



NOAA Technical Memorandum NMFS-XXX-##

Methods_Cameras

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U.S. DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric
Administration
National Marine Fisheries Service
Northwest Fisheries Science Center



**NOAA
FISHERIES**

Methods_Cameras

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Executive Summary

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1 Set-up

This is a template for a simple Quarto book output to html, PDF or docx format. It includes a GitHub Action that will build the website automatically when you make changes to the files. The NOAA palette and fonts has been added to `theme.scss`. The webpage will be on the `gh-pages` branch. Serving the website files from this branch is a common way to keep all the website files from cluttering your main branch.

The GitHub Action installs R so you can have R code in your `qmd` or `Rmd` files. Note, you do not need to make changes to your `Rmd` files unless you need Quarto features like cross-references.

- Click the green “use template” button to make a repository with this content. Make sure to make your repo public (since GitHub Pages doesn’t work on private repos unless you have a paid account) and check box to include all the branches (so that you get the `gh-pages` branch).
- Turn on GitHub Pages under Settings > Pages . You will set pages to be made from the `gh-pages` branch and root directory.
- Turn on GitHub Actions under Settings > Actions > General
- Edit the repo description and Readme to add a link to the webpage. When you edit the description, you will see the link url in the url box or you can click on the Actions tab or the Settings > Pages page to find the url.

2 Customize

Edit the qmd or md files in the `content` folder. qmd files can include code (R, Python, Julia) and lots of Quarto markdown bells and whistles (like call-outs, cross-references, auto-citations and much more).

Each page should start with

```
---  
title: your title  
---
```

and the first header will be the 2nd level, so `##`. Note, there are situations where you leave off

```
---  
title: your title  
---
```

and start the qmd file with a level header `#`, but if using the default title yaml (in the `---` fence) is a good habit since it makes it easy for Quarto convert your qmd file to other formats (like into a presentation).

2.1 Add your pages the project

- Add the files to `_quarto.yml`

2 Customize

2.1.1 Cameras

One full view (standard) digital video camera and one narrow view (zoomed) digital video camera mounted side by side were operated together on most counting passes. The “standard” camera is generally at maximum wide angle to keep the entire group of belugas in view. This wide angle video is used to count the total number of whales surfacing during the video pass. The second “zoomed” camera is kept at maximum optical zoom (10×) and its video was used to determine correction factors for missed whales (Hobbs et al. 2015). Once recording is started, the zoom setting for each camera was set and left unchanged throughout a counting pass so that magnification of the video was consistent.

In 2021, a “standard” camera (Sony HXR-NX5U HD with 1920×1080 pixel resolution) was paired with a “zoomed” camera (Panasonic HC-X1 with 3840×2160 (4K) pixel resolution but set to the same resolution as the Sony camera). This was the same camera set up used during the 2018 abundance survey, with the Panasonic replacing one of the paired Sony cameras used during the 2016 survey. Plans at the time had been to test the 4K resolution against the older cameras but this did not occur in 2018 or 2021 as other experiments such as distance sampling became a priority.

In 2022, smaller 4K resolution video cameras were introduced to improve the quality of video data collection. The Sony FDR-AX700 video handycams (3840×2160 pixel resolution) replaced the larger video cameras allowing for easier handling and positioning for capturing video. A new aluminum based camera mounting system was created with tripod mounts for the two video cameras (Fig 5a). The mounting system had adjustable brackets which allowed for side by side (Fig. 5b) or stacking (Fig. 5c) of cameras so alignment could be customized based on camera size. A series of video passes were collected to compare the 1080p resolution of the Sony HXR-NX5U used in 2021 to 4K resolution of the new Sony FDR-AX700 cameras used in 2022 (Fig. 5c). Preliminary review of comparison video shows the 4K resolution increases edge definition and clarity of whale images.

After the field season, each video counting pass was reviewed for quality and rated as excellent, good, fair, poor, or unacceptable. Video passes rated excellent and good were analyzed using a computer-aided system called “Beluga Dots” (introduced in 2004). Using Beluga Dots (Fig. 6), analysts counted and cataloged the individual whale images found in the survey video, tracked the images across the computer screen, and measured image size and color. Data were stored in a text file and exported for use in calculating the annual abundance estimate. Images from the zoomed camera were examined for whale surfacings that could not be seen in the standard video, either due to a partial surfacing, small size, or cryptic body coloration within the respective groups. The annual abundance estimate is based on estimates of the size

2 Customize

of detected groups, using Bayesian methods to account for: 1) availability bias due to diving behavior; 2) proximity bias due to whales concealed by other whales in the video data; 3) perception bias due to whales not detected because of small image size in the standard video; and 4) individual observer bias in visual observer data (see Boyd et al. (2019) for a complete description of methods).

3 Customization

Quarto allow many bells and whistles to make nice output. Read the documentation [here](#) Quarto documentation.

3.1 Examples

Looking at other people's Quarto code is a great way to figure out how to do stuff. Most will have a link to a GitHub repo where you can see the raw code. Look for a link to edit page or see source code. This will usually be on the right. Or look for the GitHub icon somewhere.

- [Quarto gallery](#)
- [nmfs-openscapes](#)
- [Faye lab manual](#)
- [quarto-titlepages](#) Note the link to edit is broken. Go to repo and look in `documentation` directory.

4 Rendering

The repo includes a GitHub Action that will render (build) the website automatically when you make changes to the files. It will be pushed to the `gh-pages` branch.

But when you are developing your content, you will want to render it locally.

Have you updated RStudio since about August 2022? No? Then update to a newer version of RStudio. In general, you want to keep RStudio updated and it is required to have a recent version to use Quarto.

4.1 Step 2. Clone and create RStudio project

First, clone the repo onto your local computer. How? You can click `File > New Project` and then select “Version Control”. Paste in the url of the repository. That will clone the repo on to your local computer. When you make changes, you will need to push those up.

4.2 Step 3. Render within RStudio

RStudio will recognize that this is a Quarto project by the presence of the `_quarto.yml` file and will see the “Build” tab. Click the “Render website” button to render to the `_site` folder.

Previewing: You can either click `index.html` in the `_site` folder and specify “preview in browser” or set up RStudio to preview to the viewer panel. To do the latter, go to `Tools > Global Options > R Markdown`. Then select “Show output preview in: Viewer panel”.

5 R Markdown

You can include R Markdown files in your project.

This is an R Markdown document. Markdown is a simple formatting syntax for authoring HTML, PDF, and MS Word documents. For more details on using R Markdown see <http://rmarkdown.rstudio.com>.

When you click the **Knit** button a document will be generated that includes both content as well as the output of any embedded R code chunks within the document. You can embed an R code chunk like this:

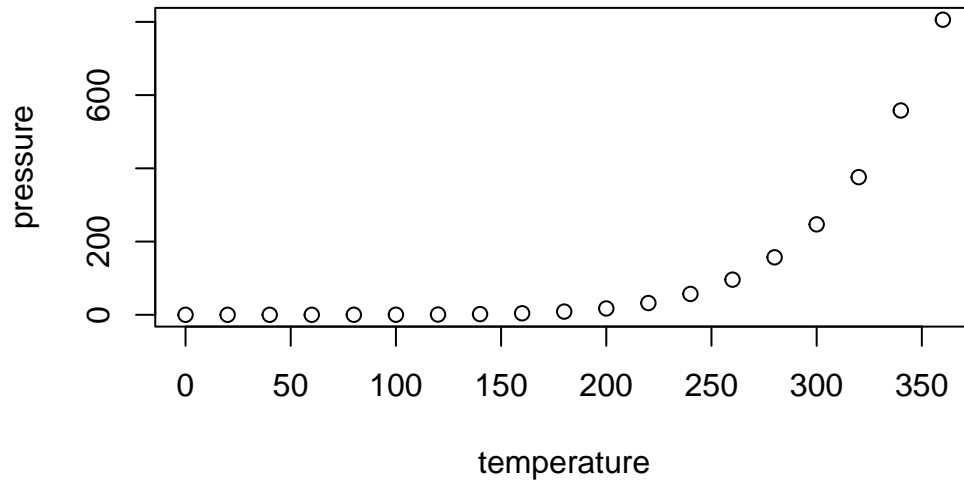
```
summary(cars)
```

speed		dist	
Min.	: 4.0	Min.	: 2.00
1st Qu.	:12.0	1st Qu.	: 26.00
Median	:15.0	Median	: 36.00
Mean	:15.4	Mean	: 42.98
3rd Qu.	:19.0	3rd Qu.	: 56.00
Max.	:25.0	Max.	:120.00

5.1 Including Plots

You can also embed plots, for example:

5 R Markdown



Note that the `echo = FALSE` parameter was added to the code chunk to prevent printing of the R code that generated the plot.

6 Rendering with Code

You can have code (R, Python or Julia) in your qmd file. You will need to have these installed on your local computer, but presumably you do already if you are adding code to your qmd files.

```
x <- c(5, 15, 25, 35, 45, 55)
y <- c(5, 20, 14, 32, 22, 38)
lm(x ~ y)
```

Call:

```
lm(formula = x ~ y)
```

Coefficients:

(Intercept)	y
1.056	1.326

You will need to change the GitHub Action in `.github/workflows` to install these and any needed packages in order for GitHub to be able to render your webpage. The GitHub Action install R since I used that in `code.qmd`. If you use Python or Julia instead, then you will need to update the GitHub Action to install those.

If getting the GitHub Action to work is too much hassle (and that definitely happens), you can always render locally and publish to the `gh-pages` branch. If you do this, make sure to delete or rename the GitHub Action to something like

```
render-and-publish.old.yml
```

so GitHub does not keep trying to run it. Nothing bad will happen if you don't do this, but if you are not using the action (because it keeps failing), then you don't need GitHub to run it.

6.1 Render locally and publish to gh-pages branch

To render locally and push up to the `gh-pages` branch, open a terminal window and then `cd` to the directory with the Quarto project. Type this in the terminal:

```
quarto render gh-pages
```


7 References

Quarto has powerful references functionality. You can easily insert citations from Zotero libraries that you maintain in the cloud (on Zotero). This allows the whole team to update the library and you can sync up to that library. Read about this on the Quarto documentation on citations. Google youtube videos on this also to see it in action.

Add a `.bib` file in to your project or add a linked Zotero library via RStudio in Visual mode with Tools > Project Options... > R Markdown > select custom libraries from the Zotero dropdown.

Then you can type @ and you will see a dropdown of the references in your libraries. You can then select the ones to add. If you don't see the one you need, you can paste in the DOI and it will be added to your references file (with all the info). The references will be added to your references section of your book automatically.

See the `references.qmd` file for how to include the references.

- @ansley1981 will produce Ansley and Davis (1981)
- [@ansley1981] will produce (Ansley and Davis 1981).

References

Ansley, H. L. H., and C. D. Davis. 1981. "Migration and Standing Stock of Fishes Associated with Artificial and Natural Reefs on Georgia's Outer Continental Shelf." Brunswick, Georgia, USA.