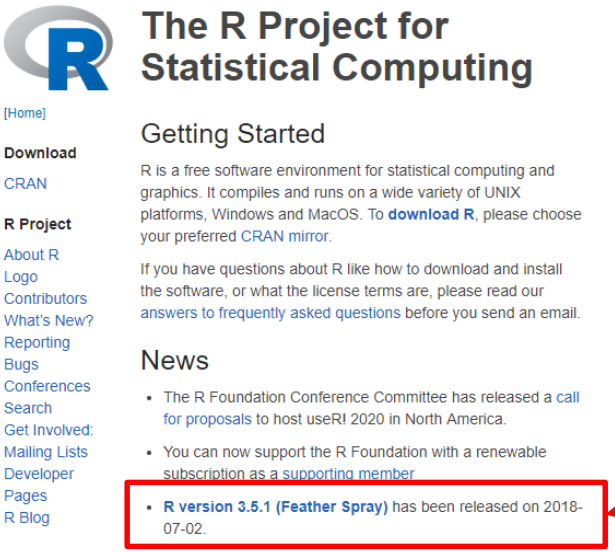
If you don't change these two parts of the sim_folder file path, your model won't run because R won't know where to look for your files!

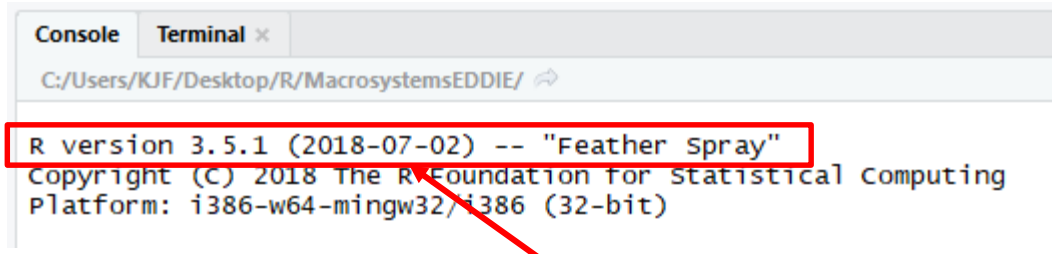
Macrosystems eddie: GLM Troubleshooting tips

Having trouble?

If you're having trouble running the Macrosystems EDDIE module, first double-check that you have the latest version of R!

- Go to https://www.r-project.org/ and make sure that the version listed on the home page matches the version that opens when you open RStudio





These versions **must** match!
Otherwise you'll get error messages when downloading packages to run the GLM model

- If it doesn't match, close RStudio, download and install the new version of R, then reopen RStudio and the MSF_R_Script.R file

Error: `gml.exe had status 309`

When does it happen?

- run_glm(sim_folder, verbose=TRUE) will start the GLM run, but you will likely get an error similar to: "`gml.exe had status 309`"

Why?

- Problem with 32-bit vs. 64-bit R in Windows 10

How to fix it:

1) In the RStudio menu, click on Tools, then Global Options.
2) In the General tab, check what R version RStudio is using (the first line at the top of the window).
3) If the selected version starts with [Default] [64-bit], try pressing Change and selecting the [Default] [32-bit] option. You will then need to restart RStudio and try the script again.

Error: `Day 2451636 (2000-04-01) not found`

When does it happen?

- run_glm(sim_folder, verbose=TRUE) will start the GLM run, but you will likely get an error similar to: "`Day 2451636 (2000-04-01) not found`"

Why?

- *time* column in .csv file not formatted correctly for GLM

How to fix it:

1) Open .csv file in Excel. Right click on the *time* column, then select Format.
2) Choose Custom, then type in YYYY-MM-DD HH:MM:SS *exactly*. Save and close your .csv file.
3) Run the following lines in R to ensure your time column is formatted for GLM (search to find in the R script, then run):
   - metdata <- read.csv("met_hourly_climate.csv", header=TRUE)
   - metdata$time <-as.POSIXct(strptime(metdata$time, "%Y-%m-%d %H:%M:%S", tz="EST"))
   - write.csv(metdata, "met_hourly_climate.csv", row.names=FALSE, quote=FALSE)

   Make sure you edit the file name (in blue, above) to match your .csv file.

Error: "MSVCR100.dll is missing"

When does it happen?

- When you try to run GLM commands, you receive the error: "`MSVCR100.dll is missing from your computer`" or "`The code execution cannot proceed because MSVCR100.dll was not found. Reinstalling the program may fix this problem`"

Why?

- The MSVCR100.dll file is missing from your Windows C++ library

How to fix it:

The missing library (MSVCR100.dll) will need to be reinstalled on your computer. This is beyond the scope of Macrosystems EDDIE troubleshooting, and we recommend you check with a campus IT worker for help.

In the meantime, we recommend partnering with a student whose computer isn't having this problem to run the Macrosystems EDDIE module.