

*Science, Service, Stewardship*



# Atlantic surfclam assessment 2020: Presentation to the MASSCC

Management Track level 3

NEFSC

July 21, 2020

**NOAA  
FISHERIES  
SERVICE**

# Background

Previous assessment: Benchmark 2016 (Not overfished/ Not overfishing)

Challenges last time:

- 1 observation on GBK with current survey platform
- generally poor survey performance on GBK
- combining advice from 2 models
- scale uncertainty

Changes this time:

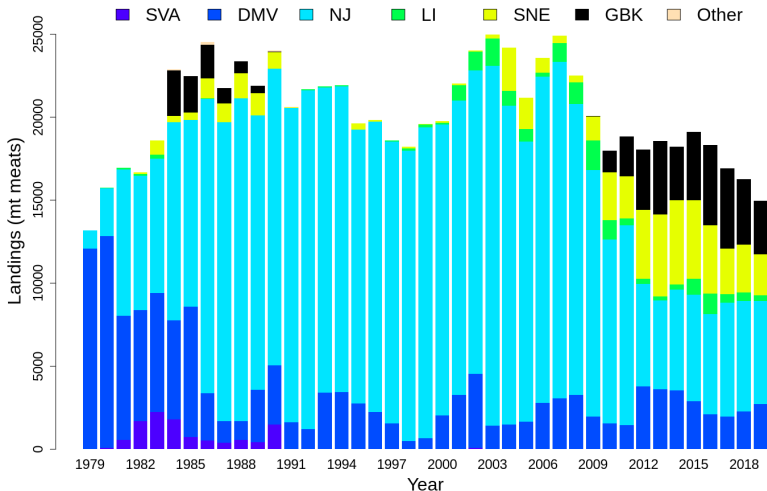
- restratify survey
- 2 models  $\Rightarrow$  1 model with 2 areas
- more flexibility (estimate more parameters)

## TOR 1: Fishery

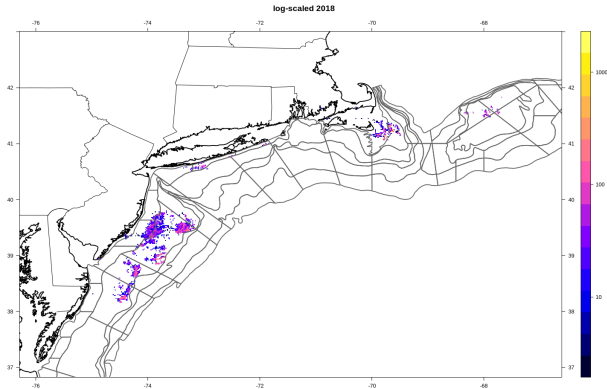
Estimate catch from all sources including landings and discards.

Review Panel: *This TOR was satisfactorily addressed...*

# TOR 1: Fishery - regional landings



# TOR 1: Fishery spatial distribution - VMS



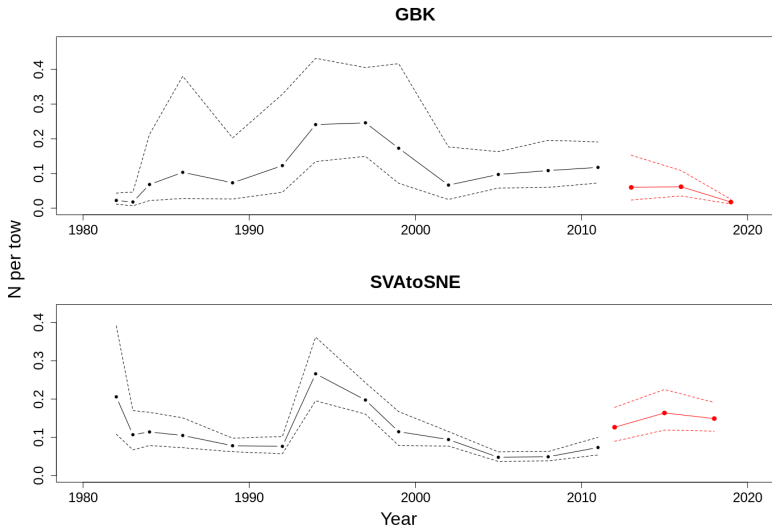
**Figure:** Locations of VMS compliant vessels fishing for Atlantic surfclam in 2018. Locations reflect probable fishing effort based on vessel speed. Locations (1 nm square) where less than 4 boats operated within 2018 are not shown.

## TOR 2: Survey

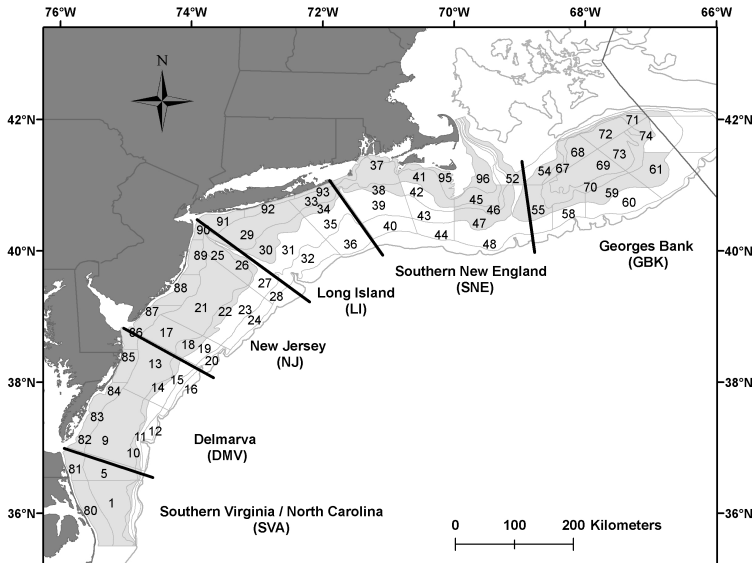
Evaluate indices used in the assessment (e.g., indices of relative or absolute abundance, recruitment, state surveys, age-length data, etc.

Review Panel: *This TOR was satisfactorily addressed...*

# TOR 2: Survey - abundance data

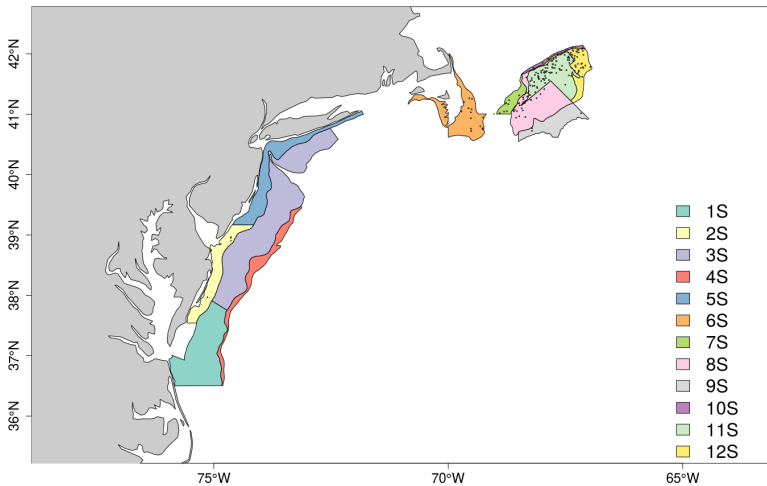


## TOR 2: Survey - old survey



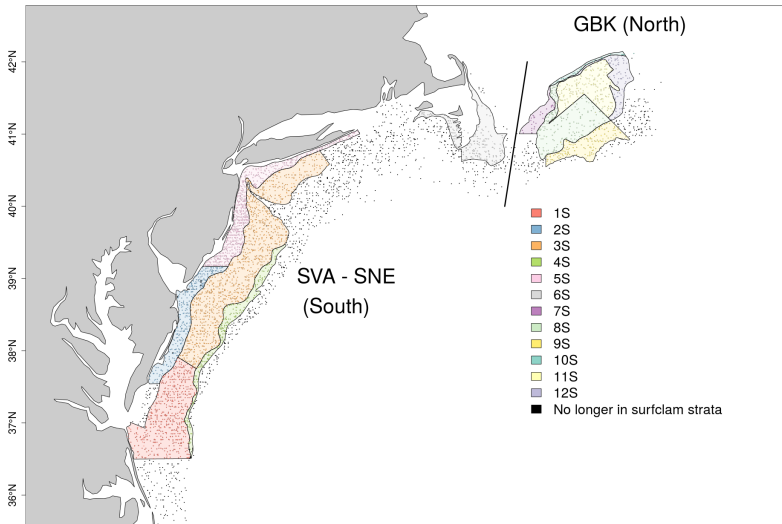


## TOR 2: Survey - new survey



## TOR 2: Survey - new survey

**Figure:** Map showing the new strata and all NEFSC clam survey stations. The stations have been color coded to conform to the new strata. Stations in black are not in the new strata.



## TOR 2: Survey - new survey

**Table:** The difference in area ( $nm^2$ ) between the survey strata used from 1982-2016 and the strata used after 2017 by area.

	Old	New	Change
North	5772	5028	0.87
South	16983	10750	0.63

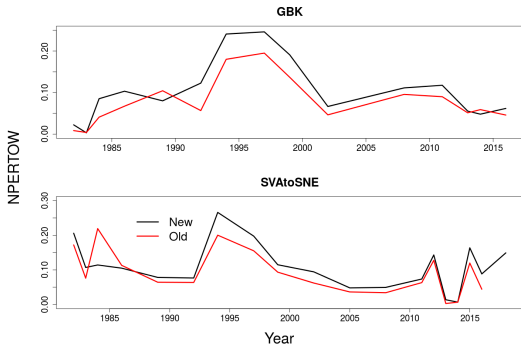
## TOR 2: Survey - new survey

**Table:** Comparison of Atlantic surfclam survey data from years prior to 2018 using previous and current stratification. Many tows are dropped under the new stratification, but these represent only a small proportion of the total biomass and abundance caught on the survey.

Comparison	Old	New	% Difference
Tows	5019.0	2694.0	46.3
Total Weight (kg)	37998.3	37660.1	0.9
Total abundance (n)	1450469.0	1427946.0	1.6

## TOR 2: Survey - Effect of post-stratification on indices

Figure: Survey indices from the NEFSC clam survey pre and post the change to a new stratification scheme from the NEFSC clam survey.



Much more detail available in  
AtlanticSurfclamAssessment2020...pdf on data portal

## TOR3: Model

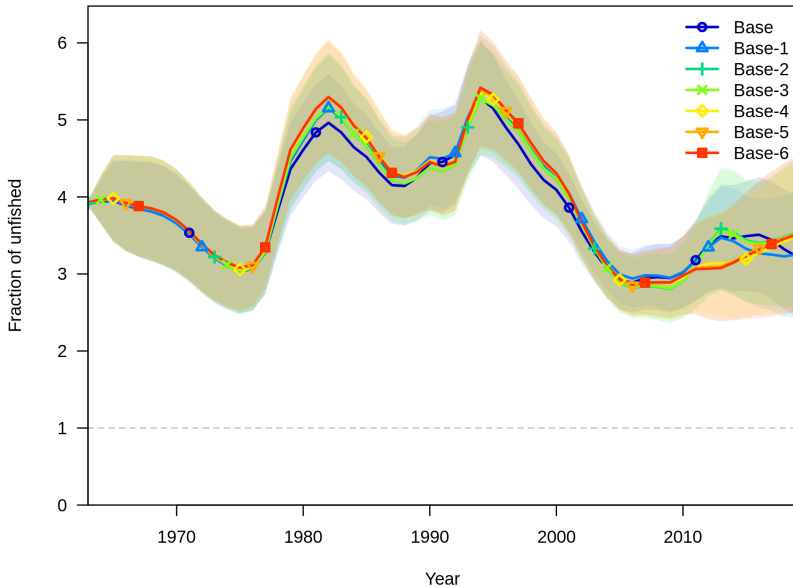
Estimate annual fishing mortality, recruitment and stock biomass (both total and spawning stock) as possible (depending on the assessment method) for the time series using the approved assessment method and estimate their uncertainty. Include retrospective analyses if possible (both historical and within-model) to allow a comparison with previous assessment results and projections, and to examine model fit...

*Review Panel: This TOR was satisfactorily addressed... The new management track assessment addressed several of the criticisms of the previous assessment (SAW 61)... Detailed bridge runs and sensitivity analyses were conducted, and detailed diagnostics were presented. The model performs sufficiently well for provision of management advice.*

Weird stuff:

- 1 Borrowing - almost none left in south!
- 2 Separation of "trend" and "scale" indices from the same survey
- 3 Informative priors for catchability
- 4 Domed selectivity

# TOR3: Model - internal retrospectives





# TOR3: Model - historical retrospectives

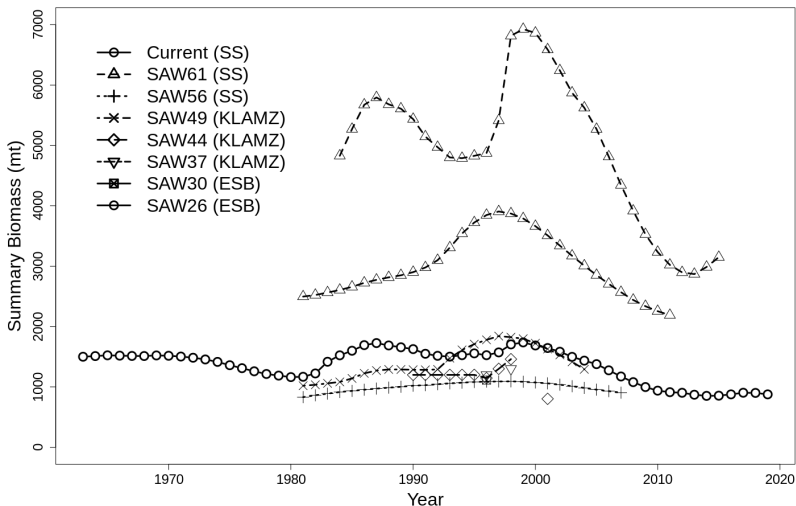


Figure: Historical retrospective plot showing the biomass trajectory from each of the previous Atlantic surfclam assessments.

## TOR3: Model - compare to empirical assessment (plan B)

**Table:** Swept area biomass estimates, catch (landings\*1.12 to account for incidental mortality) and approximate exploitation rate of Atlantic surfclam vs. model results in selected years. Weights are in 1000 mt.

Year	E corr. Bio.	Summary B	Catch	$\frac{Catch}{Biomass}$	F from model
1997	2606	1688	18.6	0.007	0.021
1999	2060	1861	19.6	0.010	0.021
2002	1786	1685	24	0.013	0.027
2008	1619	1145	22.5	0.014	0.038
2011	1579	969	18.8	0.012	0.039

## TOR3: Model - bottom line

Scale is much more certain than last time.

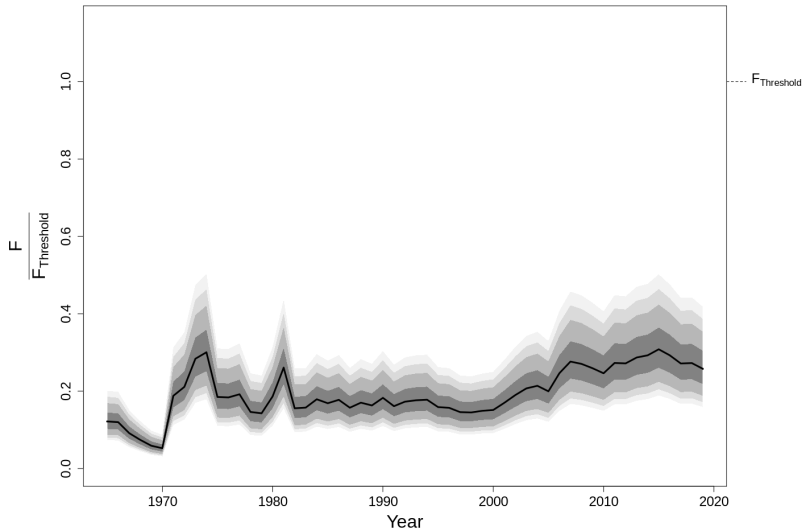
Trend is still relatively well determined (at least as far as stock status) - though model is more flexible than last time.

## TOR 4: Stock status

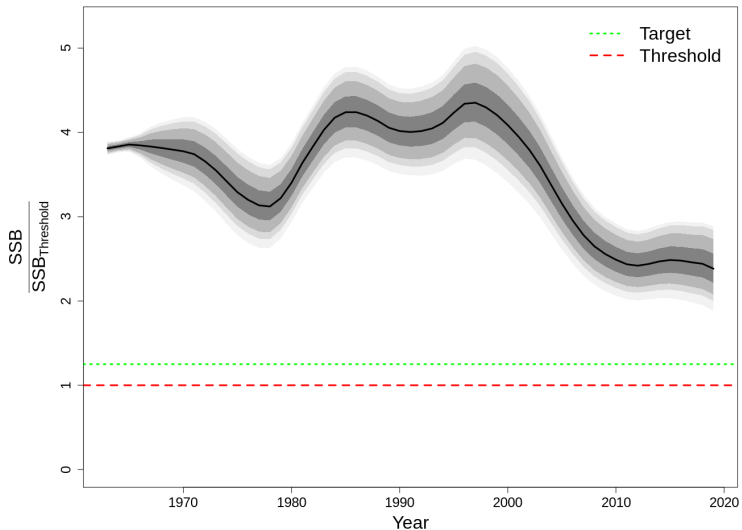
Re-estimate or update the BRP's as defined by the management track level and recommend stock status. Also, provide qualitative descriptions of stock status based on simple indicators/metrics (e.g., age- and size-structure, temporal trends in population size or recruitment indices, etc.).

Review panel: *This TOR was satisfactorily addressed. The PRC agrees that stock status has been accurately characterized.*

## TOR 4: Status



## TOR 4: Status



## TOR 4: Status - recommended BRP

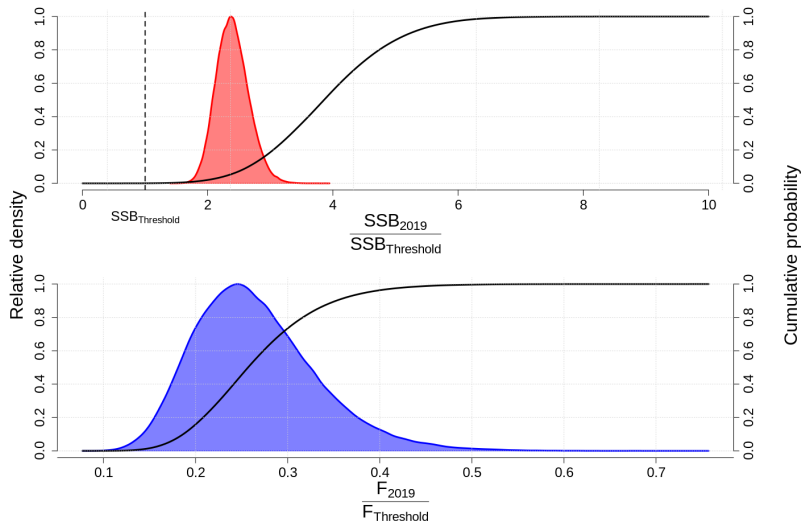
**Table:** Spawning stock Atlantic surfclam fishing mortality status estimates (based on recommended reference points) with cv and approximate 95% confidence intervals.

	Ratio	CV	LCI	UCI
$\frac{F_{2019}}{F_{Threshold}}$	0.258	0.251	0.159	0.419

**Table:** Spawning stock Atlantic surfclam biomass status estimates (based on recommended reference points) with cv and approximate 95% confidence intervals.

	Ratio	CV	LCI	UCI
$\frac{SSB_{2019}}{SSB_{Threshold}}$	2.38	0.107	1.88	2.89

## TOR 4: Status



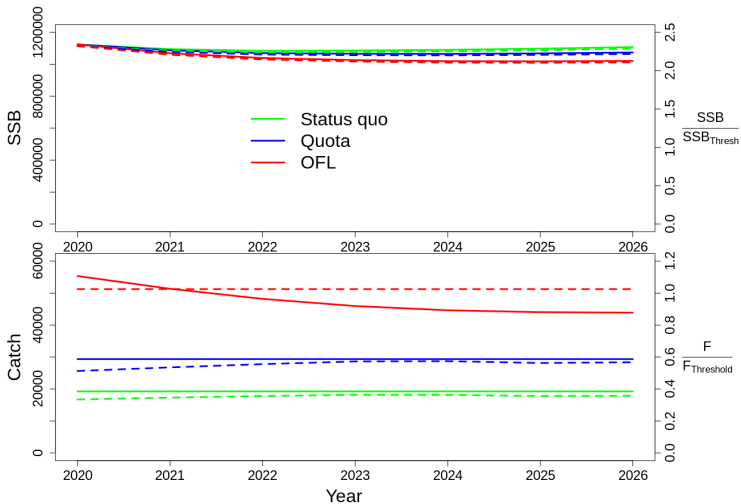


## TOR 5: Projections

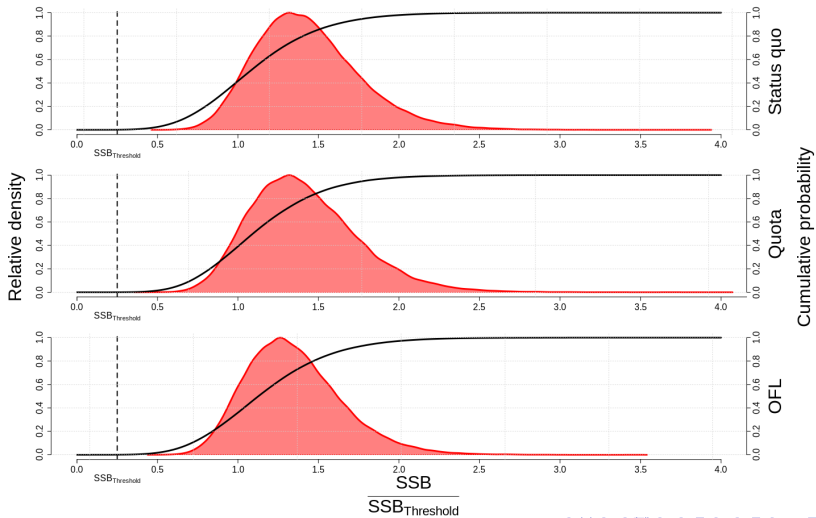
Conduct short-term stock projections when appropriate.

Review panel: *This TOR was satisfactorily addressed...*

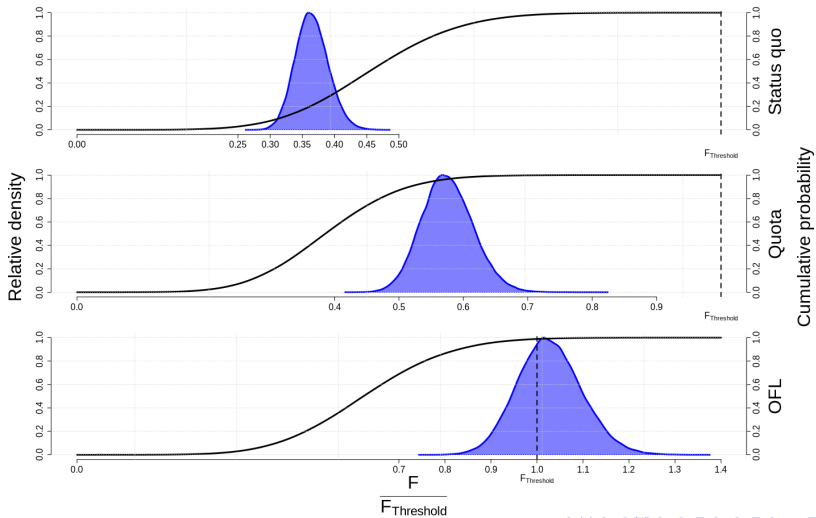
# TOR 5: Projections - results



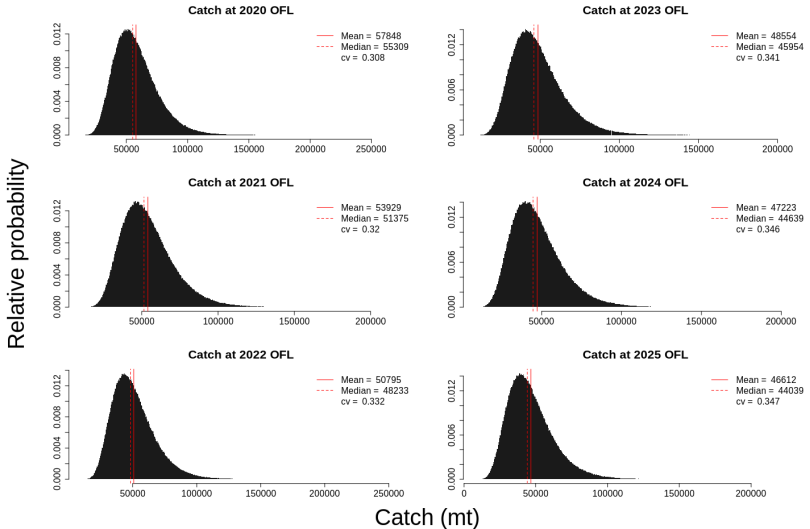
# TOR 5: Projections - results



# TOR 5: Projections - results



# TOR 5: Projections - results



# TOR5: Projections - how did we do last time?

Table: Comparing projections from the last assessment to results from this assessment.

Year	Projected (95% CI)	Current
	$\frac{SSB}{SSB_{Threshold}}$	
2016	2.57 (0.75 - 8.81)	2.48
2017	2.76 (0.81 - 9.46)	2.46
2018	2.93 (0.85 - 10.04)	2.44
2019	3.07 (0.90 - 10.52)	2.38

## TOR 6: Panel comments

Respond to any review panel comments or SSC concerns from the most recent prior research or management track assessment.

Review panel: *This TOR was satisfactorily addressed... Overall, continuing progress in addressing issues and concerns is substantial and commendable.*

## TOR 2: GBK

See AtlanticSurfclamAssessment2020...pdf.

Appendix in there called "A closer look at Georges Bank"



## TOR 2: Survey - GBK strata

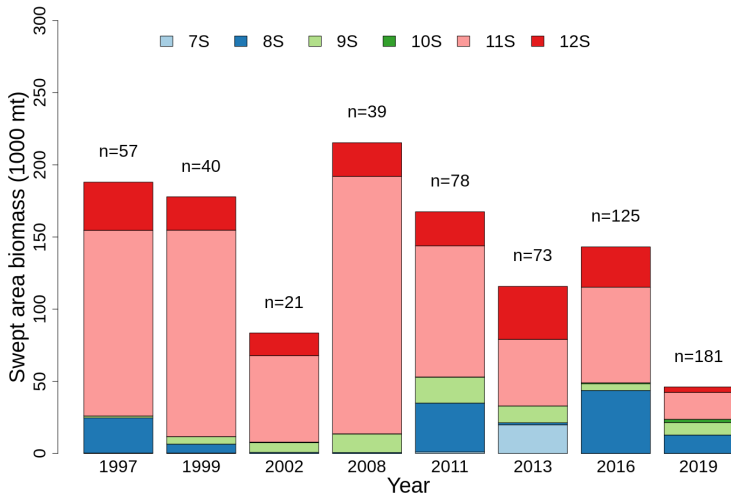


Figure: GBK swept area biomass by strata.