Instructions for generating a cruise report from the winter survey

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Installation of R, R Studio, Rtools and latex

If these tools are not installed on your laptop, take the following steps:

- Install R from https://cran.uib.no/
- Install R Studio from https://rstudio.com/products/rstudio/download/ (R Studio Desktop, free version)
- Download Rtools from https://cran.r-project.org/bin/windows/Rtools/ and install (you may need to run the installer as administrator)
- Open R Studio (as administrator if you needed this to install Rtools)
- Install latex (TinyTex) by running the following commands in the Console window (bottom left window) in RStudio:

```r
install.packages("tinytex")
tinytex::install_tinytex()
```

- Restart R Studio (as administrator)
- Choose File -> New File -> R Markdown. . . Choose Pdf format and click OK.
- Save the file (anywhere)
- Click the knit button at the top of the document.
- If a window appears prompting you to install packages, click yes. When the installations are complete you should be able to knit the document to pdf and can proceed to the steps below.
- If you successfully knitted the test document but get an error about missing latex installation when knitting the report file, try running R Studio as administrator.

Create a project and folder structure

1. Create a new R Studio project.

2. Download the cruise report script *Report_Winter_Survey.Rmd* from https://github.com/jofall/Cruise notebook and place in project directory (or fork/download the entire repository).

3. The script requires a specific folder structure for storing the cruise data. Create these folders in the project directory:

   - Data
     - Acoustic
       * Integrated
       * Channels
     - Biotic
     - CTD
     - Track
     - Definitions
     - GeoData

For acoustic, biotic and track data, it is also possible to replace the folder structure with paths directly to the location of data on the server on board. This way, the files in the script with be updated automatically when you knit the file. However, CTD data cannot be read directly from the server location with this version of the script (as there are several different types of .cnv-files and the current code looks for files with this extension).

4. Download the HI logo from https://hinnsiden.no/tema/profiltorg/LOGO/HI%20logo%20farger%20eng elsk.jpg and place in project directory (optional, but see information below on how to avoid an error if you do not include the logo).

Gather data

Collect the following cruise data from the server on board/Cruisenotebook github:

1. Acoustic data: *ListUserFile03.txt* and *ListUserFile16.txt*. If these reports have not been created, export them from LSSS.

   - Example path to acoustic reports on Johan Hjort: //nas1-jhjort/CRUISE_DATA_*YEAR*/ *cruise_name*/ACOUSTIC/LSSS/REPORTS/
   - Place *ListUserFile03.txt* in the "Acoustic/Integrated" folder and *ListUserFile16.txt* in the "Acoustic/Channels" folder.

2. Trawl data: The *.xml* file exported from Sea2Data.

   - Example path from Johan Hjort: //nas1-jhjort/CRUISE_DATA_*YEAR*/*cruise_name*/ BIOLOGY/CATCH_MEASUREMENTS/BIOTIC/
   - Place in "Biotic" folder.

3. CTD data: *ctdsort.cnv*-files (one for each CTD cast).

   - Example path from Johan Hjort: //nas1-jhjort/CRUISE_DATA_*YEAR*/*cruise_name*/ PHYSICS/CTD/CTD_DATA/
   - Place in "CTD" folder.

4. Definitions: This is a file used for reading the biotic xlm-data. Download *bioticv3* from https: //github.com/jofall/Cruisenotebook and place in folder "Definitions".

5. Map data: depth contours for plotting. Download the file *ETOPO1_nm4.csv* from the github repository and place in folder "GeoData".

6. Cruise track data: .csv-files (one for each day).

   - Example path from Johan Hjort: //nas1-jhjort/CRUISE_DATA_*YEAR*/*cruise_name*/ CRUISE_LOG/TRACK/
   - Place in "Track" folder.

NB! It is important not to place other files in these folders, as the code is based on loading files with specific file extensions.

Change or check the following in the script to adapt the report to specific survey areas and species in the catch

Line numbers refer to the file *Report_Winter_Survey.Rmd*

1. Remove line 3 if you do not wish to have the HI logo.

2. Change title and author.

3. Check the r packages specified in the second r code chunk (lines 23-24), and install any packages you do not have on your computer.

4. Lines 40-42: specify the extent of your survey area and the depth contours you would like to show in map plots.

Trawl data

5. Load packages by running lines 23-25 (without knitting the whole document!), then run lines 48-72. Run unique(dataset$`Station type`) and check that the gear definitions on lines 75-79 correspond to those used in your cruise. If not, change the definitions.

6. Check if you are using any other trawls than those specified at lines 492-493, if so add them/modify. Change also the gears at line 506-507 if necessary.

7. Lines 605-721 contain code for plotting catches of different species on a map, by gear type. For each species, two sets of plots can be produced - one showing catch rates in biomass/nmi and one showing numbers/nmi. Select which species you want to plot by changing the "species <-" argument at line 615. Select whether you want to plot numbers, biomass or both at lines 626-627. The figure size (same for all figures) can be adjusted using the "fig.width" and "fig.height" arguments at line 613.

8. Lines 738-739: specify the species that you wish to plot length distributions, length-weight relationships, and length-age relationships for. Here they are divided into larger (demersal) and smaller (pelagic) species. Note that age data will not be available early in the survey, and will later only be available for species whose otoliths are read on board.

9. Line 833: This inline code summarises the total distance of scrutinized acoustic transects, accounting for the possibility of a reset in the log values, i.e., that the log reaches 10000 and then starts over from 1. No change necessary.

10. Line 835: In this section it is possible to add screenshots from LSSS (or other images) in case you find particularly interesting or unusual echograms. The screenshot must be placed in the project directory, and the filename inserted within the brackets on line 837 Remove the "<" sign at the beginning of each paragraph. The figure width can be adjusted within the curly brackets. Remove line 835-839 or leave the code unchanged in case you have no screen shots to add.

Acoustic data

11. Line 847: The maximum bubble size for acoustic plots can be adjusted here.

12. Line 850: Change year manually in case you are using this script to plot data from a past year, or use code on line 1039.

13. Line 851: This script selects data from the 38 kHz frequency, which is what is normally exported from LSSS. Change here if you are looking at other frequencies.

14. Line 864: If you want other names for the acoustic categories than the Norwegian output from LSSS, specify labels here. Make sure that the names are specified in the same order as the acoustic categories in the original data. "Comment out" or delete lines 864-868 & 1004-1006 if you don't want to change the names.

15. Line 873: Check name of survey and vessel.

16. Line 895/915: Specify names of pelagic/demersal acoustic categories that you want to plot on a map.

CTD

17. Line 1157: Choose the maximum depth for plots of density and irradiance.

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