Quarto Report

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# 1. Quarto Report

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U.S. Department of Commerce National Oceanic and Atmospheric Administration National Marine Fisheries Service

NOAA Technical Memorandum NMFS-F/SPO-227 December 2021

# 2. Preface

Phasellus non diam posuere, laoreet velit sed, egestas felis. Etiam eget neque in tellus lacinia tincidunt. Pellentesque scelerisque odio velit, nec fringilla nibh iaculis non. Aenean sit amet nulla ipsum. Cras felis lacus, pulvinar ac nisi et, convallis pulvinar turpis. Morbi non nibh lacus. Morbi vitae lorem massa. Sed ut turpis vel felis posuere commodo lacinia ac mi. Donec finibus lectus sit amet elit finibus, vitae rhoncus ligula tincidunt. Phasellus vitae blandit lacus. Integer sed nisl fermentum, pulvinar mauris in, posuere enim. Proin sit amet semper urna. Vivamus aliquet rutrum diam ac luctus.

## Abstract

Phasellus non diam posuere, laoreet velit sed, egestas felis. Etiam eget neque in tellus lacinia tincidunt. Pellentesque scelerisque odio velit, nec fringilla nibh iaculis non. Aenean sit amet nulla ipsum. Cras felis lacus, pulvinar ac nisi et, convallis pulvinar turpis. Morbi non nibh lacus. Morbi vitae lorem massa. Sed ut turpis vel felis posuere commodo lacinia ac mi. Donec finibus lectus sit amet elit finibus, vitae rhoncus ligula tincidunt. Phasellus vitae blandit lacus. Integer sed nisl fermentum, pulvinar mauris in, posuere enim. Proin sit amet semper urna. Vivamus aliquet rutrum diam ac luctus.

# 3. Tips

plot(pressure)

|  |
| --- |
| Figure 3.1: chapter 1 plot |

## 3.1 General set-up

* Be as modular and simple as you can.
* Don’t make everyone in your team be the markdown wizard. You only need one person to build the framework.
* Use simple child Rmds so that other team members work only on simple Rmd/qmd flat files.
* Don’t put all your tables or figures in one huge file: Table xyz.Rmd/qmd, Table abc.Rmd/qmd. Have your dedicated markdown wizard figure out the automatic numbering.
* Copy reports built by others who are doing something similar to you. TALK within your center or across centers and share work.

## 3.2 Tips

### 3.2.1 Cross-references

This can be really troublesome unless you use an output that already has cross-references as part of the design. For R Markdown,

* {bookdown} outputs for html and PDF
* {officedown} for Word

These output formats give you access to cross-referencing via the \@ref(xxx:yyy) format and if you use bookdown::pdf\_book, this will also work with PDF.

However, Quarto makes cross-references, auto-numbering and cross-referencing of tables and figures super easy. [Quarto cross-ref page](https://quarto.org/docs/authoring/cross-references.html).

For example, we can make a figure with the chunk label fig-plot like so.

```{r}  
#| label: fig-plot  
#| fig-cap: "Plot"  
  
plot(cars)  
```

The later in the text we use @fig-plot to get [Figure 3.2](#fig-plot).

|  |
| --- |
| Figure 3.2: This is a plot of some data |

### 3.2.2 Chunk labels

* When using R Markdown (or Quarto), it is best not to use chunk labels in the your Rmd/qmd children. It’s too easy to get duplicate labels accidentally.

### 3.2.3 File paths

* if you need to reference a file in a folder, let R create the path so that it is compatible across systems:

file.path('figures', 'figure1.Rmd')

* I typically use the {here} package so that my code doesn’t break if I happen to issue a change workspace directory command.

here::here('images', 'logo.png')

### 3.2.4 Tables in for loops

Making tables within for loops is tricky and it is different if you are outputting to Word versus html and also depends on what package that you use. See my Rmd/qmd files in the tables folder for examples of how to set it up, but also be prepared for things breaking in the future as package writers change things. This feature is really fluid. Web searches on stackoverflow are key for solving these problems.

## 3.3 Working with Word

For many of us, Word is part of our team’s workflow. Here are some tips if that is the case for you:

* Check out the [officeverse](https://ardata-fr.github.io/officeverse/index.html): [officedown](https://CRAN.R-project.org/package=officedown) and [flextable](https://CRAN.R-project.org/package=flextable) R packages.
* Quarto has greatly [improved Word](https://quarto.org/docs/output-formats/ms-word.html) integration so many of the problems we faced with Word output may soon be solved.
* Don’t build the whole report in one file. Work on individual text sections and then have RStudio (via pandoc/knitr) assemble the report (text, figures, tables) from the individual parts.
* How to deal with the team needing to review the assembled document (text, figures, tables):
  + Try to modularize. So maybe make individual chapters and have review happen at that level. Then you incorporate the changes into the plain text manually.
  + Use templates to make your Word doc look the way you want. The default Word template is bare bones. See my example and read about using Word templates with Quartro [here](https://quarto.org/docs/output-formats/ms-word-templates.html) and R Markdown [here](https://bookdown.org/yihui/rmarkdown-cookbook/word-template.html) .

### 3.3.1 Making tables look nice in Word

The example in Table\_Counts.Rmd and Table\_Counts\_flex.Rmd shows you tricks to make nice Word tables.

* how to include a page break in your Word doc between tables.
* using format="pandoc" for the table
* using results='asis' and print() so you can use for loops.
* centering your tables is next to impossible with kable(). Use the {[flextable](https://ardata-fr.github.io/flextable-book/)} package if you need that.

### 3.3.2 New pages

This is how to get a new page in Word. Make sure you are in print view on the word doc, otherwise you won’t see any of the pages.

```{=openxml}  
<w:p><w:r><w:br w:type="page"/></w:r></w:p>  
```

## 3.4 Output templates with Quarto

Quarto is working on templates to make output to different formats easy. Here is an example of journal templates [quarto-journals](https://github.com/quarto-journals/).

# 4. Tables and figures

Lorem ipsum dolor sit amet (Knuth 1984) consectetur adipiscing elit. Nam commodo sit amet nibh non molestie. Maecenas hendrerit nisl velit, a condimentum enim lobortis sit amet. Ut vitae nunc sed mauris condimentum fermentum. Mauris pellentesque nec neque id elementum. Suspendisse a quam aliquam, facilisis urna venenatis, malesuada diam. Pellentesque in fringilla orci. Knuth (1984) cras sed purus urna. Ut pharetra enim ut ligula egestas mattis.

Phasellus non diam posuere, laoreet velit sed, egestas felis. Etiam eget neque in tellus lacinia tincidunt. Pellentesque scelerisque odio velit, nec fringilla nibh iaculis non. Aenean sit amet nulla ipsum. Cras felis lacus, pulvinar ac nisi et, convallis pulvinar turpis. Morbi non nibh lacus. Morbi vitae lorem massa. Sed ut turpis vel felis posuere commodo lacinia ac mi. Donec finibus lectus sit amet elit finibus, vitae rhoncus ligula tincidunt. Phasellus vitae blandit lacus. Integer sed nisl fermentum, pulvinar mauris in, posuere enim. Proin sit amet semper urna. Vivamus aliquet rutrum diam ac luctus.

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Attaching package: 'flextable'

The following object is masked from 'package:xtable':  
  
 align

Attaching package: 'dplyr'

The following objects are masked from 'package:stats':  
  
 filter, lag

The following objects are masked from 'package:base':  
  
 intersect, setdiff, setequal, union

if( require("xtable") ){  
 data(tli)  
 fm3 <- glm(disadvg ~ ethnicty\*grade, data = tli, family = binomial)  
 ft <- xtable\_to\_flextable(xtable(anova(fm3)), hline.after = c(1))  
 ft %>%  
 font(fontname="Times New Roman", part="all") %>%  
 fontsize(size=12)  
}

|  | **Df** | **Deviance** | **Resid. Df** | **Resid. Dev** |
| --- | --- | --- | --- | --- |
| **NULL** |  |  | 99 | 129.5 |
| **ethnicty** | 3 | 47.2 | 96 | 82.2 |
| **grade** | 1 | 1.7 | 95 | 80.5 |
| **ethnicty:grade** | 3 | 7.2 | 92 | 73.3 |

## 4.1 Some figures

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|  |
| --- |
| Figure 1. Plot of the data |

# 5. Table in for loop

This is an example of a Tables qmd with separate qmds for the individual tables. The table code is in the tables folder. Table1 is a simple table. Table\_Counts is a table function that is then called to make tables with the same format but different input data. For this example, I am only going to use kable() for all output types. See Tables.Rmd and Table\_Counts\_flex.Rmd for examples of using the **kableExtra**, **xtable** and **flextable** packages.

The **flextable** package will do a bit nicer tables than **kable**.

| Table 2. Coweeman River. Yearly counts of Spawners and Fracwild for 2000 to 2014 | | |
| --- | --- | --- |
| Year | Spawners | Fracwild |
| 2000 | 290 | 1.00 |
| 2001 | 802 | 0.73 |
| 2002 | 877 | 0.97 |
| 2003 | 1,106 | 0.89 |
| 2004 | 1,503 | 0.91 |
| 2005 | 853 | 0.60 |
| 2006 | 566 | 1.00 |
| 2007 | 251 | 1.00 |
| 2008 | 424 | 0.52 |
| 2009 | 783 | 0.63 |
| 2010 | 639 | 0.70 |
| 2011 | 566 | 0.88 |
| 2012 | 413 | 0.86 |
| 2013 | 2,035 | 0.69 |
| 2014 | 890 | 0.96 |
| \*\* data file date: Fri Jul 29 07:21:42 2022 -0400 | | |
| \* These spawner counts are from river redd surveys. | | |

| Table 3. Elochoman River. Yearly counts of Spawners and Fracwild for 2000 to 2014 | | |
| --- | --- | --- |
| Year | Spawners | Fracwild |
| 2000 | 146 | 0.62 |
| 2001 | 2,806 | 0.82 |
| 2002 | 7,893 | 0.00 |
| 2003 | 7,348 | 0.65 |
| 2004 | 6,880 | 0.01 |
| 2005 | 2,699 | 0.05 |
| 2006 | 324 | 1.00 |
| 2007 | 168 | 1.00 |
| 2008 | 1,320 | 0.10 |
| 2009 | 1,467 | 0.18 |
| 2010 | 1,318 | 0.12 |
| 2011 | 1,127 | 0.05 |
| 2012 | 172 | 0.26 |
| 2013 | 637 | 0.29 |
| 2014 | 869 | 0.22 |
| \*\* data file date: Fri Jul 29 07:21:42 2022 -0400 | | |
| \* These spawner counts are from river redd surveys. | | |

Now, let’s add a caption with set\_caption:

**Table** : airquality dataset

| Ozone | Solar.R | Wind | Temp | Month | Day |
| --- | --- | --- | --- | --- | --- |
| 41 | 190 | 7.4 | 67 | 5 | 1 |
| 36 | 118 | 8.0 | 72 | 5 | 2 |
| 12 | 149 | 12.6 | 74 | 5 | 3 |
| 18 | 313 | 11.5 | 62 | 5 | 4 |
|  |  | 14.3 | 56 | 5 | 5 |
| 28 |  | 14.9 | 66 | 5 | 6 |

Or use knitr chunk options:

**Table** : airquality dataset

| Ozone | Solar.R | Wind | Temp | Month | Day |
| --- | --- | --- | --- | --- | --- |
| 41 | 190 | 7.4 | 67 | 5 | 1 |
| 36 | 118 | 8.0 | 72 | 5 | 2 |
| 12 | 149 | 12.6 | 74 | 5 | 3 |
| 18 | 313 | 11.5 | 62 | 5 | 4 |
|  |  | 14.3 | 56 | 5 | 5 |
| 28 |  | 14.9 | 66 | 5 | 6 |

## 5.1 Cross-references

If your output is officedown::rdocx\_document or bookdown::, then you will have access to auto-referencing via \@ref(xxx:yyy) format.

* Example, this is a reference to Table @ref(tab:tab1). This is a reference to Table @ref(tab:tab2).

You can create links but you won’t see the table number [the table](#tab:tab1). This works whether you created the table caption with flextable or knitr.

# 6. Kable vs Flex

Table 2. Coweeman River. Yearly counts of Spawners and Fracwild for 2000 to 2014

| Year | Spawners | Fracwild |
| --- | --- | --- |
| 2000 | 290 | 1 |
| 2001 | 802 | 1 |
| 2002 | 877 | 1 |
| 2003 | 1106 | 1 |
| 2004 | 1503 | 1 |
| 2005 | 853 | 1 |
| 2006 | 566 | 1 |
| 2007 | 251 | 1 |
| 2008 | 424 | 1 |
| 2009 | 783 | 1 |
| 2010 | 639 | 1 |
| 2011 | 566 | 1 |
| 2012 | 413 | 1 |
| 2013 | 2035 | 1 |
| 2014 | 890 | 1 |

Table 3. Elochoman River. Yearly counts of Spawners and Fracwild for 2000 to 2014

| Year | Spawners | Fracwild |
| --- | --- | --- |
| 2000 | 146 | 1 |
| 2001 | 2806 | 1 |
| 2002 | 7893 | 0 |
| 2003 | 7348 | 1 |
| 2004 | 6880 | 0 |
| 2005 | 2699 | 0 |
| 2006 | 324 | 1 |
| 2007 | 168 | 1 |
| 2008 | 1320 | 0 |
| 2009 | 1467 | 0 |
| 2010 | 1318 | 0 |
| 2011 | 1127 | 0 |
| 2012 | 172 | 0 |
| 2013 | 637 | 0 |
| 2014 | 869 | 0 |

## 6.1 flextable

The **flextable** package will do a bit nicer tables than **kable**.

| Table 2. Coweeman River. Yearly counts of Spawners and Fracwild for 2000 to 2014 | | |
| --- | --- | --- |
| Year | Spawners | Fracwild |
| 2000 | 290 | 1.00 |
| 2001 | 802 | 0.73 |
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| 2003 | 1,106 | 0.89 |
| 2004 | 1,503 | 0.91 |
| 2005 | 853 | 0.60 |
| 2006 | 566 | 1.00 |
| 2007 | 251 | 1.00 |
| 2008 | 424 | 0.52 |
| 2009 | 783 | 0.63 |
| 2010 | 639 | 0.70 |
| 2011 | 566 | 0.88 |
| 2012 | 413 | 0.86 |
| 2013 | 2,035 | 0.69 |
| 2014 | 890 | 0.96 |
| \*\* data file date: Fri Jul 29 07:21:42 2022 -0400 | | |
| \* These spawner counts are from river redd surveys. | | |

| Table 3. Elochoman River. Yearly counts of Spawners and Fracwild for 2000 to 2014 | | |
| --- | --- | --- |
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| 2013 | 637 | 0.29 |
| 2014 | 869 | 0.22 |
| \*\* data file date: Fri Jul 29 07:21:42 2022 -0400 | | |
| \* These spawner counts are from river redd surveys. | | |

# 7. Conclusion

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Nam commodo sit amet nibh non molestie. Maecenas hendrerit nisl velit, a condimentum enim lobortis sit amet. Ut vitae nunc sed mauris condimentum fermentum. Mauris pellentesque nec neque id elementum. Suspendisse a quam aliquam, facilisis urna venenatis, malesuada diam. Pellentesque in fringilla orci. Cras sed purus urna. Ut pharetra enim ut ligula egestas mattis.

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Quisque in nibh sit amet nunc mollis porttitor quis et mauris. Sed non condimentum leo, ac condimentum est. Duis ac venenatis nulla, et aliquet elit. Suspendisse potenti. Duis mollis dui at semper luctus. Maecenas euismod finibus condimentum. Fusce vitae gravida massa. Mauris metus est, pretium non semper vel, dictum vel augue.

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# References

Knuth, Donald E. 1984. “Literate Programming.” *Comput. J.* 27 (2): 97–111. <https://doi.org/10.1093/comjnl/27.2.97>.