Science, Service, Stewardship

Ocean quahog assessment 2020: Presenation to the MASSC

Management Track level 1

NEFSC

July 22, 2020

NOAA FISHERIES SERVICE

Background

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

Challenges last time:

1. So so survey performance

Changes this time:

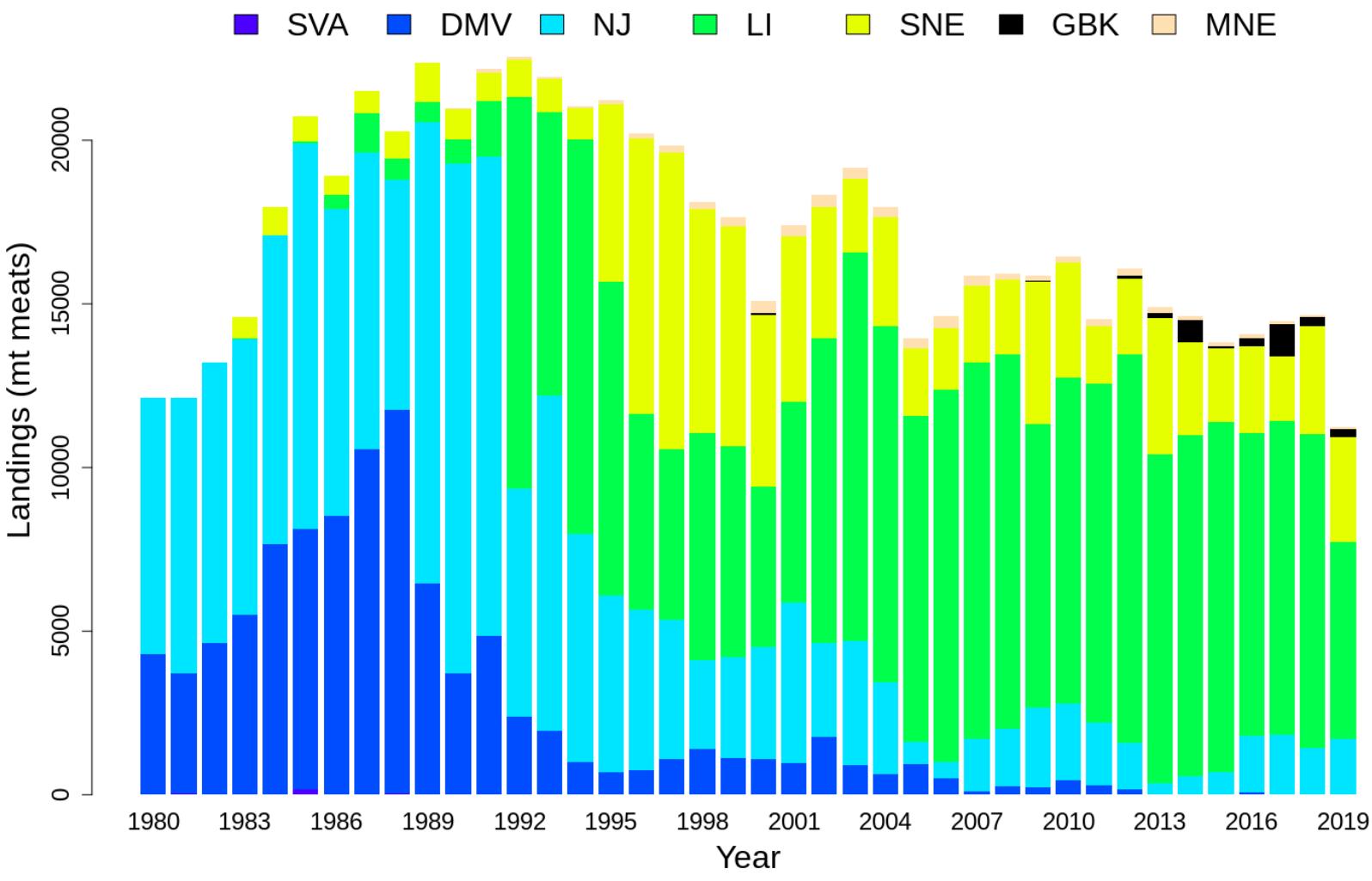
1. restratify survey

Note: no new survey data!

TOR 1: Fishery

Estimate catch from all sources including landings and discards.

TOR 1: Fishery - regional landings



TOR 1: Fishery spatial distribution - VMS

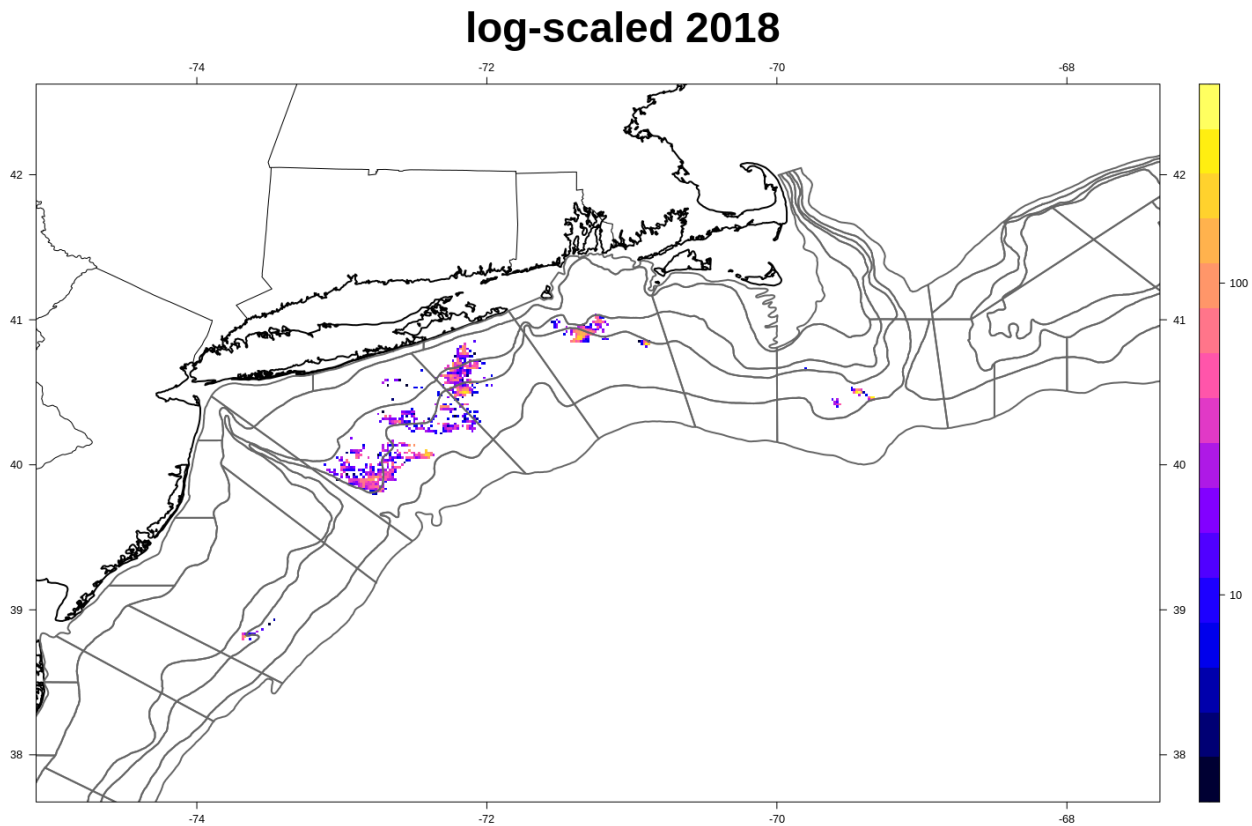


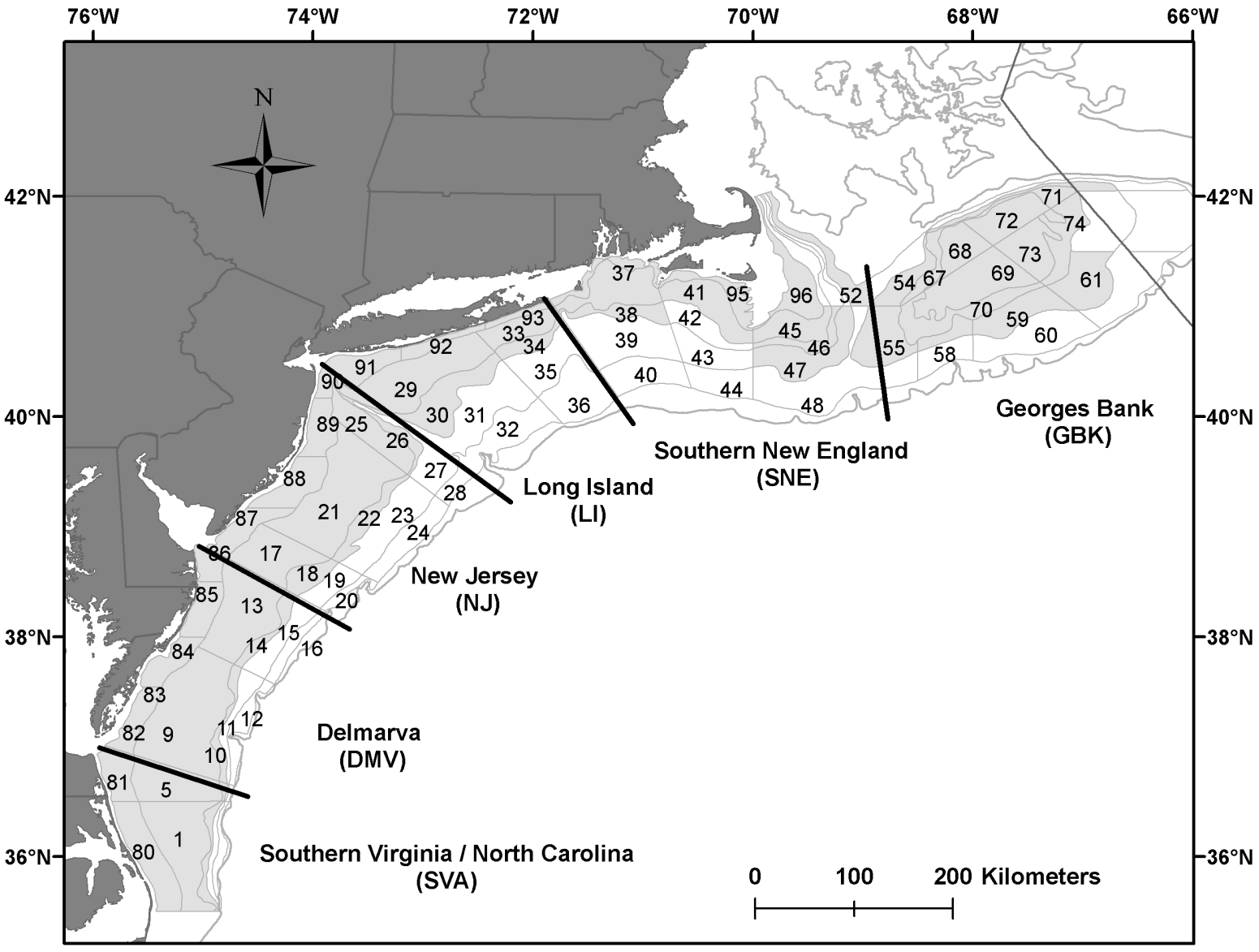
Figure: Locations of VMS compliant vessels fishing for Ocean quahog in 2018. Locations reflect probable fishing effort based on vessel speed. Locations (1 nm square) where less than 4 boats operated within 2018 are not shown.

TOR 2: Survey

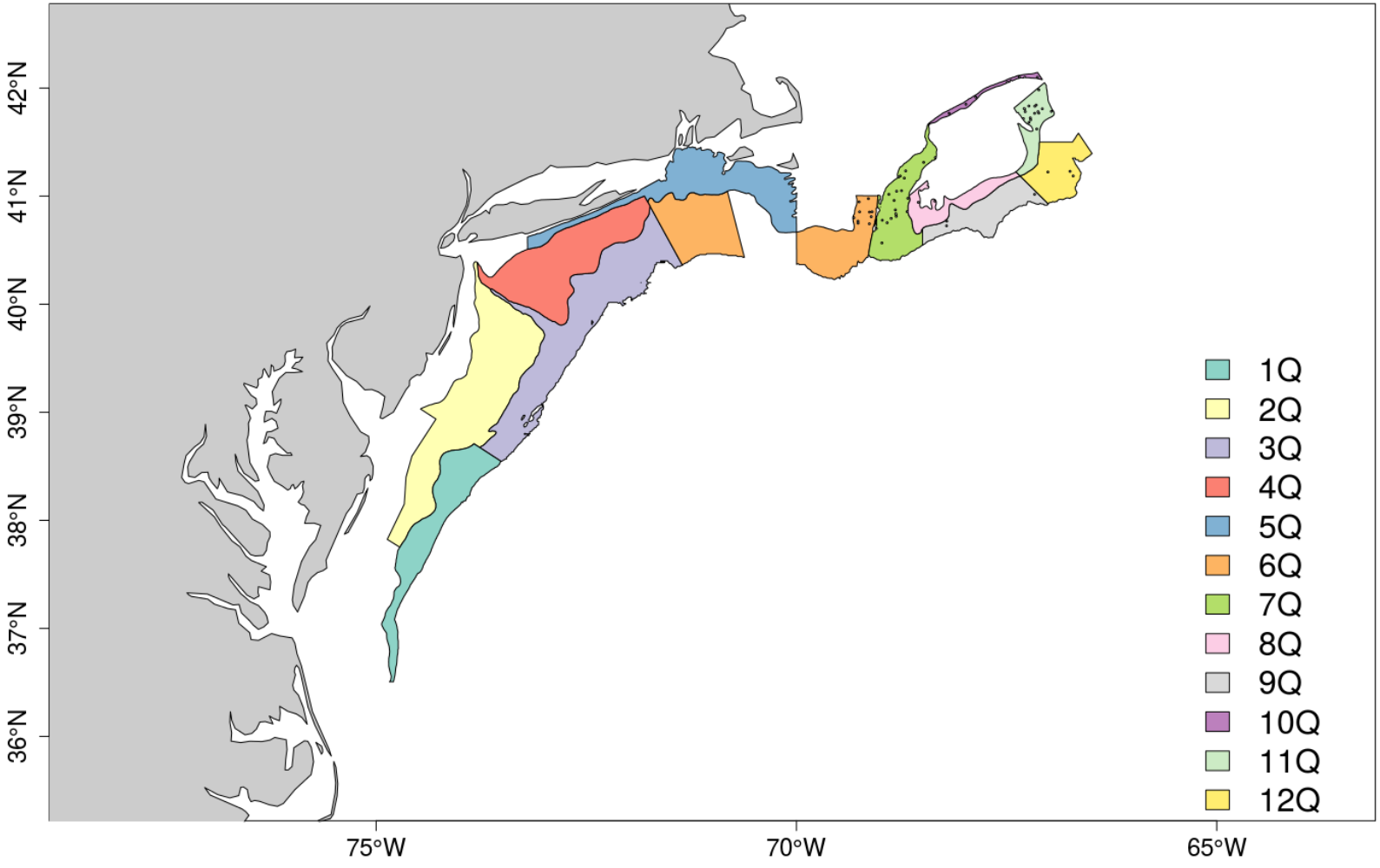
Evaluate indices used in the assessment (e.g., indices of relative or absolute abundance, recruitment, state surveys, age-length data, etc.

No new survey data, but we did restratify

TOR 2: Survey - old survey

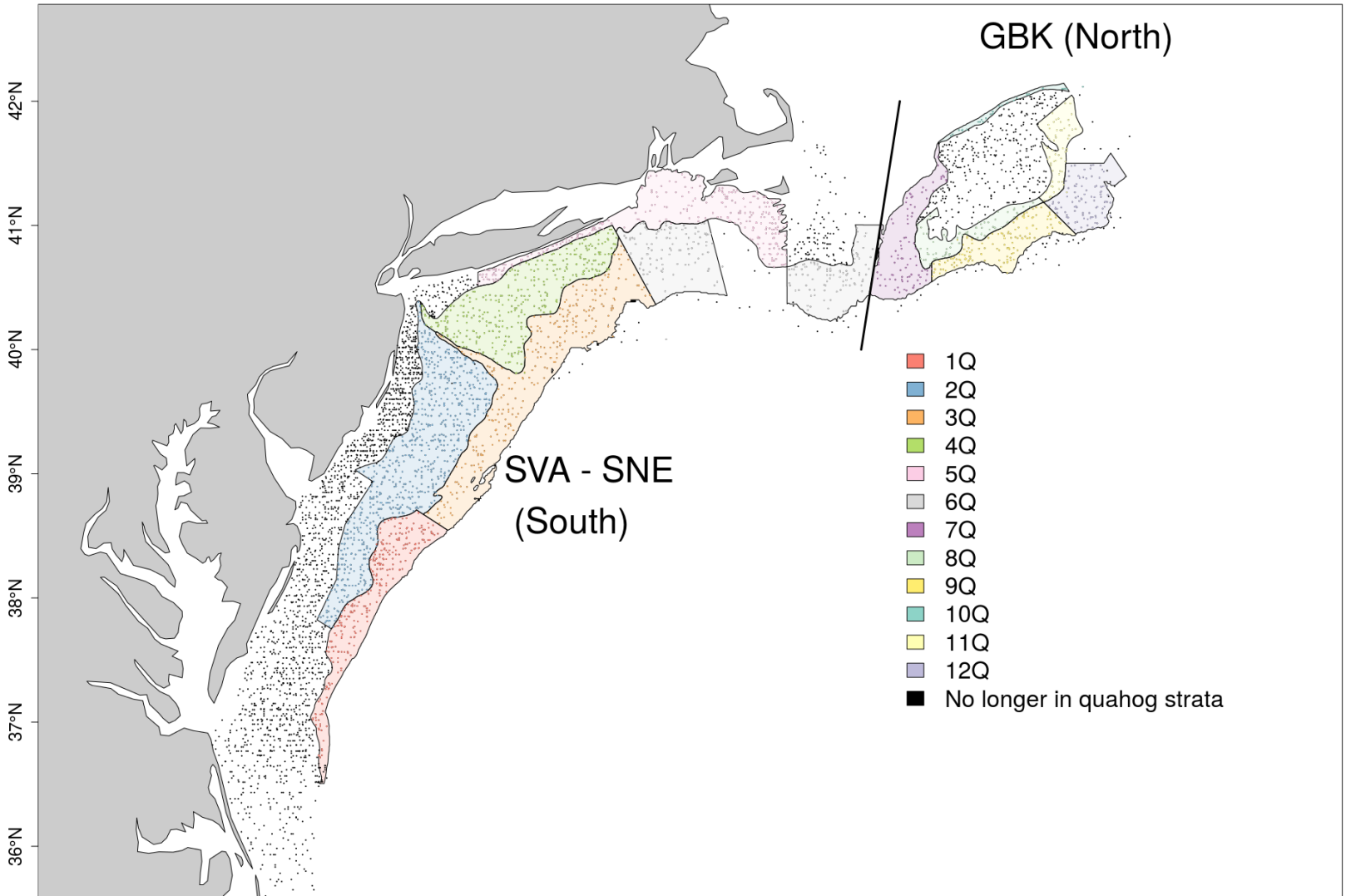


TOR 2: Survey - new survey



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	3983	0.69
South	16983	15752	0.93

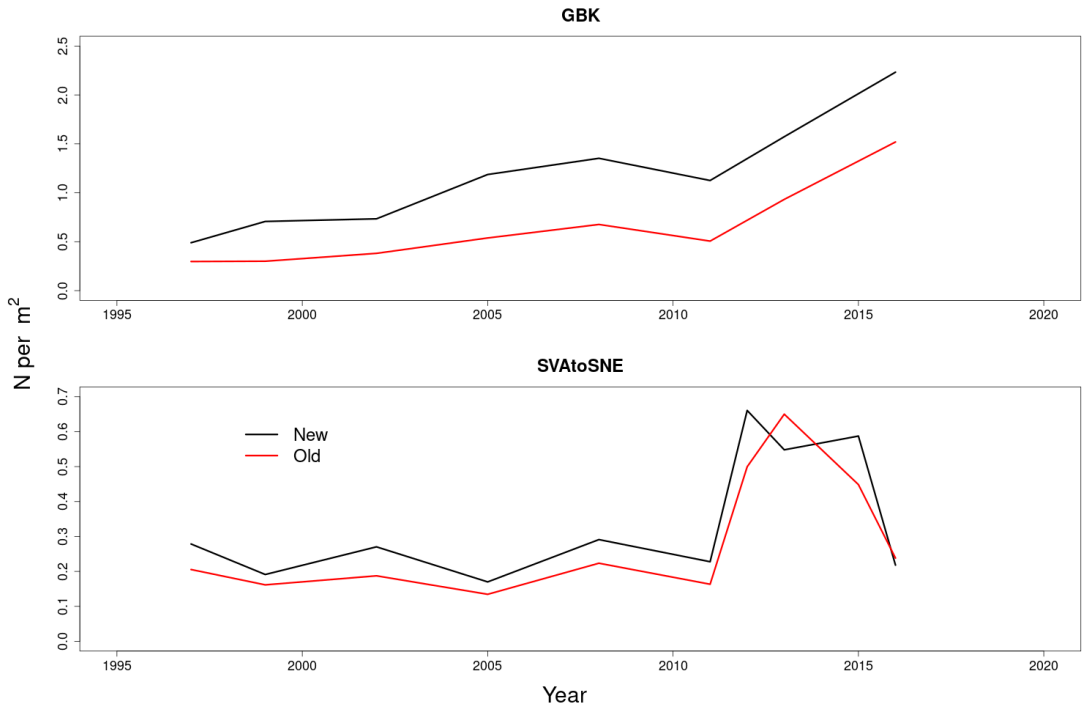
TOR 2: Survey - new survey

Table: Comparison of Ocean quahog 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	5104.00	3705.00	27.41
Total Weight (kg)	30849.64	30564.51	0.92
Total abundance (n)	300129.00	294041.00	2.03

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 OceanQuahogAssessment2020...pdf on data portal

TOR3: Model

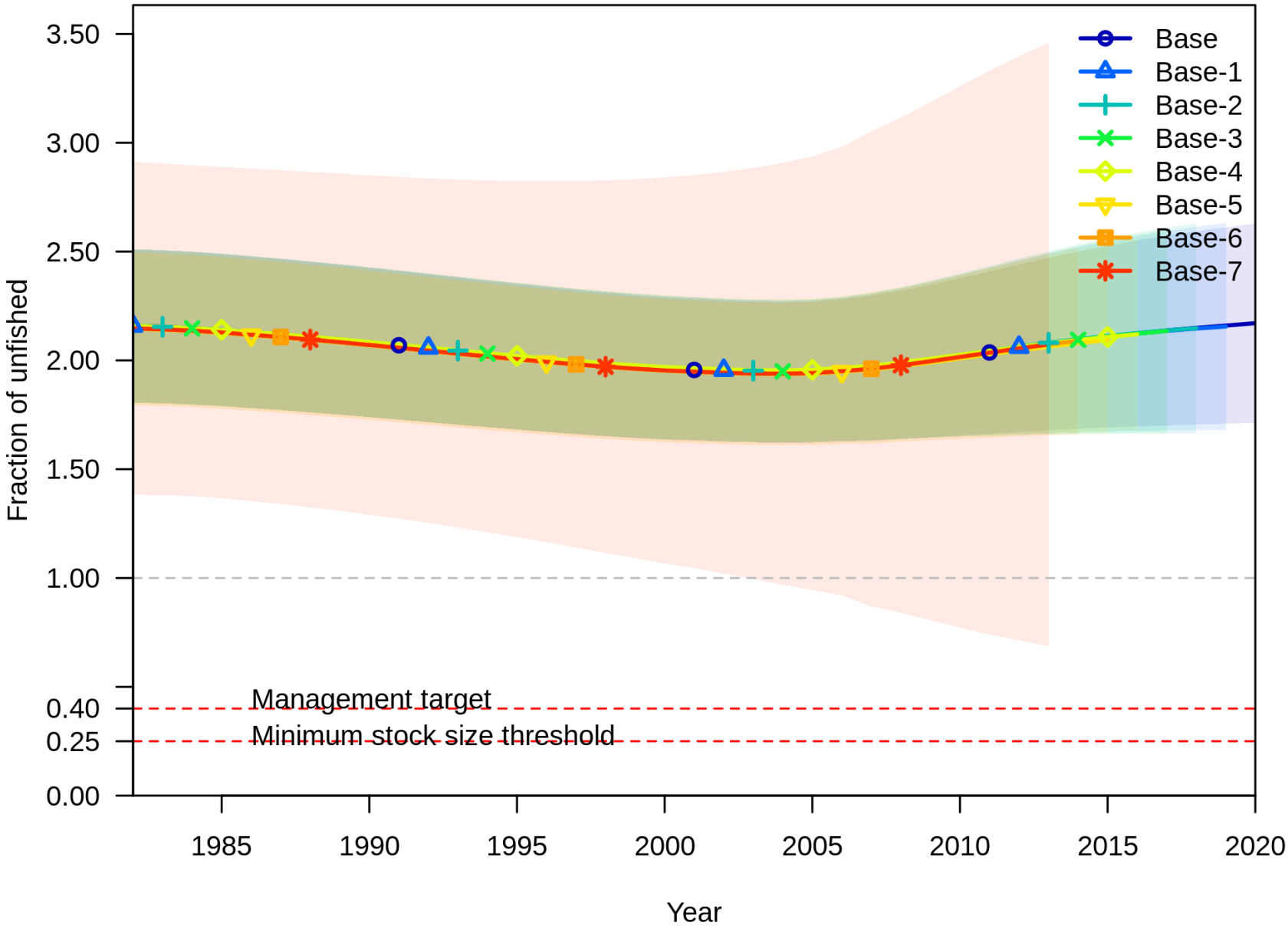
Estimate annual fishing mortality, recruitment and stock biomass (both total and spawning stock) as possible (depending on the assessment method) for the time series using the approved assessment method and estimate their uncertainty. Include retrospective analyses if possible (both historical and within-model)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

TOR3: Model

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

TOR3: Model - internal retrospectives



TOR3: Model - historical retrospectives

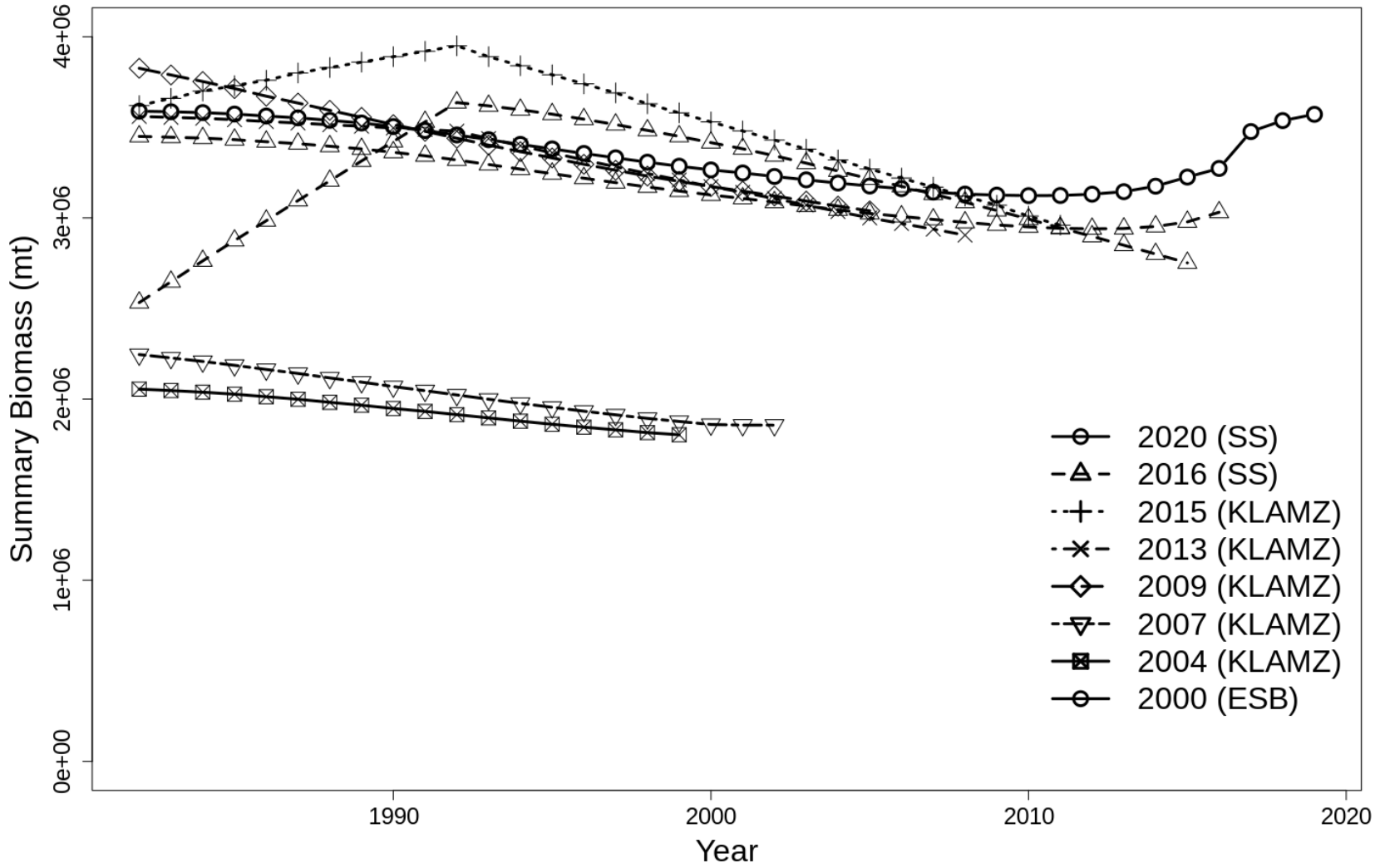


Figure: Historical retrospective plot showing the biomass trajectory from each of the previous Ocean quahog assessments.

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

Table: Swept area biomass estimates, catch (landings*1.05 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	2058	3332	19.63	0.01	0.009
1999	1773	3285	17.38	0.01	0.008
2002	2250	3229	17.95	0.01	0.009
2008	2273	3132	15.73	0.01	0.008
2011	1856	3124	14.33	0.01	0.007

TOR3: Model - bottom line

Results are essentially unchanged from last time.

TOR 4: Stock status

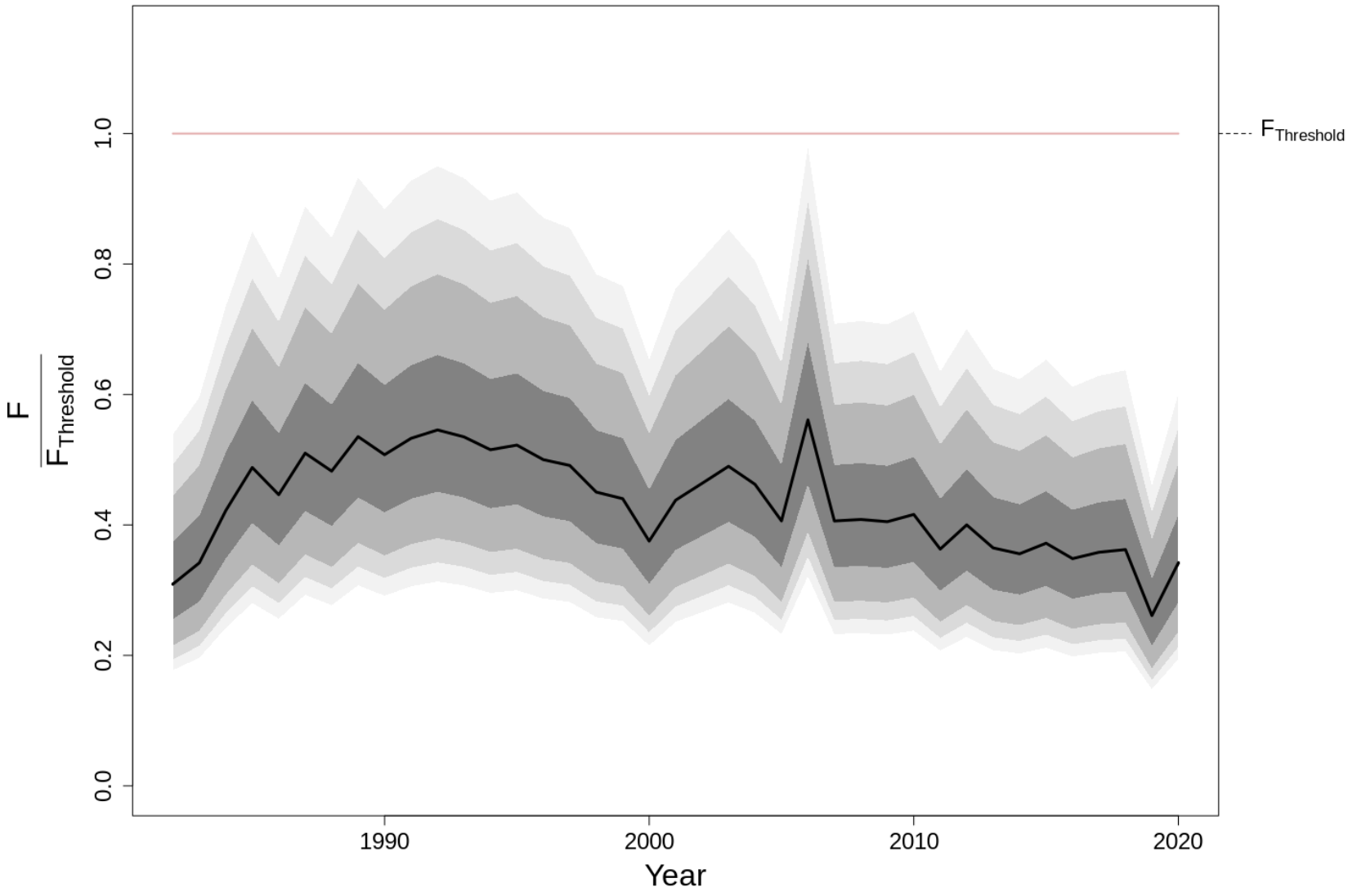
Re-estimate or update the BRP's as defined by the management track level and recommend stock status. Also, provide qualitative descriptions of stock status based on simple indicators/metrics (e.g., age- and size-structure, temporal trends in population size or recruitment indices, etc.).

TOR 4: BRP

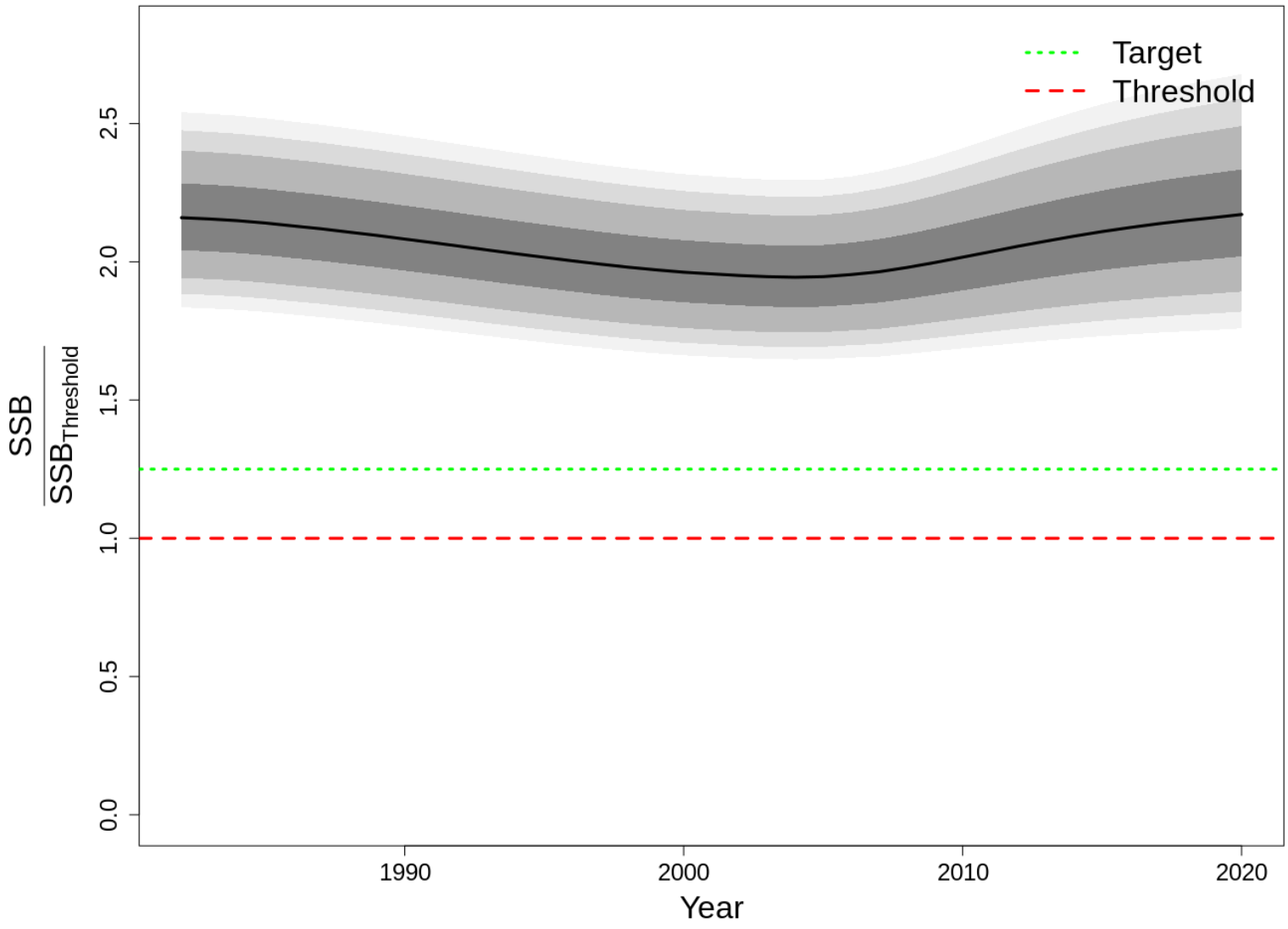
Table: Comparison of reference points estimated in an earlier assessment and from the current assessment update. An F_{MSY} proxy was used for the overfishing threshold and was based on a simulation study and scaled to the current assessment.

	2017	2020
F_{MSY} *proxy*	0.019	0.019 (0.011 - 0.032)
SSB_{MSY} ('000 mt)	2,014	2,113 (1,754 - 2,473)
Overfishing	No	No
Overfished	No	No

TOR 4: Status


F / F_Threshold
0.0
0.2
0.4
0.6
0.8
1.0
1990
2000
2010
2020
Year
F_Threshold

TOR 4: Status


Target
Threshold
SSB / SSB_Threshold
0.0
0.5
1.0
1.5
2.0
2.5
1990
2000
2010
2020
Year

TOR 4: Status - recommended BRP

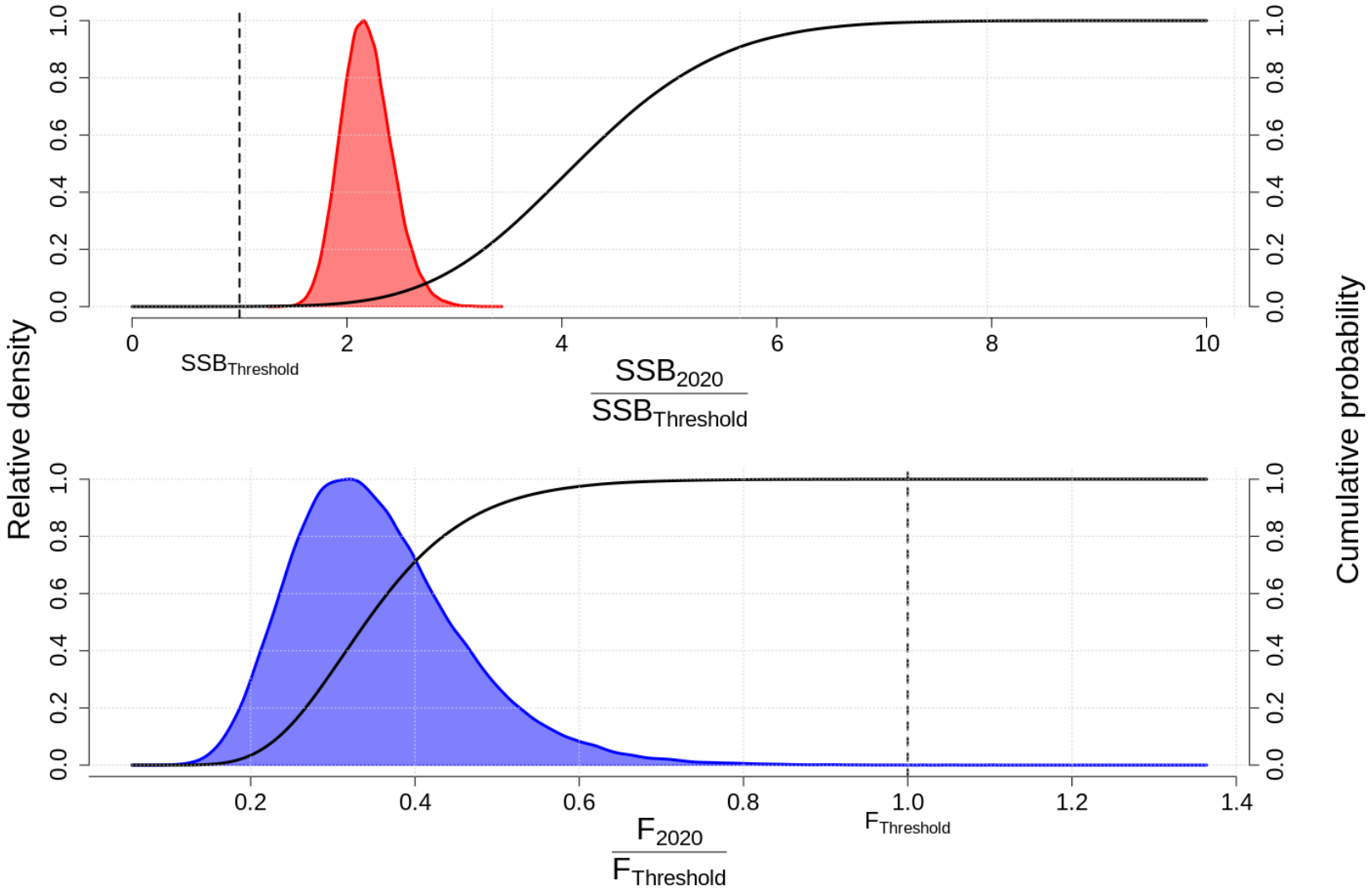
Table: Spawning stock Ocean quahog fishing mortality status estimates (based on recommended reference points) with cv and approximate 95% confidence intervals.

	Ratio	CV	LCI	UCI
$\frac{F_{2020}}{F_{Threshold}}$	0.342	0.295	0.194	0.602

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

	Ratio	CV	LCI	UCI
$\frac{SSB_{2020}}{SSB_{Threshold}}$	2.17	0.108	1.76	2.68

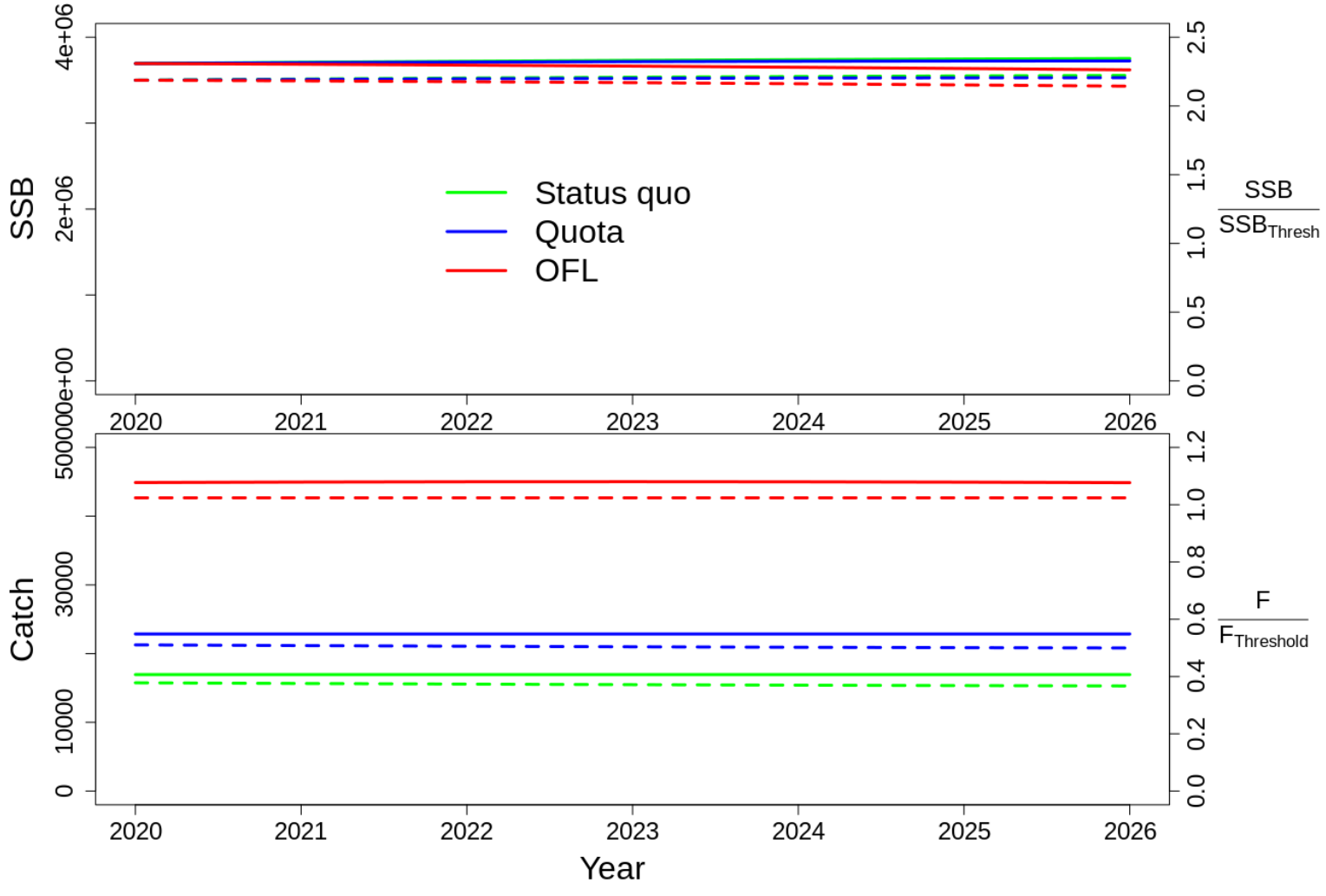
TOR 4: Status


Relative density
Cumulative probability
0.0
0.2
0.4
0.6
0.8
1.0
0
2
4
6
8
10
SSB_Threshold
SSB_2020 / SSB_Threshold
0.2
0.4
0.6
0.8
1.0
1.2
1.4
F_Threshold
F_2020 / F_Threshold

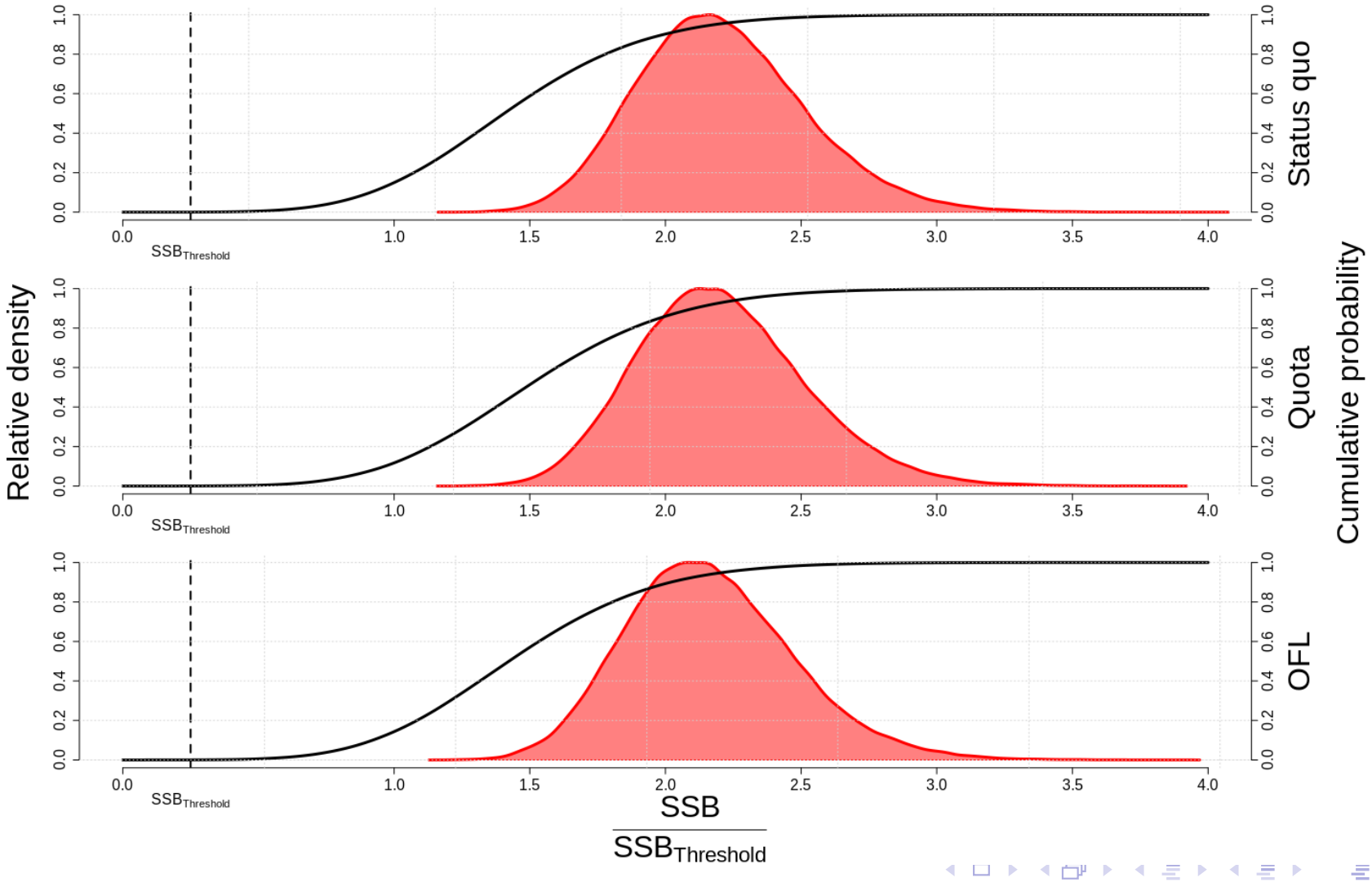
TOR 5: Projections

Conduct short-term stock projections when appropriate.

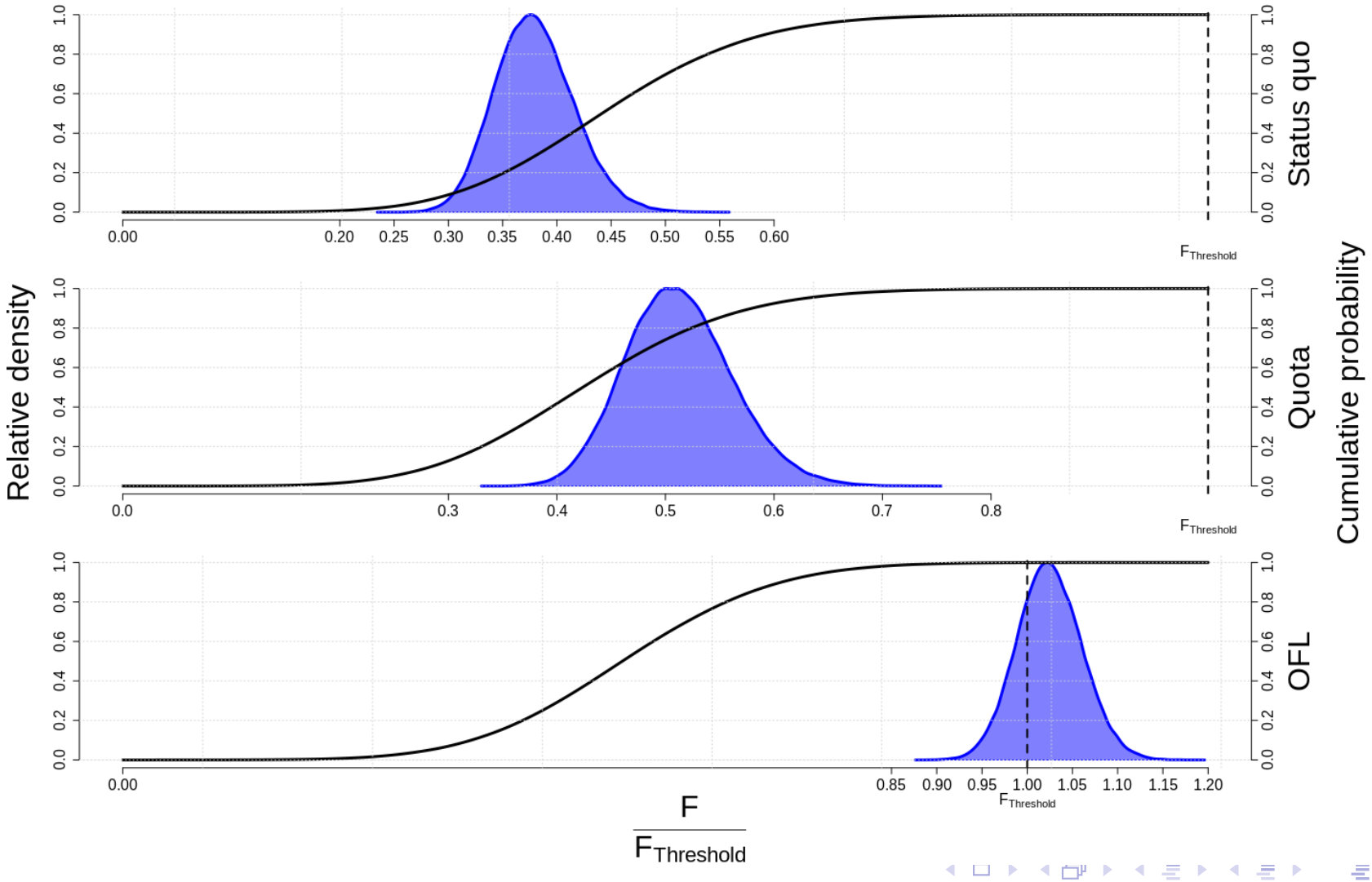
TOR 5: Projections - results



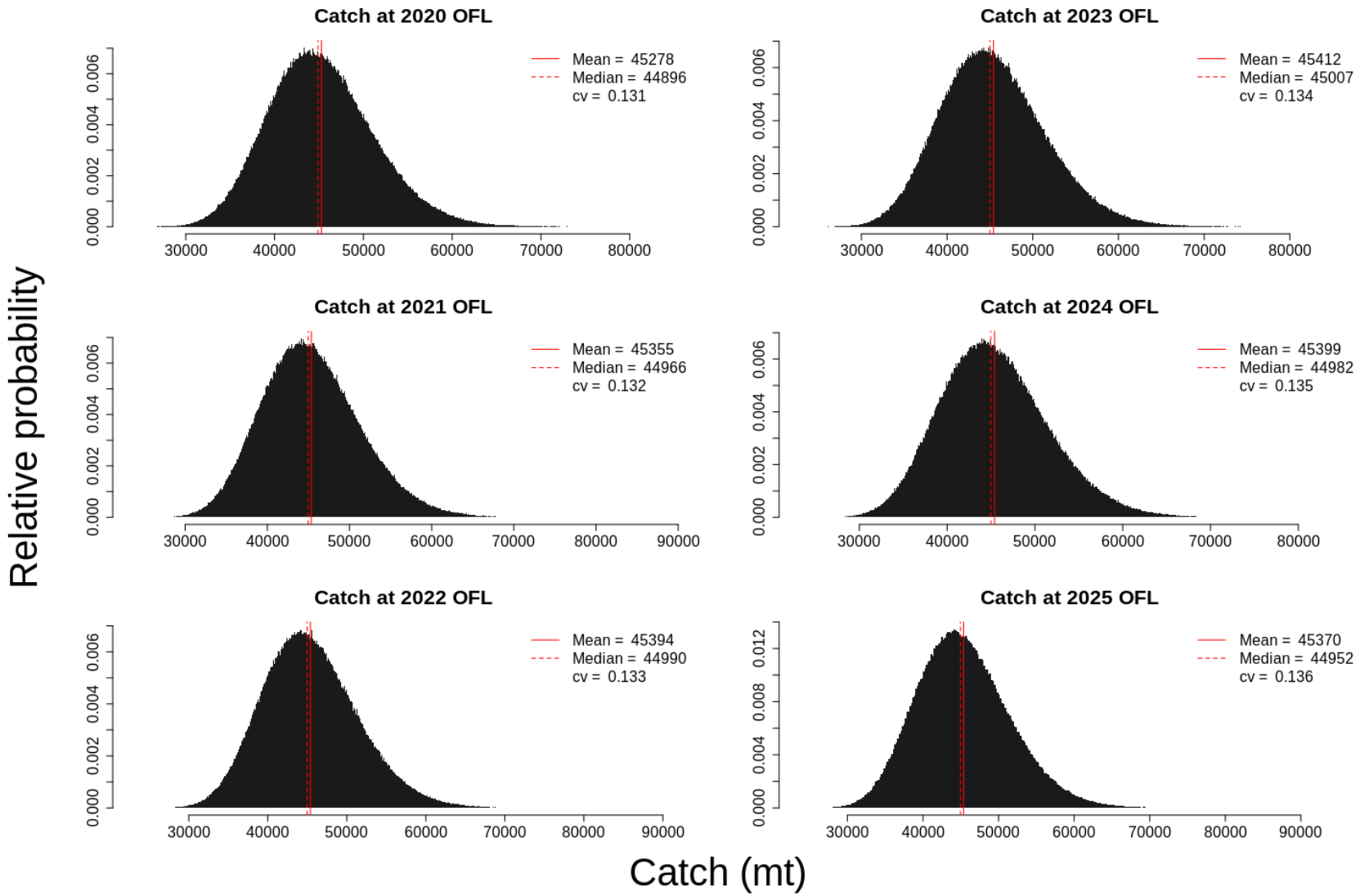
TOR 5: Projections - results



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
	SSB ('000 mt)	
2017	3300 (2516 - 4328)	3614
2018	3311 (2525 - 4343)	3634
2019	3321 (2532 - 4355)	3651

TOR 6: Panel comments

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

See OceanQuahogAssessment2020...pdf.