New England Fishery Management Council
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John F. Quinn, J.D., Ph.D., *Chairman* | Thomas A. Nies, *Executive Director*

MEMORANDUM

DATE: August 4, 2017

TO: Scientific and Statistical Committee (SSC)

CC: Groundfish Committee

FROM: Groundfish Plan Development Team (PDT)

SUBJECT: **Georges Bank yellowtail flounder Acceptable Biological Catch for fishing years 2018 and 2019**

The Groundfish Plan Development Team (PDT) met on August 3, 2017 in Plymouth, MA and discussed **Georges Bank (GB) yellowtail flounder catch advice in support of developing Acceptable Biological Catch (ABCs).**

The Groundfish PDT compiled information and analysis on for the SSC to consider when developing catch advice. In addition, the Scallop PDT provides information on the scallop fishery and bycatch of GB yellowtail flounder in Attachment #1. Both PDTs refer the SSC to the 2016 memos on the subject for additional background.

Information reviewed included assessment documents and memos:

- TRAC. 2017. Georges Bank Yellowtail Flounder. TRAC Status Report 2017/XX.
- TRAC. 2017. DRAFT Stock Assessment of Georges Bank Yellowtail Flounder for 2017.
- PDT to SSC re GB yellowtail flounder ABCs, dated August 5, 2016 including appendices and a memo from the Scallop PDT to the Groundfish PDT
- SSC to Council re GB yellowtail flounder ABCs, dated August 22, 2016.

2017 TRAC Assessment

The Transboundary Resource Assessment Committee (TRAC) met July 11-14, 2017 in St. Andrews, New Brunswick, Canada to conduct assessments for Eastern Georges Bank (EGB) cod, EGB haddock, and GB yellowtail flounder.

Briefly, TRAC results indicate that the GB yellowtail flounder stock biomass is low and productivity is poor. The Total Allowable Catch (TAC) has been reduced substantially in recent years due to declining stock conditions, and recent catch is low relative to the low quotas. Combined Canada and US catches in 2016 were 44 mt, which is the lowest value in the time

series beginning in 1935. The survey biomass from all three bottom trawl surveys (Northeast Fisheries Science Center, NEFSC, fall and NEFSC spring and Division of Fisheries and Oceans, DFO, winter) decreased since the last assessment. Overall, the declining trend in survey biomass to low levels for the past four years remains, despite reductions in catch to historical low amounts. Recent catch is low relative to the quota and biomass estimated by the surveys, while catch curve analyses indicated high total mortality rates (Z above 1 for most years).

To generate catch advice, an empirical approach based on survey catches developed during the 2014 Georges Bank Yellowtail Flounder Diagnostic and Empirical Approach Benchmark and updated during the 2017 TRAC intersessional was applied. The consensus was to change survey catchability from 0.37 to 0.31 and to use wing width instead of door width to compute the area of a tow based on the three working papers discussed during the intersessional. Under these assumptions average survey biomass is approximately three times higher, but the trend does not change.

The TRAC revised its review process this year (see 2017 TSR for an overview). Notably in the absence of consensus, the advice from the science group will be provided along with the perspective from the broader TRAC. This was the case for GB yellowtail flounder.

The TRAC external reviewers and science members recommended an exploitation rate between 2% and 6% for catch advice, which results in 62 mt to 187 mt for 2018. The average exploitation rate associated with the quota during the past eight years has been 6%. The TRAC external reviewers and science members felt this is an appropriate upper bound for the exploitation rate given the declines continuing in the surveys so recommend using a range of 2% to 6% for setting the 2018 catch advice, resulting in 62 mt to 187 mt.

The broader TRAC considered the full range of exploitation rates, 2% to 16%, to still be informative. The broader TRAC agreed there were no indications in the data that support increasing the catch advice for 2018 from the 300 mt quota for 2017, but feel the possibility of low catch advice for yellowtail flounder limiting the catch of other species such as sea scallops and groundfish should be considered as well. Holding the 2018 quota constant from the 2017 quota (300 mt) would represent an exploitation rate of approximately 10%.

PDT Analysis and Discussion

The PDT recognizes that the stock condition of GB yellowtail flounder is poor. The average trend in the surveys biomass indices continued to decline and recruitment (age 1 and age 2) is at record lows.

- Net Efficiency
    - Rather than derived from the literature (q=0.37), the incorporation of the net efficiency research should result in a more accurate biomass estimate in the assessment. The revised q could be considered conservative as it assumes the chain sweep is 100% efficient and the calculation did not incorporate diel effects (which could have resulted in a lower q). A q of 0.31 could therefore be considered a maximum value if assume no herding.
    - Incorporation of the change in q does not change the survey biomass trend, but does scale the absolute biomass and possible removals when an exploitation rate is applied.

- Exploitation Rate Approach
    - The exploitation rate approach provides a technical basis for catch setting, because it is tied directly to the NEFSC and DFO surveys. However, this approach based on survey variability means that the quota could vary annually based on survey biomass estimates, which could result in wide swings in catch advice from year to year.
- Fishing Mortality and Stock Dynamics
    - The GB yellowtail flounder stock does not appear to have responded to low catches. Further, it is unclear if or what environmental driver(s) may be negatively impacting stock productivity.
    - The PDT recognizes that catches might not be indicative of biomass, and changes in catch may not accurately track changes in biomass well for this stock.
    - Recent low quotas for GB yellowtail flounder have not appeared to constrain the U.S. groundfish fishery in its access to other abundant stocks like GB haddock. Otherwise, GB yellowtail flounder would be expected to be caught at a higher rate. Total fishery catches were 218 mt in 2013, 159 mt in 2014, 118 mt in 2015, and 44 mt in 2016. Quotas lower than recent catches may constrain access to other species (i.e., haddock, scallops).
- Market for Yellowtail Flounder
    - The PDT discussed the work by Cadrin et al. on a market analysis for yellowtail flounder. Cadrin et al. suggest that: 1) the lack of yellowtail landings in the Georges Bank stock area are driven in large part by the smaller quotas themselves, such that demand for yellowtail flounder has dropped off because of a lack of supply to the market; and 2) this creates a circumstance where the relationship between the commercial catch and the underlying stock biomass has broken down. Essentially, they argue that one should not infer stock conditions from low catch, because poor demand is a larger driver of low catch than resource conditions.
    - The first part of this hypothesis hinges on changes in landings for the GB yellowtail flounder stock. While it is true that landings have declined substantially for this stock, landings of yellowtail flounder overall (GB, Southern New England/Mid-Atlantic and Cape Cod/Gulf of Maine stocks combined) have remained relatively stable between 2.7 and 5.1 million pounds from 2005-2015 (Figure 3). It is unlikely that other stocks of yellowtail flounder are not perfect substitutes for GB yellowtail flounder in the marketplace, and this relative stability of landings does run counterpoint to the hypothesis that reduced supply has led to reduced demand.
    - However, a cursory analysis of the relationship between price and quantity for yellowtail flounder does indicate that overall demand for this species has declined substantially over the past 20 years (Figure 3). For example, between 2006 and 2013, a period where supply was relatively stable, prices dropped nearly 45% in real terms. This lends credence to the idea that yellowtail prices do not justify the expenses required for larger trawlers to make multi-day trip to Georges Bank in order to target this stock. Extraordinarily low quotas and additional restrictions such as windowpane flounder accountability measures further exacerbate this situation.

- The PDT compiled information on (1) catch performance for GB yellowtail flounder, (2) the ratio of discards to landings for GB yellowtail flounder, and (3) demand functions for yellowtail flounder (all three stocks combined).

1. *Catch performance of GB yellowtail flounder*

Figure 1 - Catch performance for Georges Bank yellowtail flounder including: catches from CY 2005- CY 2016 and historical ABCs since FY 2010. Overfishing status in the terminal year of the assessment indicated on the x-axis (Yes = overfishing, No= not overfishing, and unknown = unknown overfishing status).

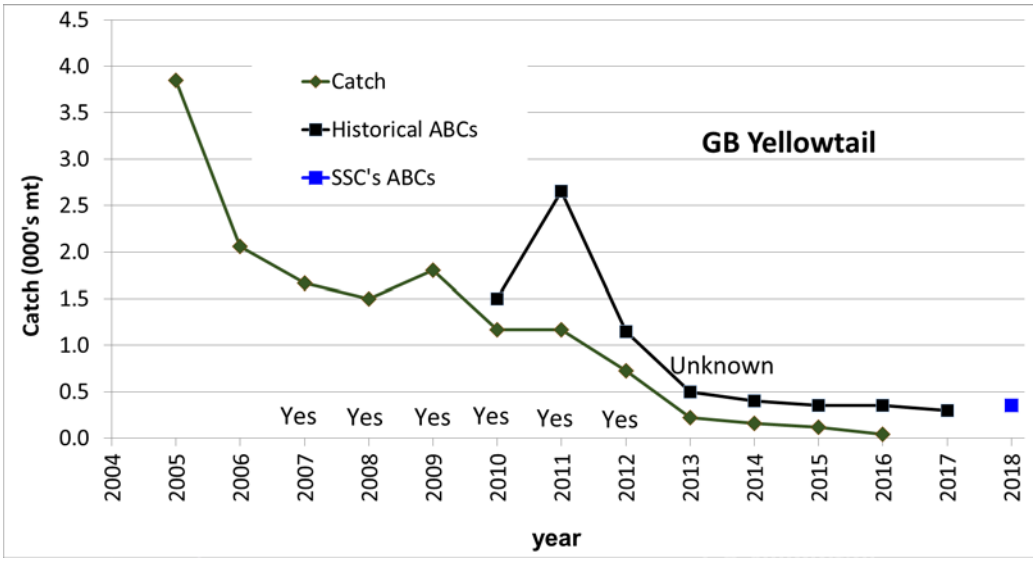


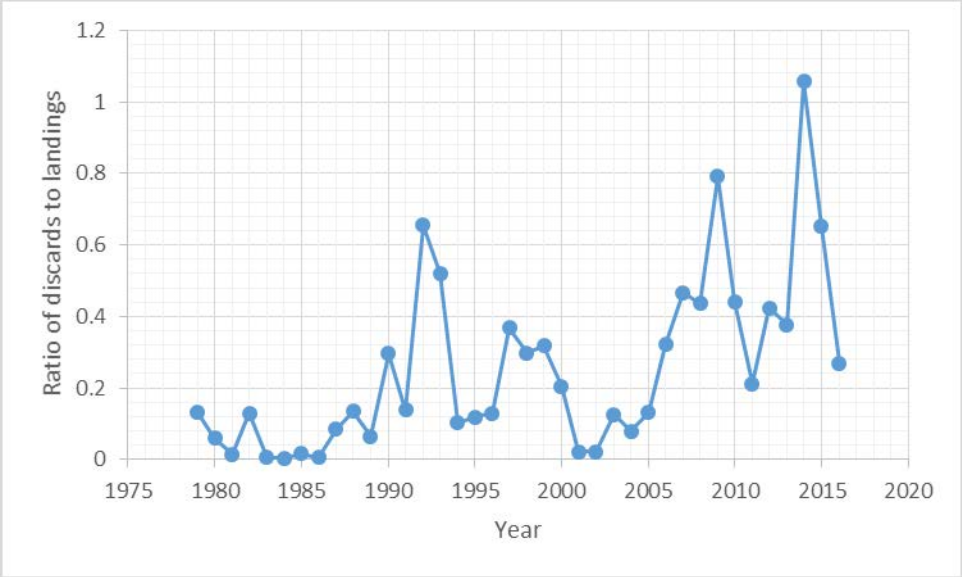
Table 1 - Recent GB YT TACs and groundfish fishery sub-ACLs and catches. Values shown in metric tons (mt).

	Total Shared TAC – US & CA (mt)	US % Share	US TAC (mt)	% US TAC Caught	Groundfish sub-ACL (mt)	Groundfish catch (mt)	Percent Groundfish ACL Caught (%)
FY2011	2,650	55%	1,458	76%	1142.0	990.0	86.7
FY2012	1,150	49%	564	68%	368.3	215.5	58.5
FY2013	500	43%	215	43%	154.5	55.8	36.1
FY2014	400	82%	328	37%	254.5	62.5	24.5
FY2015	354	70%	248	27.5%	202.9	38.4	18.9
FY2016*	354	76%	269		250.8	23.9	9.5
FY2017**	300	69%	207		163.0	21.4	13.1
FY2018		71%					

*Indicates preliminary year-end catch data.
**Preliminary in-season catch estimate as of July 28, 2017, GARFO catch reports.

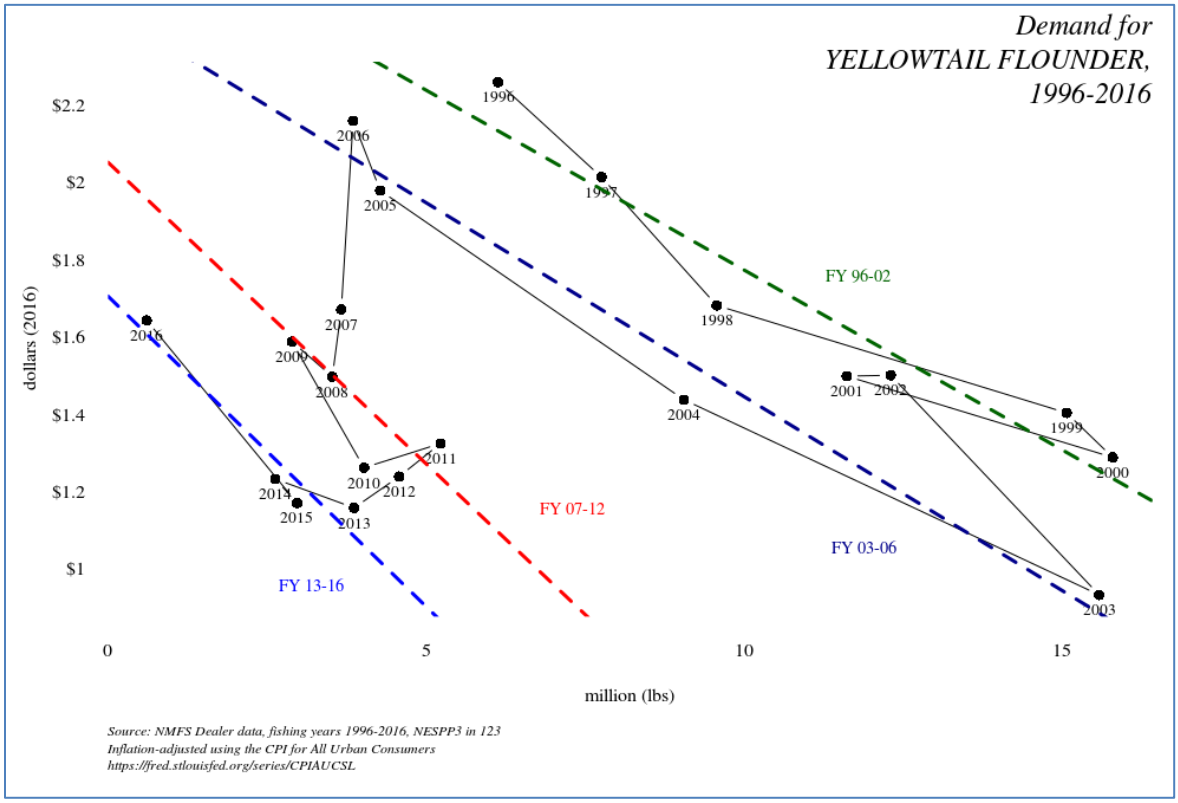
2. *Ratio of US discards to US landings of GB yellowtail flounder*

Figure 2 – Ratio of US discards to US landings of Georges Bank yellowtail flounder, 1979-2016. Source: 2017 stock assessment of Georges Bank yellowtail flounder, TRAC, Table 1, pp. 9.



3. *Demand function for yellowtail flounder, FY1996-FY2016.*

Figure 3- Demand of yellowtail flounder, all three stocks combined, FY1996-FY2016. Source: Dealer database.



PDT Recommendation

- The PDT does not recommend an increase in GB yellowtail flounder quota from the 2017 quota of 300 mt. The PDT is concerned about the continued declines in survey biomass estimates, low stock productivity, and poor state of the stock.
- The PDT could not reach consensus on a value to recommend for the GB yellowtail flounder quota for FY 2018. Some members proposed using the most recent three year (2014-2016) average catch of 107 mt in the interim to allow the stock the possibility for rebuilding. A 107 mt quota would represent a 3.4% exploitation rate. Other members suggested holding the quota constant at 300 mt since the fishery removals do not appear to be driving the stock dynamics. A 300 mt quota would represent about a 10% exploitation rate.

Addendum to August 1, 2016 Scallop PDT Memo to Groundfish PDT

DATE: August 2, 2017

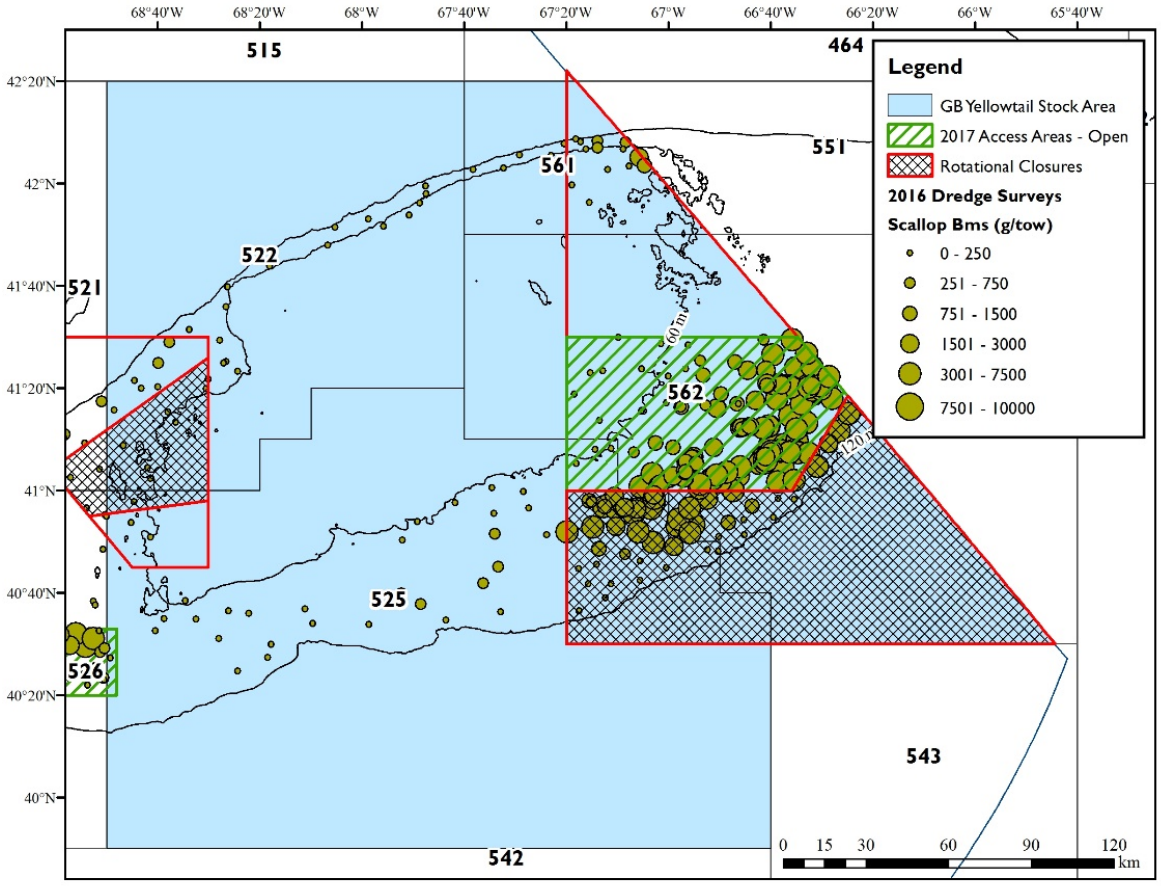
TO: Groundfish PDT

FROM: Scallop PDT

SUBJECT: **Update to 2016 memo re: Scallop Fishery Catch of Georges Bank Yellowtail Flounder**

On August 1, 2016 the Scallop PDT provided a memo outlining recent management measures within the Georges Bank yellowtail flounder (GB YT) stock area (statistical reporting areas 522, 525, 561, 562), catch estimates of GB YT, and scallop fishing effort within the GB YT stock boundary. In recent years, several management measures have been included in the Scallop FMP for the purpose of reducing GB YT bycatch. This document updates sections of the scallop PDT's 2016 memo on scallop fishery catch of GB YT to reflect recent Council action, and should be considered in addition to last year's memo.

Figure 1 – 2016 scallop dredge survey data, FY 2017 (FW28) Access Areas and Rotational Closures with Georges Bank Yellowtail Flounder statistical reporting areas (SRAs) shown in blue.



1. Scallop Fishery Allocations and Catch of GB YT

The scallop fishery is currently allocated 16% (based on historic catch) of the GB YT US acceptable biological catch (see Groundfish FW48). Bycatch of GB YT in the scallop fishery is highly variable based on access to the CAII access area. In years when NMFS projects that less than 90% of the scallop GB YT sub-ACL will be caught, the agency may initiate an allocation transfer from the scallop fishery to the groundfish fishery. In FY2015, NMFS transferred 7.9 mt of GB YT from the scallop fishery to the groundfish fishery (~21% of the FY 2015 scallop GB YT sub-ACL). In FY2016, NMFS transferred 39.8 mt from the scallop fishery to the groundfish fishery (~95% of the FY 2016 scallop GB YT sub-ACL).

Since FY 2011, scallop fishery catch of GB YT has ranged from a high of 164 mt (FY 2012) to a low of 2.1 mt in FY 2016 (note that there was no access to CAII or CAII Ext for FY 2016; Table 1). The Scallop PDT projects GB YT bycatch associated with the preferred scallop allocation alternatives for each Framework. Under FW 28, the projection of GB YT bycatch for FY 2017 was 63.2 mt (~50 mt was projected for CAII and ~13 mt was projected for the remaining open areas of GB), while the actual GB YT sub-ACL for FY 2017 is 32 mt. Bycatch projections for scallop FY 2018 will not be available until the Scallop PDT generates scallop allocation alternatives based on 2017 scallop surveys. However, FY 2018 scallop allocation may include access to CA II AA, as well as the CAII Ext area.

Table 1 - Recent GB YT TACs and scallop fishery sub-ACLs and catches. Values shown in metric tons (mt).

	Total Shared TAC – US & CA (mt)	US % Share	US TAC (mt)	% US TAC Caught	Scallop sub-ACL (mt)	Scallop catch (mt)	% Scallop ACL Caught
FY2011	2,650	55%	1,458	76%	200.8	83.9	41.8%
FY2012	1,150	49%	564	68%	156.9	164	104.5%
FY2013	500	43%	215	43%	41.5	37.5	90.4%
FY2014*	400	82%	328	37%	50.9	59	115.9%
FY2015*	354	70%	248	27.5%	38	29.7	78.1%
FY2016*	354	76%	269	***	42	2.1	5%
FY2017*	300	69%	207	***	32	14.5**	45.3%
FY2018*		71%					

* Indicates that retention of GB YT was prohibited for scallop fishery
**FY2017 GB YT scallop fishery catch estimate as of June 6, 2017
***Indicates that final catch data is not yet available

2. Rotational and Seasonal Closures within GB YT Stock Area

The CA II AA is situated within the GB YT stock area. After two years of closures (FY 2015-2016), the Closed Area II Access Area was reopened for FY 2017 through Framework 28 to the scallop FMP (Table 2). Scallop quota monitoring data from the Greater Atlantic Regional Office

(GARFO) indicate that approximately 45% of the GB YT sub-ACL was caught in April – May, 2017, with a scallop catch of ~820,000 lbs. Scallop catch from CAII AA during June and July, 2017 totaled over 2.5 million lbs; GB YT discard data for June and July is not currently available (Table 3). Since FY 2013, a seasonal closure from August 15 – November 15 has been employed within the CAII AA when the area is open to help reduce the catch of GB YT by the fishery. Additionally, FW28 prohibits RSA compensation fishing in CA II AA to reduce bycatch of yellowtail flounder.

In FY 2016 and FY 2017, the area to the south of CA II was designated as a rotational closure, CAII Ext., based on observations of small scallops (Figure 1). This area, which was previously part of the Georges Bank open areas, has historically had relatively higher GB YT bycatch than other Georges Bank open areas. Closure of the area for the past two years may have reduced overall GB YT catch by the scallop fishery.

Table 2 - Limited Access scallop fishery allocations by FY and recent schedule of CA II access

FY	Action	LA DAS (Full Time)	FT LA AA trips	CA II AA	Notes re: CA II AA and other management
2011	FW22	32	4 (2 MA)	0.5 trips (157 vessels; 18K lbs/trip)	10% access area bycatch cap; GB stock-wide monitoring of YT sub-ACL; Bycatch Avoidance Program CAI and CAII
2012	FW22	34	4	1 trip (313 vessels; 18K lbs/trip)	GB stock-wide monitoring of YT sub-ACL; Bycatch Avoidance Program CAI and CAII
2013	FW24	33	2	182 trips (13K lbs/trip)	Seasonal closure of CAII Aug 15 – Nov 15; GB stock-wide monitoring of YT sub-ACL; Bycatch Avoidance Program CAII
2014	FW25	31	2	197 trips (12K lbs/trip)	16% GB YT sub-ACL; YT landings prohibited; Seasonal closure of CAII Aug 15 – Nov 15; GB stock-wide monitoring of YT sub-ACL; Bycatch Avoidance Program CAII
2015	FW26	30.86	51K lbs to MAAA	Closed	In-season transfer to groundfish fishery (7.9 mt).
2016	FW27	34.55	3 (51K lbs to MAAA)	Closed	'CAII Extension' closure of open areas to protect small scallops; In-season transfer to groundfish fishery (39.8 mt)
2017	FW28	30.41	4 (18k each)	1 trip (313 vessels; 18k lbs trip)	'CAII Extension' closure of open areas to protect small scallops, no RSA compensation fishing in CAII; Bycatch Avoidance Program CAII

Table 3 - Limited Access scallop fishery CAII AA landings and discards to date for FY 2017 (adapted from www.greateratlantic.fisheries.noaa.gov/aps/monitoring/atlanticseascallop.html)

Month	Scallop (lbs)	GBYT (lbs)	Cumulative GB YT Catch (lbs)	% GBYT Sub-ACL
March	0	0	0	0.0%
April	110,795	5,180	5,180	7.3%
May	708,703	26,772	31,952	45.3%
June	1,745,098			
July	788,364			

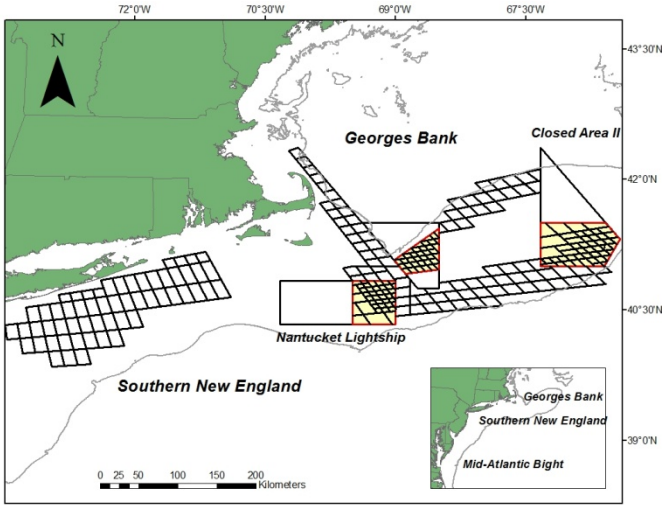
3. Bycatch Avoidance Efforts

The School for Marine Science and Technology (SMAST) Yellowtail Flounder Bycatch Avoidance System is a voluntary program to exchange real-time, spatially-specific information on yellowtail flounder bycatch in the rotational and open areas of Georges Bank and southern New England. The system uses fishery-dependent data to provide advice on bycatch hotspots. Vessels can use the near real-time advice to change fishing behavior and avoid regions with high bycatch rates. The system was implemented in 2010, and has continued each year with additional participating vessels and areas of bycatch reporting and avoidance (Table 4; Figure 2).

Table 4 - SMAST Bycatch Avoidance Program areas 2010-2017. Numbers in parentheses represent the number of participating vessels in each year. Closed Area II row is shown in gray.

	2010 (122)	2011 (214)	2012 (244)	2013 (252)	2014 (253)	2015 (258)	2016 (258)	2017 (258)
NLCA	x		x					
NLCA Extended				x	x			
CAI		x	x	x				
CAII		x	x	x	x			x
North GB Open				x	x	x	x	
South GB Open				x	x	x	x	
SNE Open					x	x	x	
Channel Open						x	X	

Figure 2 - Map of all reporting grids used for the SMAST Bycatch Avoidance Program 2010-2017.



4. Accountability Measures

The current Accountability Measure (AM) associated with the scallop fishery's sub-ACL of GB YT is a time-area closure, including the CA II AA and region south of the access area. The scheduled length of the closure is based on the amount by which the fishery exceeded the sub-ACL, and whether CA II AA is open or closed. The scallop fishery has not trigged the GB YT AM to date. If triggered, the AM could constrain the scallop fishery's ability to achieve yield objectives and could undermine the rotational management system. The Council is considering modifications to flatfish AMs in Framework 29.

In November 2016, the NEFMC voted to allow a "temporary exception with a two year sunset provision, to the scallop fishery AM implementation policy for the GBYT flounder stock" under Groundfish Framework 56. NMFS approved this measure in the final rule to Framework 56 in July of 2017, retroactive to the start of the groundfish fishing year (May 1, 2017). Under this temporary exception, the only criteria used to determine if an AM would be implemented for GB YT is if the scallop fishery exceeds their sub-ACL and the overall ACL for the stock is also exceeded. This exception removes the AM trigger criteria of the scallop fishery exceeding the GB YT sub-ACL by 150% or more. The Council's rationale for this provision was that "the purpose of the ACL and AM management system is to prevent overfishing… it makes little sense to sacrifice yield or increase fishing costs from the scallop fishery because of AMs designed to reduce the catch of groundfish stocks if the total ACL for those stocks is not exceeded". The Council specifically noted that recent utilization of GB YT by the groundfish fishery has been low due to low quotas.

Table 3 - Range of potential exploitation rates, with corresponding US share and scallop sub-ACL values (Adapted from the draft 2017 TRAC TSR for yellowtail flounder, dated 8/1/17).

Exp Rate	Catch Advice (mt)	US share (71% of catch advice)	Scallop sub-ACL (16% of US share)
2%	62	44	7
4%	125	89	14
6%	187	133	21
8%	249	177	28
10%	312	222	35
12%	374	266	42
14%	437	310	50
16%	499	354	57