2022 Data Management Workshop: RMarkdown

Knit to Word Demonstration

Jason Ross & Jacob Cochran

June 02 2023

Table of Contents

# Introduction

This document demonstrates how to render a Word document using **RMarkdown** ([RMarkdown Cheat Sheet](https://www.rstudio.com/wp-content/uploads/2015/02/rmarkdown-cheatsheet.pdf)) and provides a few helpful links. Rendering a Word document can be challenging to format in R, especially when trying to format a table. Unlike rendering a PDF where you can format the document in the R script, it is better to format a reference document that can be used to format the document you are rendering ([Formating a Word document article](https://rmarkdown.rstudio.com/articles_docx.html)). We will step through the process to generate and use the reference document today. For more complex documents, I would recommend checking out the following packages:

Other packages that may help you:

1. [Bookdown](https://bookdown.org/)
2. [officedown](https://ardata-fr.github.io/flextable-book/index.html)

# Tables

There are a few packages that can handle tables in word ([Comparison of Packages](https://cran.r-project.org/web/packages/gtsummary/vignettes/rmarkdown.html)) with varying capabilities. The kable package can be used for simple tables while the huxtable package uses the flextable package. Therefore, the flextable package is best suited for formatting a table when rendering a document to word. Here are a few links that are helpful when using the flextable package:

* Flextable Resources:
  + <https://ardata-fr.github.io/flextable-book/>
  + <https://davidgohel.github.io/flextable/reference/index.html>

## Kable Package

# Summarize data of effort by gear and year  
EffortSum<- Effort %>%  
 group\_by(Year,Gear) %>%  
 count() %>%  
 pivot\_wider(names\_from = Gear, values\_from = n) %>%  
 as\_tibble()   
  
## Creates a table using kable  
knitr::kable(EffortSum, format="simple", align = 'lccc',caption = "Table 1. This is a nice table using kable.")

Table 1. This is a nice table using kable.

| Year | 16’ Bottom Trawl (4.9 m) | Boat Electroshocker | Fyke Net |
| --- | --- | --- | --- |
| 2018 | 120 | 60 | 60 |
| 2019 | 123 | 60 | 60 |

## Flextable Package

### Chunk Name must not have special characters or spaces  
library(flextable)  
  
## Set the defaults for flextable  
set\_flextable\_defaults(font.size = 10, padding = 3,theme\_fun = theme\_booktabs)  
## Tell R to use the df printer as data.frame print method for the document   
use\_df\_printer()  
  
### Summarizes data to create the effort summary table  
EffortFlex<- Effort %>%   
 mutate(Year=as.factor(Year)) %>%   
 group\_by(Year,Gear) %>%   
 count() %>%   
 pivot\_wider(names\_from = Gear, values\_from = n) %>%   
 rename(Electrofishing="Boat Electroshocker", Bottom\_Trawl="16' Bottom Trawl (4.9 m)") %>%   
 adorn\_totals(where = "col")   
  
## Converts dataframe to a flextable and format the table  
EffortTable<- flextable(EffortFlex) %>%  
 #style(i=1:2, j=~2 >=120, pr\_t=fp\_text\_default(color="red")) %>%   
 color(~Bottom\_Trawl>=121, j=2,i=, color="red") %>% #Change values in column 2(j) if values in Bottom\_Trawl >121%>%   
 width(width=1.1) %>% #Each column is 1.1 inches wide  
 set\_caption("This is a nice table using the flextable package.", style = "Table Caption") %>%  
 align(align = "center",part = "all") %>%  
 bold(j=ncol(EffortFlex))  
  
## Print flextable  
EffortTable

**Table** : This is a nice table using the flextable package.

| Year | Bottom\_Trawl | Electrofishing | Fyke Net | Total |
| --- | --- | --- | --- | --- |
| 2018 | 120 | 60 | 60 | **240** |
| 2019 | 123 | 60 | 60 | **243** |

# Plots

## ggplot2

Embedding a figure is more straight forward than generating tables. The same package can be used to generate figures whether you are knitting MSWord, PDF, HTML, and etc. I use ggplot2 to generate my maps and figures and the reference can be found at:  
<https://ggplot2.tidyverse.org/reference/ggplot.html>

## ggplot counts

## Summarize data to be total number of individuals by gear and year.  
catchsummary<- Effort %>%   
 right\_join(Catch, by="SiteID") %>%   
 group\_by(Year, Gear) %>%   
 summarise(Total=sum(Number), .groups = "keep")  
  
## Creates and formats the plot   
Catchplot<- ggplot(catchsummary,aes(Gear, Total))+  
 facet\_grid(Year~., scales="free")+ geom\_bar(stat="identity")+theme\_classic()+  
 theme(axis.title.y = element\_text(face="bold", size=14),axis.text.y = element\_text(size=12, colour="black"))+   
 theme(axis.title.x = element\_text(face="bold", size=14),axis.text.x = element\_text(size=12, colour="black"))+  
 theme(strip.background = element\_rect(colour = "White", fill = "white"))+   
 theme(strip.text = element\_text(size=11, face = "bold"))+  
 labs(title = "Total Number of fish by gear across years")+   
 theme(plot.title = element\_text(hjust = 0.4, size=12, face="bold"))  
  
## Print plot  
Catchplot

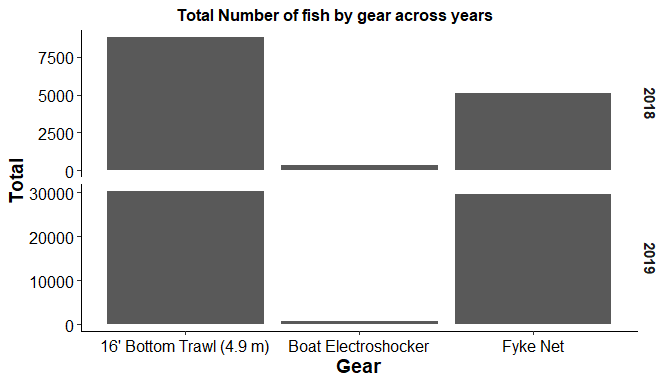


Figure 1. An example of a figure that was created using ggplot.

## ggplot with parameters

## Creates a data frame to summarize catch of a species by gear   
catchsummary2<- Catch %>%   
 #filter(Common\_Name=="Black Crappie") %>% ## I use this before I include parameters to ensure it works correctly  
 filter(Common\_Name==params$SPECIES) %>%   
 right\_join(Effort, by="SiteID") %>%  
 filter(Year==params$YEAR) %>%  
 replace\_na(list(Number=0))  
  
## Creates and formats the plot   
Catchplot2<- ggplot(catchsummary2,aes(Gear, Number))+geom\_boxplot(aes(y=Number),outlier.colour = "red")+theme\_classic()+  
 ylab("Mean No. Individuals per Site")+  
 theme(axis.title.y = element\_text(face="bold", size=14),axis.text.y = element\_text(size=12, colour="black"))+   
 theme(axis.title.x = element\_text(face="bold", size=14),axis.text.x = element\_text(size=12, colour="black"))+  
 theme(strip.background = element\_rect(colour = "White", fill = "white"))+   
 theme(strip.text = element\_text(size=11, face = "bold"))+   
 theme(plot.title = element\_text(hjust = 0.4, size=12, face="bold"))  
  
## Print plot  
Catchplot2

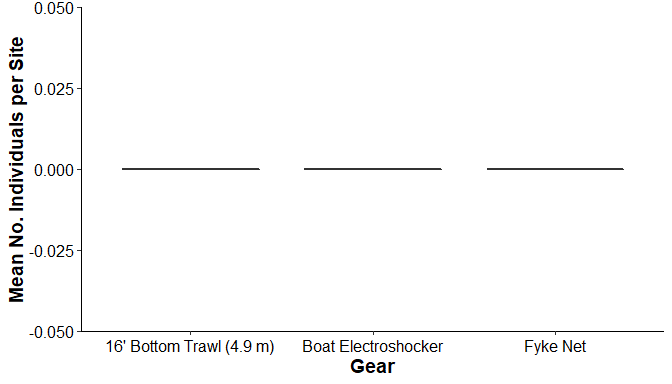


Figure 2. An example of a figure that was created using ggplot with parameters: Species during 2018.