Reporting acoustic surveys: R code and Rmarkdown

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Housekeeping – Did you do your homework?

- Go to the Github:

https://github.com/TESA-workshops/Small-Pelagics-Workshop-2023/

Scroll to Rmarkdown acoustic Survey Report:

Download the folder.

Look at the README for R package dependencies.

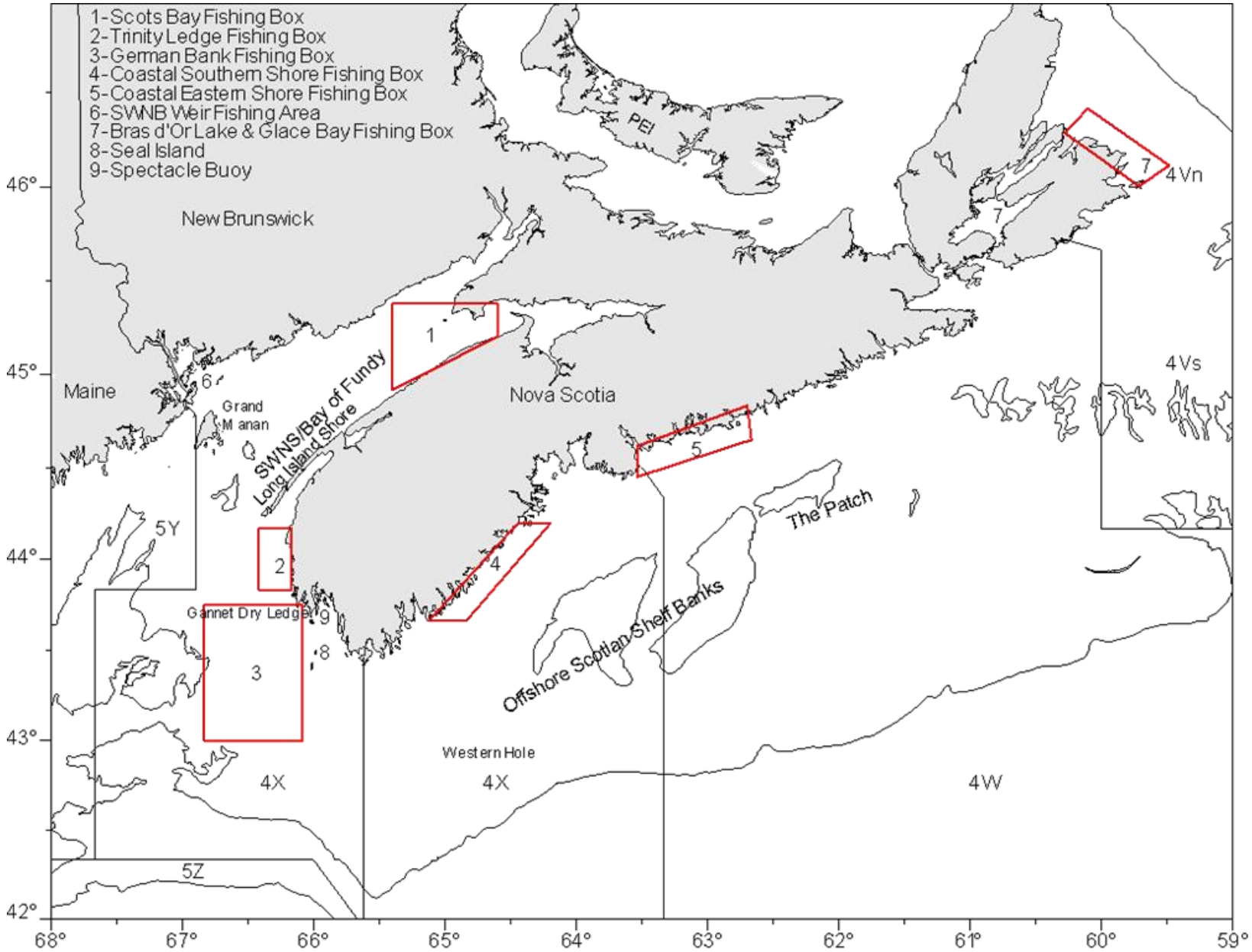


Figure A1. Place names and fishing locations for Southwest Nova Scotia/Bay of Fundy, Coastal NS (South Shore, Eastern Shore, Cape Breton), Offshore Scotian Shelf, and SWNB weirs. The vertical line between the two 4X labels indicates the outer boundary of the Southwest Nova Scotia/Bay of Fundy (SWNS/BoF) stock component.

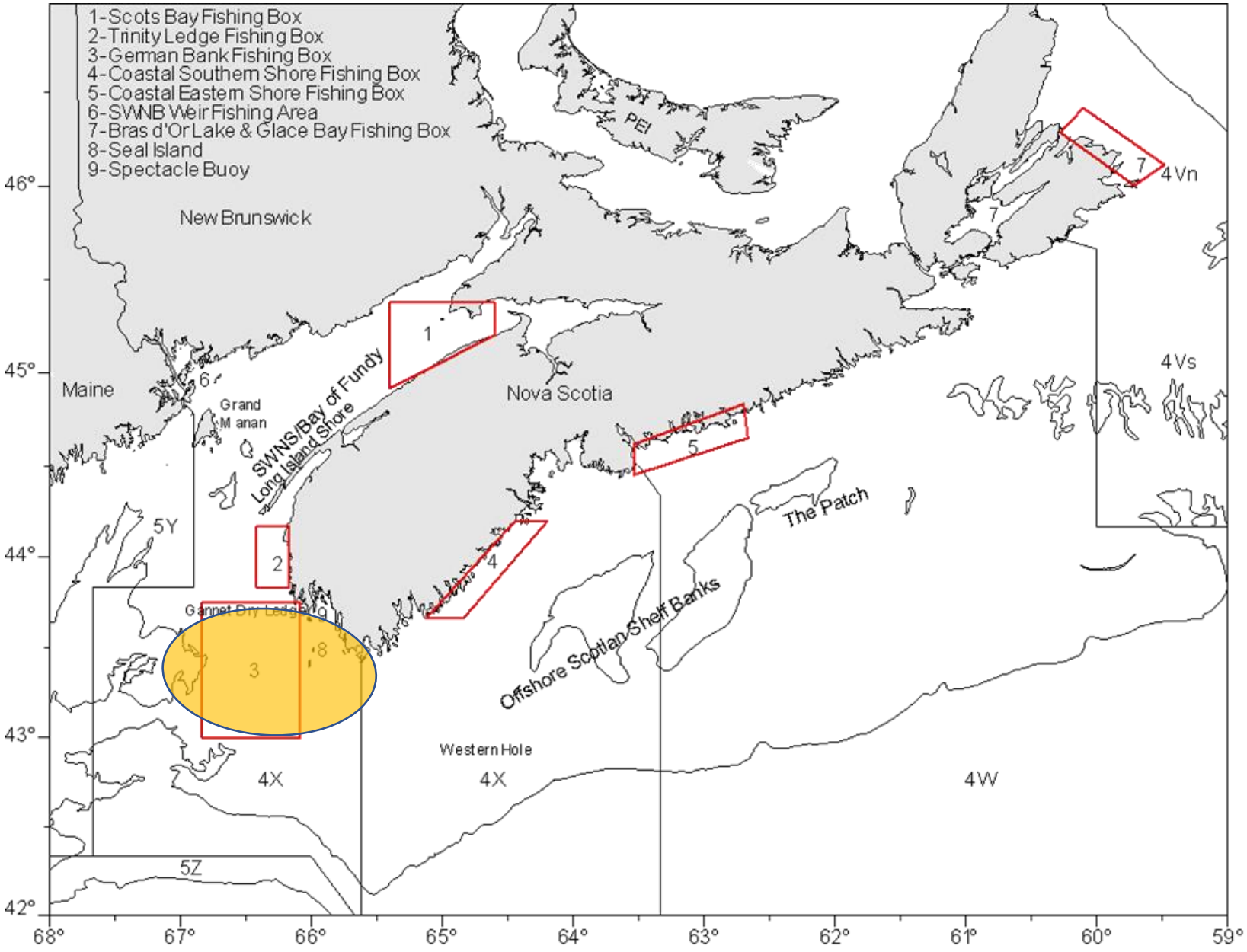
Acoustic Summary Report 2022

- Go to report in folders – scroll through full report.

- Show NAS and Acoustic Index review folder.

Car Salesmen *slaps roof of NAS* “This bad boy can fit so many acoustic files.”

- Today will be Making a report for German Bank 2020.



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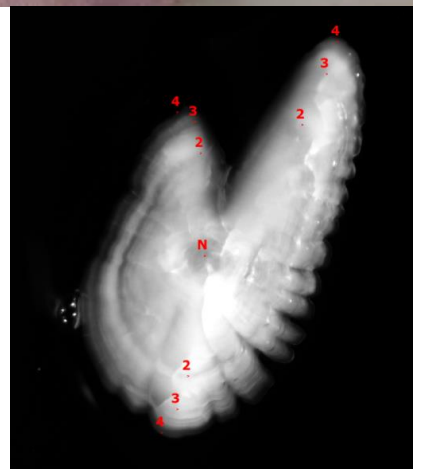
Assume we are happy with Survey design…

Setup a sampling database

- Maritime Region relies on a the Small Pelagics Database setup (Oracle) to input industry-based samples.
- We perform the following:
  - A) Length-Frequency sheets from industry/port sampler
  - B) Frozen-Samples
    - i) Thaw
    - ii) Weigh (wet)
    - iii) Measure Length (apply 2% correction – Hunt et al. 1986)
    - iv) Gonads (Stage and weight)
    - v) Stomach Content (fullness, wet weight)
    - vi) Otoliths (Age)



1) Calculate Target Strength

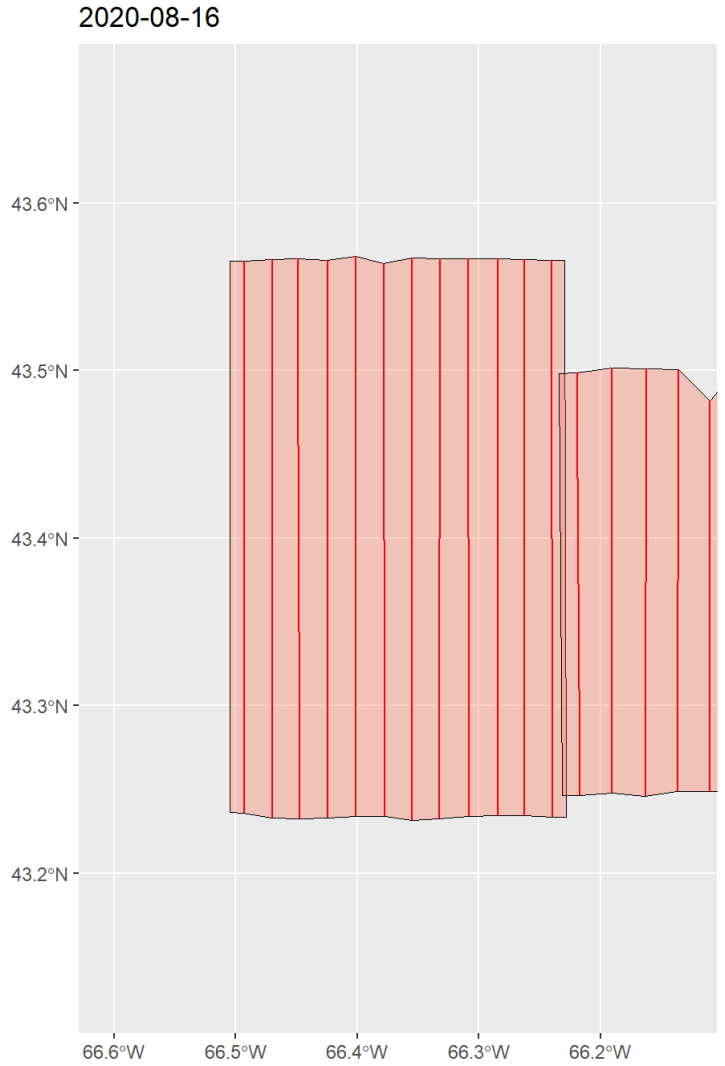
- For MAR region Herring TS, we rely on the Foote, 1987.

$$TS = 20 \log L - 71.9 - 10 \log W \text{ in dB kg}^{-1} \text{ @ 38 kHz}$$

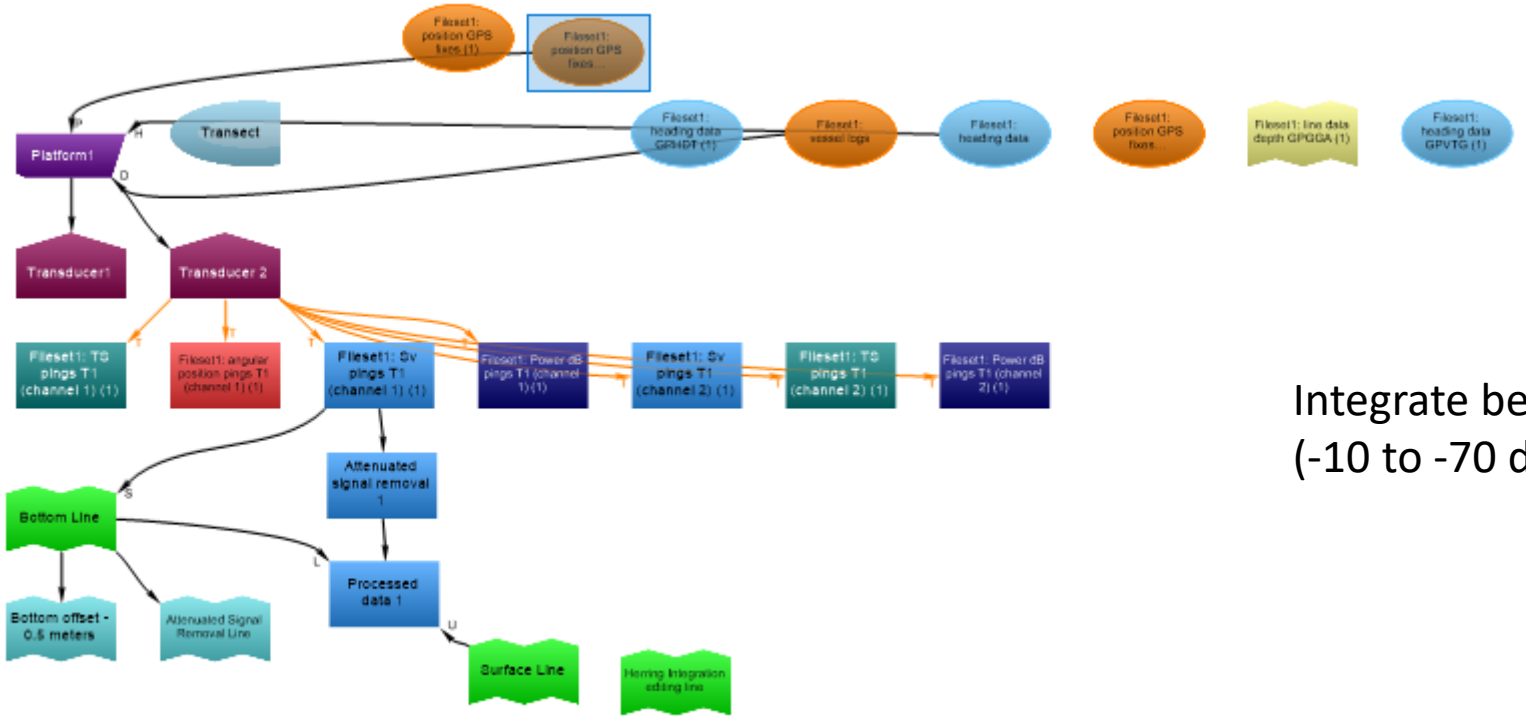
TS - Target Strength distribution
L – Length distribution
W- Weight distribution.

$$TS_f = 20 \log L - 10 \log W + (-0.434 \ln(f) + \log f) - 71.9$$

2) Calibrate Vessels & Collect acoustic Data



3) Acoustic Data Editing and Integration.



Integrate between
(-10 to -70 dB re @1m^2/m^3)

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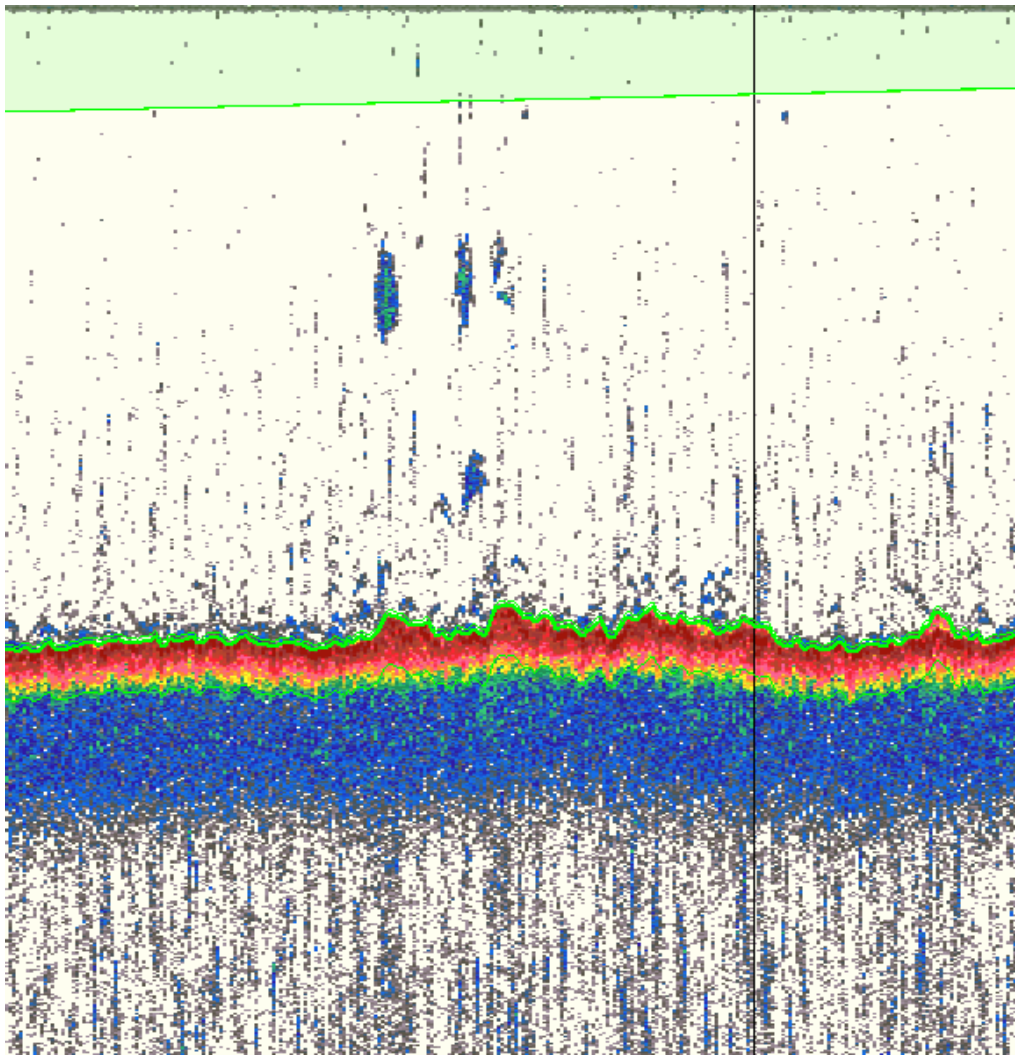

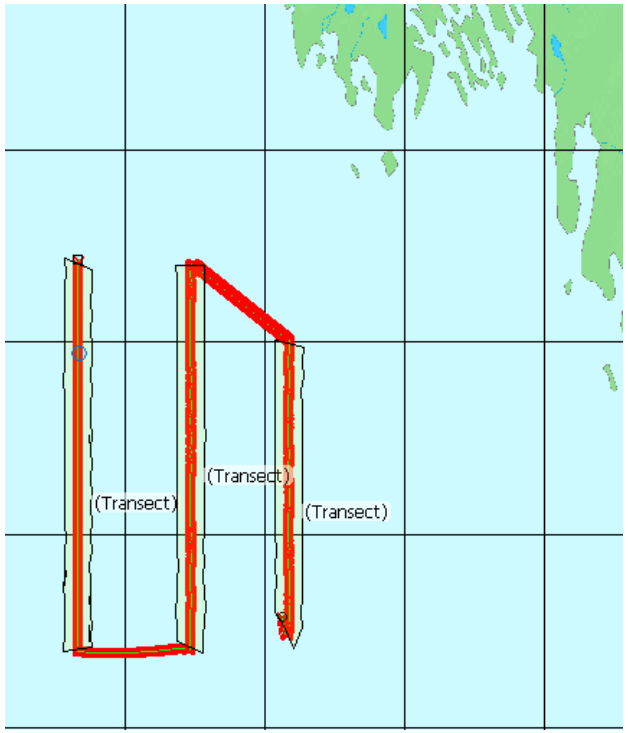

echoview
SOUND KNOWLEDGE

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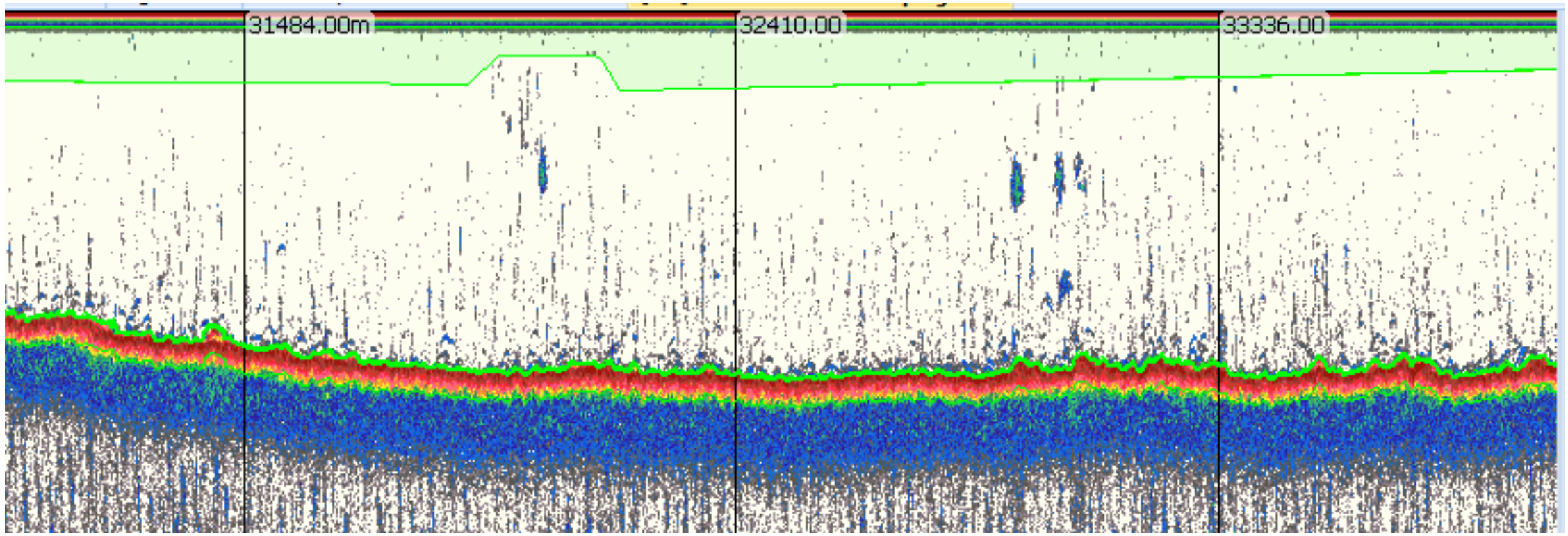
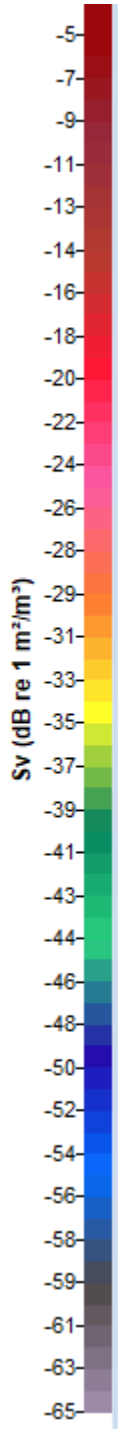


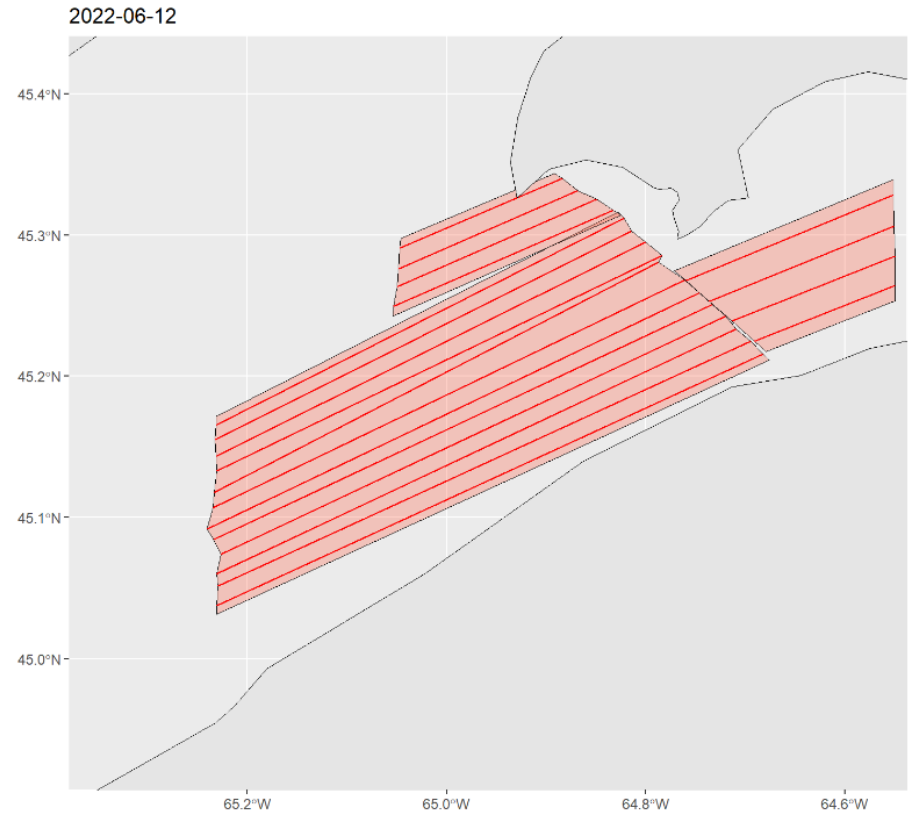


Go through Integration example.

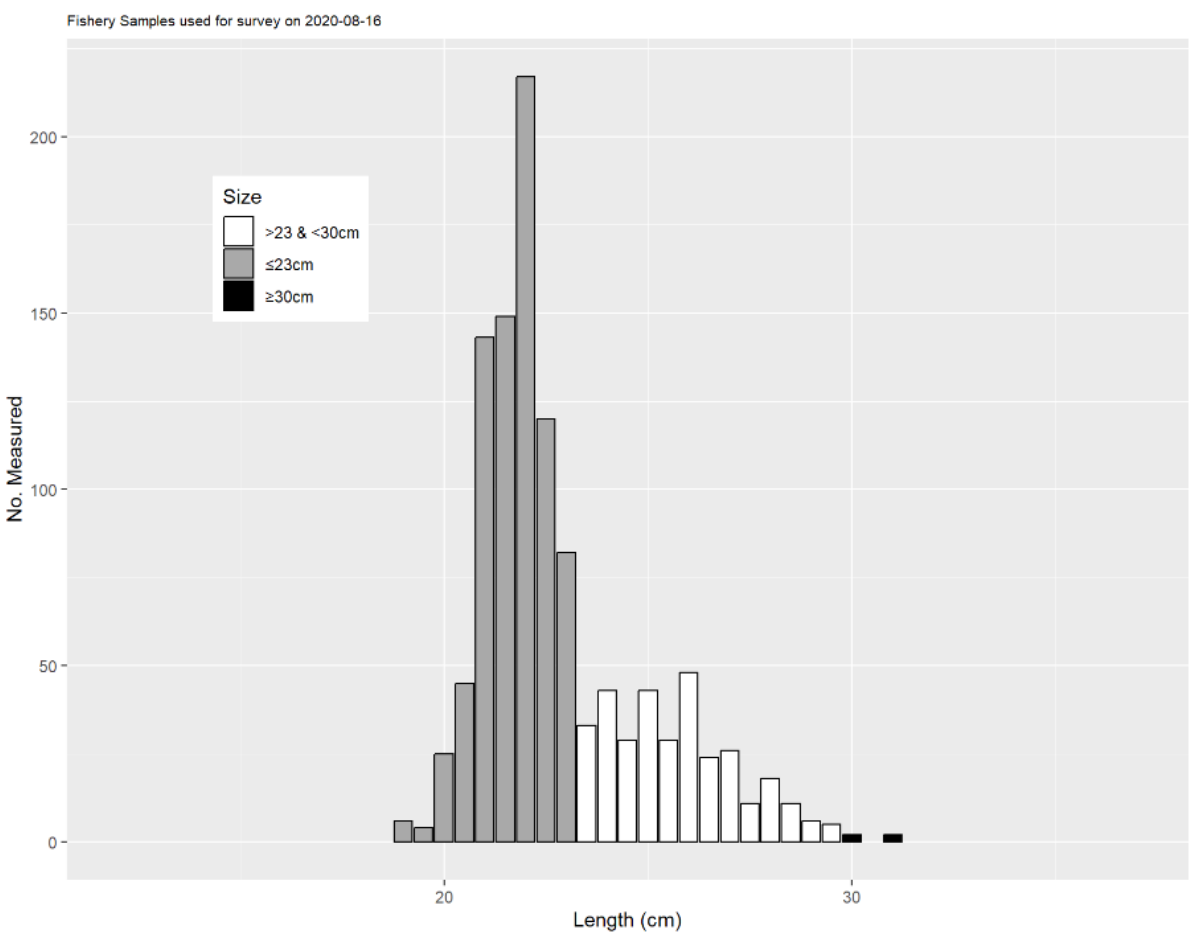
4) Biomass Estimates – Strata and EDSU

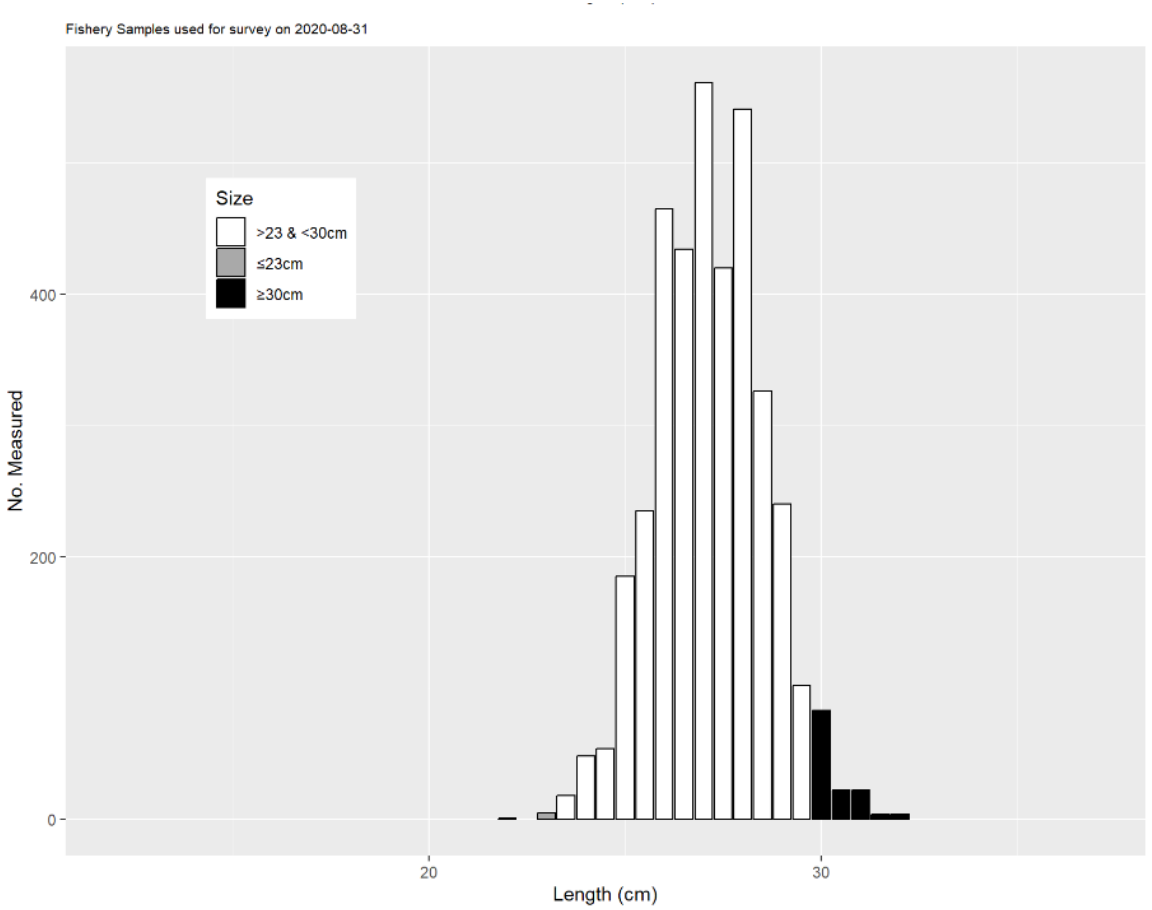
- Survey area calculation for SWNS/BoF Herring

- Go through R Code



4) Biomass Estimates – SSB vs Juveniles?





- Develop Rule or just run a s
  Maturation at length for ea

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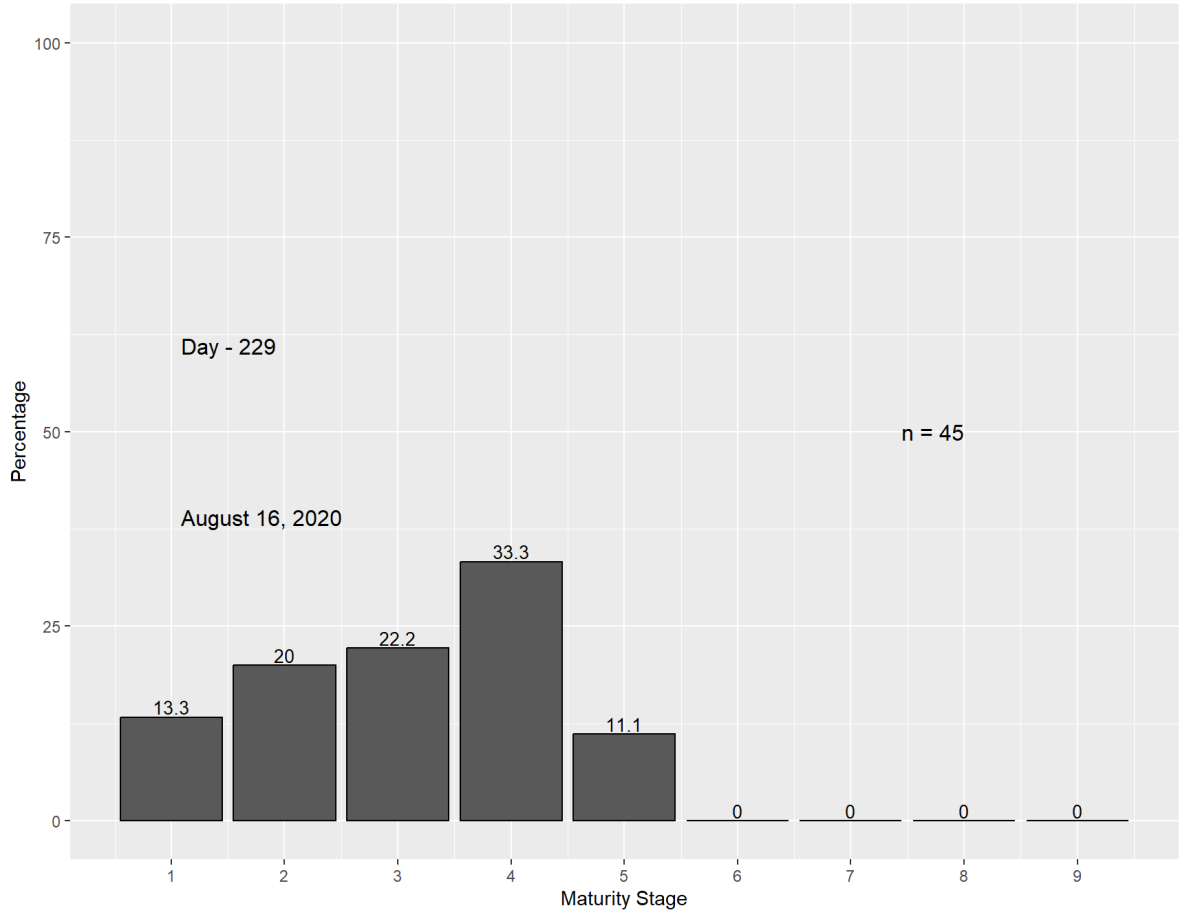
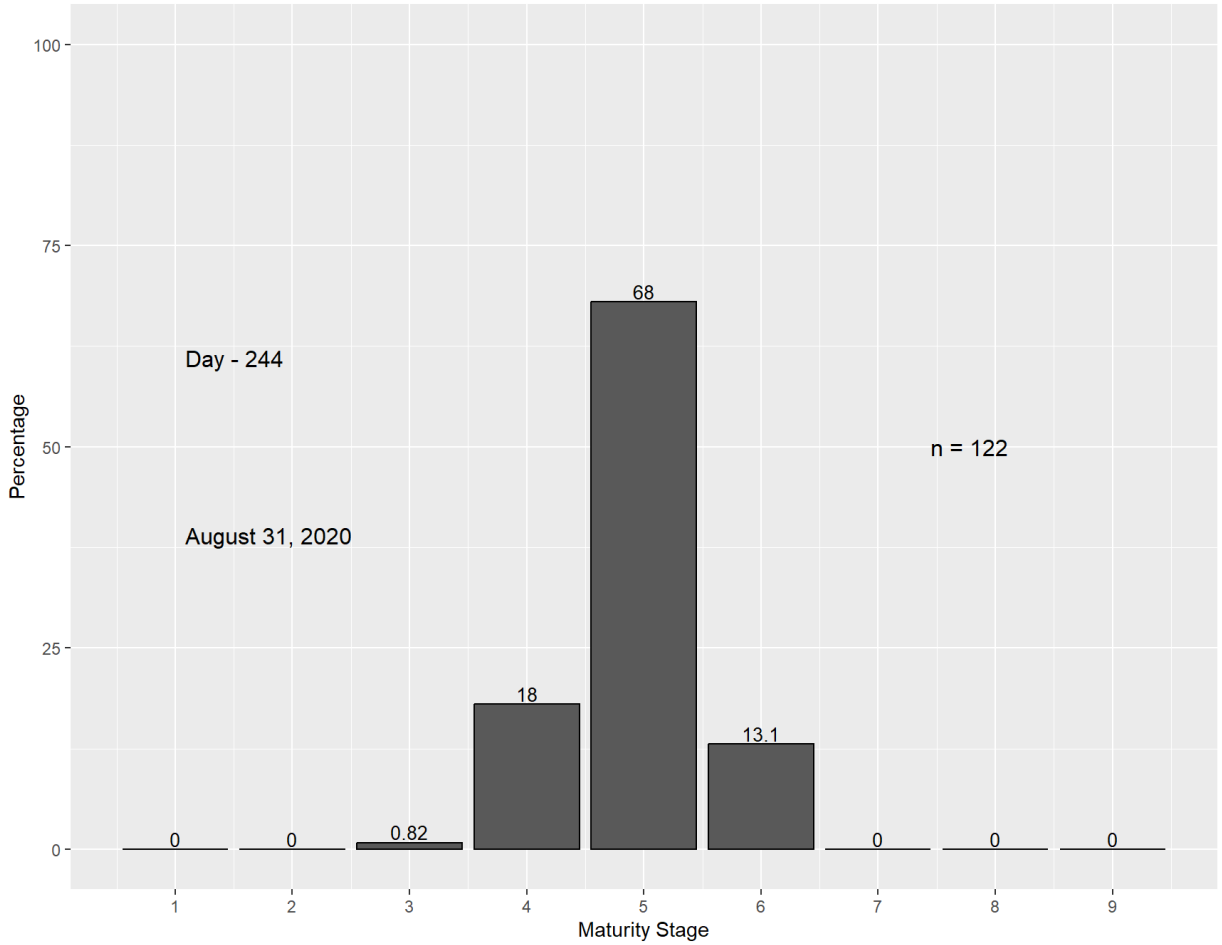
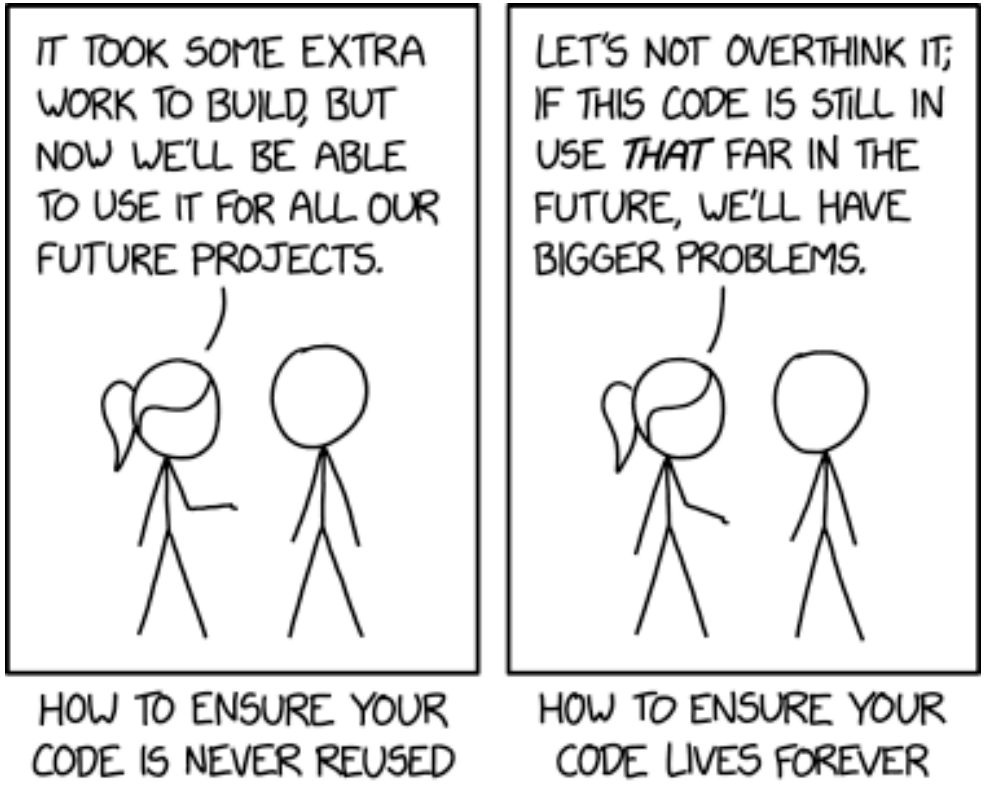




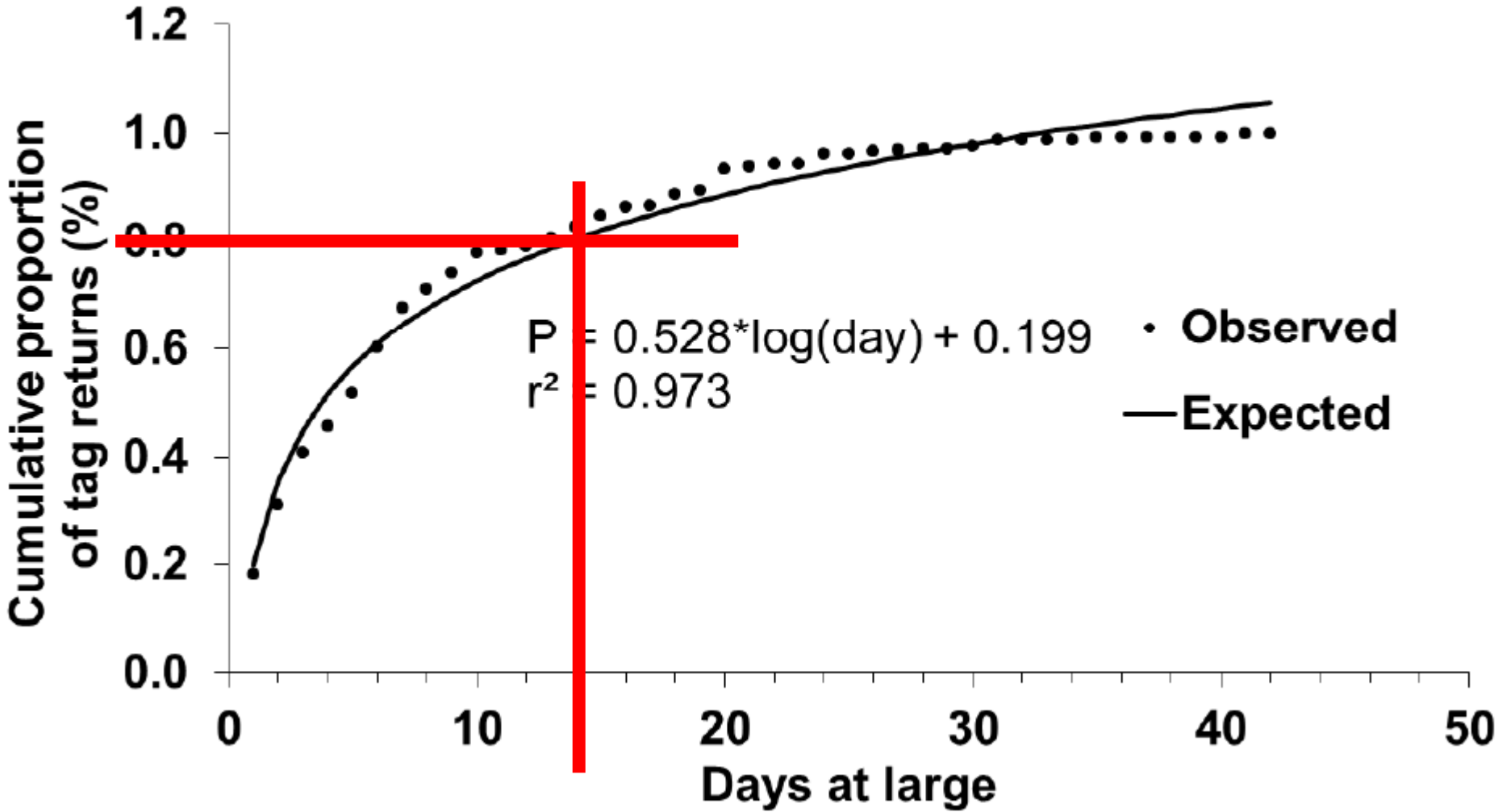
- RULE: If >10% of sample is stage 2 or less, discount sample at 23cm mark.

4) Biomass Estimates – SSB vs Juveniles?

- So, at least have a rule for Juvenile discounting, if not code in direct.
- Go to Juvenile Discounting Code:



5) Double-Counting and Turnover Equation.



5) Double-Counting and Turnover Equation.

$$P = 0.528*\log(day) + 0.199$$

>31 days is 0

Table 19. German Bank 2002 survey biomass estimates (diagonal), elapsed time between surveys (below diagonal), and estimated tonnes remaining (above diagonal) at the time of a subsequent survey. Table includes only those surveys used to estimate total annual biomass. A "-", indicates no information.

Survey Date	Survey Number	Surveys						Total
		1	2	3	4	5	6	
11-Aug-02	1	3,843	689	0	0	0	0	-
26-Aug-02	2	15	114,119	20,448	8140	0	0	-
10-Sep-02	3	0	15	108,837	32,260	13,598	3,913	-
19-Sep-02	4	0	24	9	174,042	47,379	21,744	-
29-Sep-02	5	0	0	19	10	4,857	1,440	-
08-Oct-02	6	0	0	28	19	9	10,403	-
-	-	-	-	-	-	-	-	416,101
Adjusted total		3,843	113,430	88,389	133,642	0	0	339,305

Go to the CODE!

6) Figures and Tables

- Code to Code

7) Rmarkdown Scripting

- Go to Code