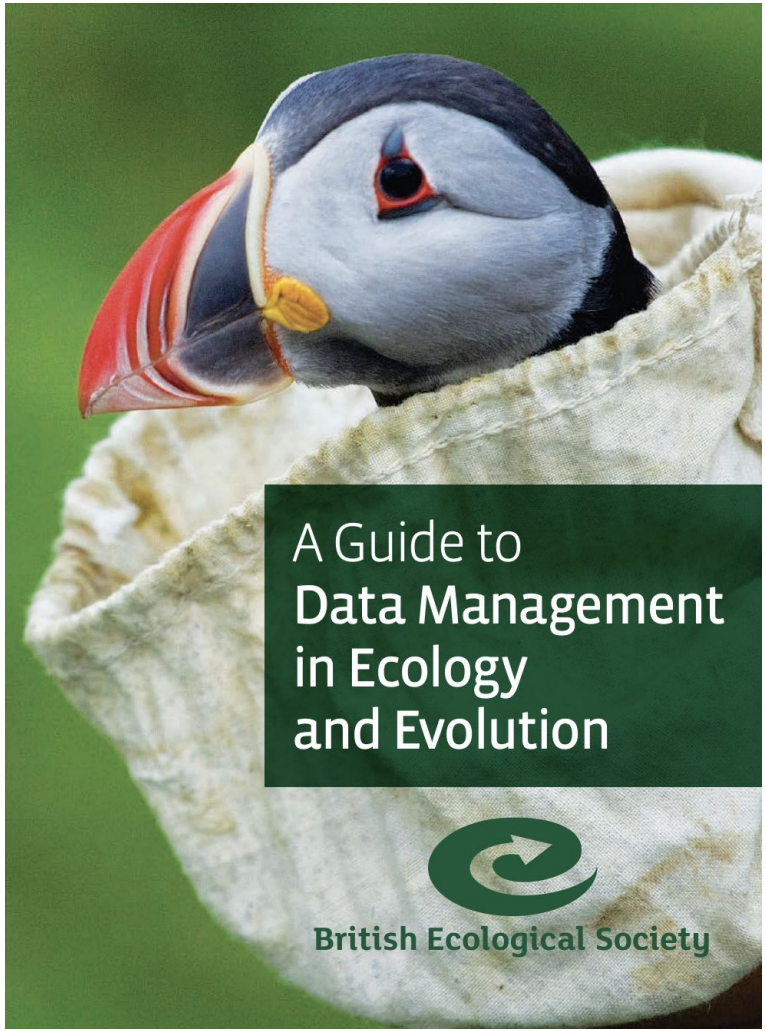
Intro to Tidyverse

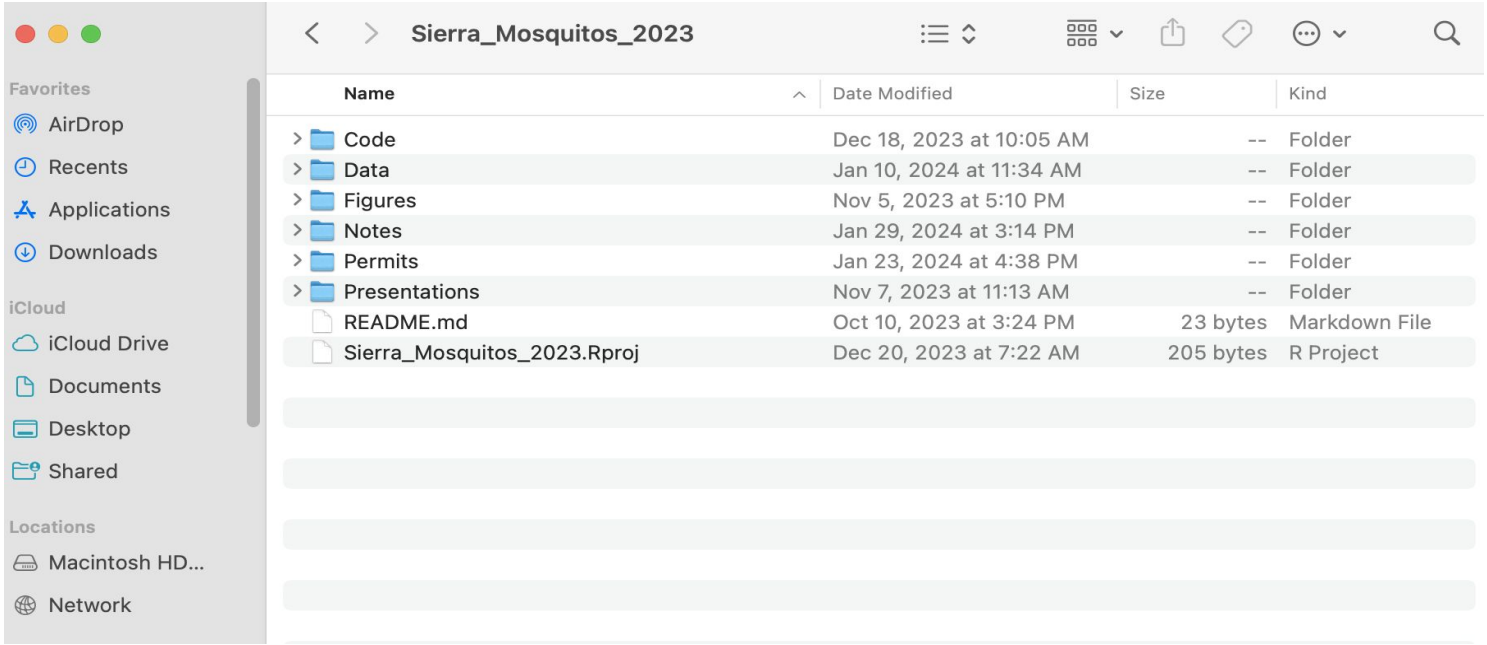
And data management!!!

Data Management

1. Create a git repository online and an RStudio project.
2. Set up an analysis-friendly folder structure



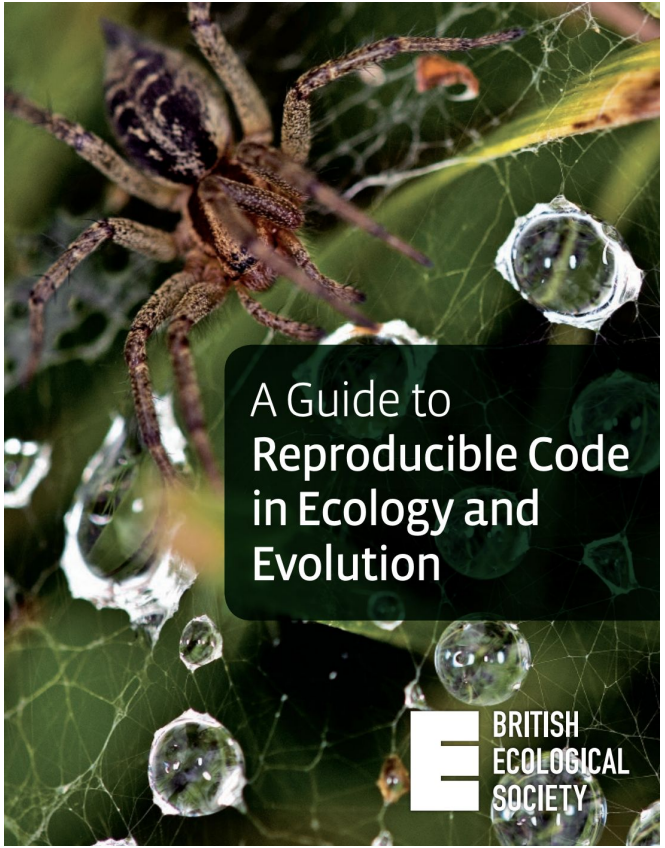
Folder Structure



[A professional GitHub repository]

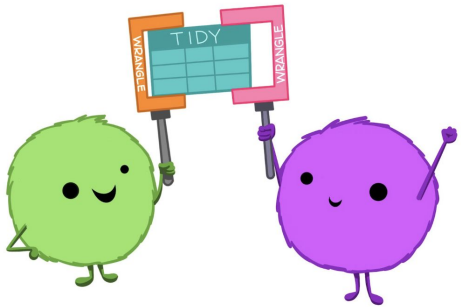
Reproducible Code

A data analyses are **reproducible** if all the information (data, files, etc.) required are available for someone else to re-do your entire analysis.



Benefits of Reproducible Code

- You can figure out what you did six months from now.
- You can quickly make adjustments to code or data.
- You can pass along or share a project with others.
- You can give useful code examples to people who want to extend your research.



Requirements of Reproducible Code

- All your raw data should be saved in the project directory.
- Scripts should be included for all code - data cleaning, analyses, figures, etc.
- You should include details on the versions of any software used.
- If possible, there should be no “by hand” steps.

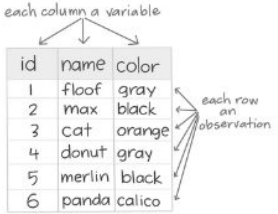
clean data

"TIDY DATA is a standard way of mapping the meaning of a dataset to its structure."

–HADLEY WICKHAM

In tidy data:

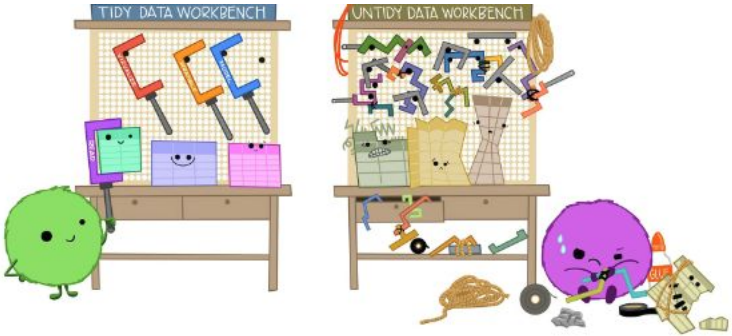
- each variable forms a column
- each observation forms a row
- each cell is a single measurement



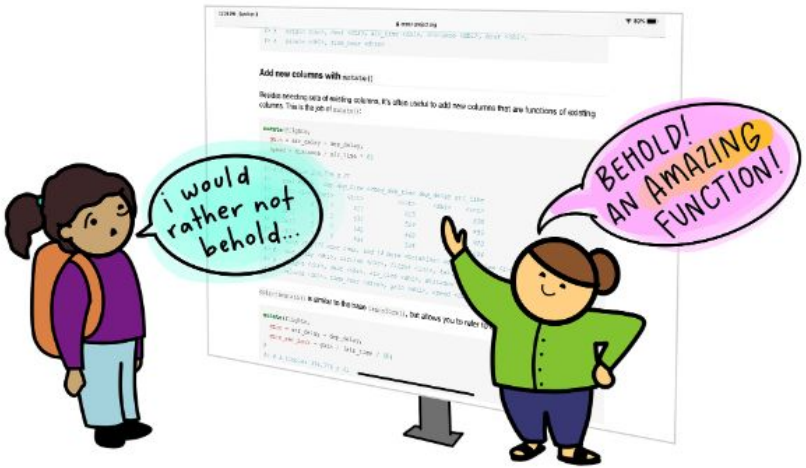
Wickham, H. (2014). Tidy Data. Journal of Statistical Software 59 (10). DOI: 10.18637/jss.v059.i10

You can start this while doing manual entry!

	A	B	C	D	E	F	G	H	I	J
1	sampler	Lake	Date	Time_start	Time_end	Total_time	snow_melt_	black_mosq	culiseta	culex_tarsali b
2	SC	Heart	14-Jul	18:01	19:57	116	158	0	6	0
3	SL_MR	Heart	19-Jul	15:03	16:03	60	16	1	0	0
4	SC	Heart	19-Jul	15:03	16:03	60	18	0	0	0
5	SC	Heart	25-Jul	18:00	19:00	60	233	2	1	0
6	SL	Heart	25-Jul	18:00	19:00	60	93	5	0	0
7	SC	Heart	25-Jul	19:00	20:00	60	398	6	0	0
8	MR	Heart	25-Jul	19:00	20:00	60	170	1	0	0
9	SC	Heart	3-Aug	15:20	16:20	60	44	0	1	0
10	SL	Heart	3-Aug	15:15	16:15	60	22	0	0	0
11	SC	Heart	3-Aug	16:20	17:20	60	110	0	1	0
12	SL	Heart	3-Aug	16:15	17:15	60	50	0	1	0
13	CC	Heart	15-Aug	16:00	17:00	60	29	0	0	0
14	SC	Heart	15-Aug	16:00	16:30	30	41	0	0	0
15	SC	Heart	15-Aug	16:30	17:00	30	50	0	0	0
16	SC	Heart	22-Aug	17:04	18:04	60	193	0	0	0
17	KK	Heart	22-Aug	17:04	18:04	60	108	0	0	0
18	SL_MR	Hidden	14-Jul	18:01	19:57	116	93	1	1	0
19	SL_MR	Hidden	19-Jul	17:03	18:03	60	21	1	1	0
20	SC	Hidden	19-Jul	17:03	18:03	60	37	1	0	0
21	MR	Hidden	25-Jul	15:00	16:00	60	19	0	0	0
22	SC	Hidden	25-Jul	15:00	16:00	60	6	0	0	0
23	SC	Hidden	25-Jul	16:00	17:00	60	25	0	1	0
24	SL	Hidden	25-Jul	16:00	17:00	60	63	0	0	0


TIDY DATA WORKBENCH
UNTIDY DATA WORKBENCH

Let’s take a closer look at some packages!



Let's talk about Tidyverse:

Overview of Tidyverse

Today we will be focusing on the packages we find most helpful:

1. **Dplyr** - within dataframe changes
2. **Lubridate** - time series
3. **Tidyr** - reshaping and tidying data (between wide and long formats)

There are other packages that are included in Tidyverse!

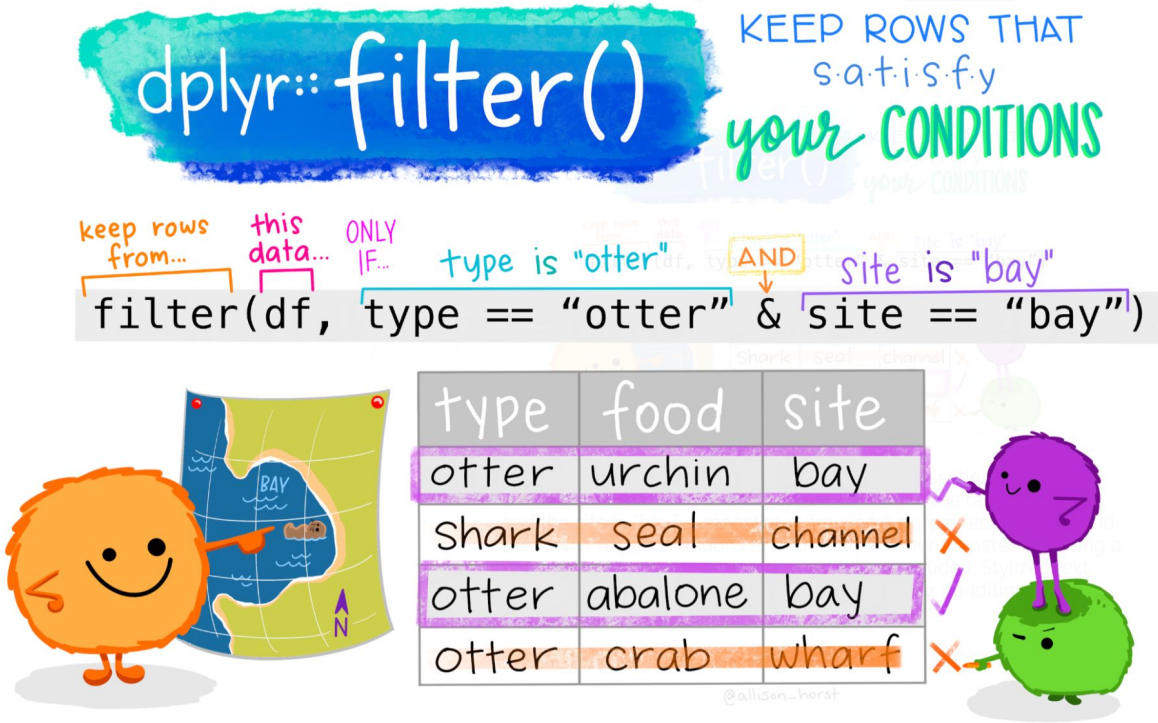
1. **ggplot**- graphical presentation of data
2. **purrr**- combining dataframes
3. **Tibble**- making dataframes in R (great for example data)
4. **readr**- reading and writing data in various formats
5. **across**- used to apply a function or transformation to multiple columns of a data frame simultaneously

Quick Intro to Nemo_BO Dataset

- Collected at Blue Oak Ranch (BO)
- Data includes life-history, morphological, and physiological traits for *Nemophila menziesii* (Baby Blue Eyes, Boraginaceae)
- We can use the data to estimate phenotypic selection
    - (the process by which the phenotype of an organism influences its reproductive success in a given environment)

Dplyr: filter

- used to subset data frames based on specific conditions or criteria
- It allows you to extract rows from a dataframe that meet certain logical conditions.



Dplyr: Mutate

- Create new columns or modify existing columns in a dataframe based on transformations or calculations
- It allows you to add calculated columns to your data frame without modifying original data

Dplyr: case_when

- It allows you to define multiple conditions and corresponding values to be assigned based on those conditions
- creating new variables based on complex conditional logic in your data analysis or data wrangling tasks

Lubridate

- designed to make working with dates and times easier and more intuitive

- It provides functions to parse, manipulate, and work with date-time objects in a user-friendly manner

here("data", "my_data.csv")

- generates a path to a file named "my_data.csv" located in the "data" directory relative to the project's root directory
- This path remains consistent regardless of the current working directory, simplifying code maintenance and sharing.