

Mid-Atlantic Fishery Management Council 800 North State Street, Suite 201, Dover, DE 19901 Phone: 302-674-2331 | FAX: 302-674-5399 | www.mafmc.org Michael P. Luisi, Chairman | G. Warren Elliott, Vice Chairman Christopher M. Moore, Ph.D., Executive Director

## M E M O R A N D U M

Date: March 23, 2017

To: Council

From: José Montañez, Staff

Subject: Golden Tilefish Management Measures for 2018-2020

The following materials are enclosed for Council consideration for the 2018-2020 golden tilefish management measures.

- 1) Summary of the Golden Tilefish Monitoring Committee Recommendations (including summary table of the SSC and Monitoring Committee recommended catch and landings limits)
- 2) March 2017 Scientific and Statistical Committee Report (see Tab #10)
- 3) Golden Tilefish Stock Assessment Update Through 2016 NEFSC
- 4) Staff Recommendation Memo to Dr. Chris Moore (March 6, 2017)
- 5) 2017 Golden Tilefish Fishery Performance Report
- 6) 2017 Golden Tilefish Advisory Panel Information Document



#### Tilefish Monitoring Committee Webinar Meeting Summary March 21, 2017

Attendees: José Montañez (Council Staff), Steve Heins (NYSDEC), Paul Nitschke (NEFSC), Dan Farnham (Golden Tilefish Fishing Industry), and Douglas Potts (GARFO). Others in attendance: Laurie Nolan (Golden Tilefish Fishing Industry and Council Member), Kiley Dancy, Julia Beaty, and Matthew Seeley (Council Staff).

**Discussion:** The Tilefish Monitoring Committee (MC) was presented with a summary of the Scientific and Statistical Committee (SSC) deliberations of the March 2017 SSC meeting, where the SSC reviewed the Golden Tilefish Stock Assessment Update, the 2017 Golden Tilefish Advisory Panel Fishery Performance Report, and the 2017 Golden Tilefish Advisory Panel Information Document. Based on the updated information presented, the SSC recommended a three-year ABC based on Council revised approach of risk policy to maintain consistency in catch advise. The golden tilefish recommended ABC for each year 2018, 2019, and 2020 is 1.636 million pounds (742 mt). The monitoring committee discussed the different components of the golden tilefish catch and recent fishery trends.

#### The Monitoring Committees' Comments and Recommendations

#### Annual Catch Targets and Landings Limits and Basis for Derivation

The recommendations in this section were made for the next three years (2018-2020). The Monitoring Committee endorses the management measures recommended by staff for 2018-2020. The Tilefish MC recommended the annual catch limit (ACL) equal the annual catch target (ACT; no adjustment for management uncertainty)<sup>1</sup> of 1.636 million pounds (742 mt) for each year 2018, 2019, and 2020. The committee recommended the total allowed landings (TAL) be reduced by 0.009 million pounds (4 mt)<sup>2</sup> from the ACT, or from the appropriate sector-specific ACT if Framework 2 is approved and implemented, to account for commercial discards. The recommend TAL is 1.626 million pounds (738 mt) for each year 2018, 2019, and 2020. All catch and landings limits are shown in Table 1 at the end of this document.

The MC shares the SSC's concern over the poorly described level of recreational catch for golden tilefish, and recreational catch is currently unaccounted for within the stock assessment. The MC notes that

<sup>&</sup>lt;sup>1</sup> The MC discussed industry concerns related to some golden tilefish landings/sale by incidental vessels and/or non-permitted vessels. However, the MC believes that all golden tilefish landings are well recorded in the dealer/VTR data systems and they have not seen evidence that this may be a problem or heard from enforcement that this is a problem. The MC will continue to monitor this issue.

<sup>&</sup>lt;sup>2</sup> According to the "Discard Estimation, Precision, and Sample Size Analysis" conducted by the NEFSC, an average of 9,393 pounds (4.26 mt) were discarded for the 2012-2016 period (mostly large/small mesh trawls and gillnets).

recreational effort and landings by part/charter vessels have increased in recent years and that private vessels have likely also increased, and will continue to monitor recreational trends.

#### **Relevant Sources of Management Uncertainty**

Past sector-specific performance and catch performance can be used as a basis for qualifying management uncertainty (implementation error), and as an indicator of future availability to achieve the 2018-2020 ACTs. The commercial fishery landings performance has been in line with expectations and the MC recommends that an adjustment to address this aspect of management uncertainty is not necessary. The MC noted that IFQ vessels have been landing nearly the entirety of the IFQ from 2009 to 2014. In 2015, commercial landings were 1.354 million pounds or 23% below the overall TAL (1.755 million pounds). In 2016, commercial landings were 1.043 million pounds or 45% below the overall TAL (1.887 million pounds). Furthermore, since the IFQ system became effective, golden tilefish landings are closely scrutinized. The incidental fishery landed approximately 21,000 pounds (22% of their allocation) in 2016 fishing year, and this year the landings trajectory is slightly ahead when compared to last year's landings trajectory.

#### **Commercial Discards**

Development of a time series of discards was not done in the assessment model since discarding was considered negligible and information on discards do not exist for most of the time series. Very low or insignificant discards were estimated in other fisheries (incidental tilefish fisheries). There is higher uncertainty (high CVs) on some of the low recent discard estimates since the discarding of tilefish is a rare event on observed trips. Therefore, an average of several years was used to judge the recent relative magnitude of discarding in other fisheries. Following the process created by the ACL/AM Omnibus Amendment, the monitoring committee adjusted the TAL from the ACT using average annual discards for 2012-2016 as presented in "Discard Estimation, Precision, and Sample Size Analysis" conducted by the NEFSC (0.009 million pounds or 4 mt).<sup>1</sup>

The Monitoring Committee also discussed that commercial discards are not generated by the IFQ fishery. It was also discussed that Framework 2 recommends modifying the golden tilefish catch and landings flowchart to deduct discards after the ACT is divided between the IFQ and incidental categories as this would allow for commercial sector specific adjustments. Framework 2 is under review by GARFO (working on implementation, proposed rule coming). After consulting with GARFO, Council staff will note in the specifications package the catch and landings limits under the current catch and landings limit process (Table 1) and the process described under Framework 2 (where discards are directly subtracted from the specific fishery sector generating them to derive sector specific TALs).

#### **Other Management Measures**

#### Incidental Trip Limit

The MC did not recommend changes to the current 500-pounds whole weight (458-pounds gutted) incidental trip limit. The MC noted that Framework 2 would implement new landings ratios/qualifiers in the incidental fishery. The proposed landings ratios/qualifiers under Framework 2 are expected to address the industry concerns about directed trips in the incidental category by non-trawl vessels.

#### Recreational Bag Limit

The MC discussed the increase in recreational landings and those landings potentially becoming significant. The MC expressed concern about the increase in effort in the recreational fishery in recent years and the fact that we do not have a good understanding of the magnitude of those landings.

The MC shares the SSC's concerns over the poorly described level of recreational catch of golden tilefish, which is currently unaccounted for within the stock assessment; and that, if the harvest is substantially larger than currently believed, the SSC recommend that efforts should be made to directly account for this source of removals in the assessment. The MC will continue to monitor the recreational catch in the fishery. The MC is hopeful that the recreational data collection requirements (for blueline and golden tilefish) to be implemented under Amendment 6 will provide additional information regarding tilefish landings in the recreational fishery.

The MC also discussed industry concerns that the 8-fish per person per trip bag limit was first implemented when the TAL was under the constant harvest strategy of 1.995 million pounds (905 mt) and that we have seen reductions in the TAL in recent years while maintaining the 8-fish per person bag limit. The MC indicated that given the uncertainty in the recreational catches and effort and with the given difficulties in predicting changes in the recreational effort and tilefish mortality with changes in the bag limit, they do not have sufficient information to make a recommendation about reductions in the bag limit at this time. However, the MC did explicitly recommend that no increase to the bag limit should be made with the needed reductions in the ABCs.

	2017 (Current)	2018	2019	2020	Basis (2018-2020)
OFL	2.405 m lb (1,063 mt)	2.332 m lb (1,058 mt)	2.421 m lb (1,098 mt)	2.291 m lb (1,039 mt)	Projections
ABC	1.898 m lb (861 mt) 79%	1.636 m lb (742 mt) 70%	1.636 m lb (742 mt) 68%	1.636 m lb (742 mt) 71%	Projections/ Council Risk Policy (recommendation, based on
ACL	1.898 m lb (861 mt)	1.636 m lb (742 mt)	1.636 m lb (742 mt)	1.636 m lb (742 mt)	overfishing probability averaging) ABC = ACL
ACT	1.898 m lb (861 mt)	1.636 m lb (742 mt)	1.636 m lb (742 mt)	1.636 m lb (742 mt)	Deduction for management uncertainty = 0
Discards	0.011 m lb (5 mt)	0.009 (4 mt)	0.009 m lb (4 mt)	0.009 m lb (4 mt)	Avg. discard (2012-2016) mostly sm/lg mesh OT and Gillnet gear
TAL	1.887 m lb (856 mt)	1.626 m lb (738 mt)	1.626 m lb (738 mt)	1.626 m lb (738 mt)	ACT - discards
IFQ Quota	1,792,799 lb (813.2 mt)	1,545,115 (700.85 mt)	1,545,115 (700.85 mt)	1,545,115 (700.85 mt)	95% of the TAL
Incidental Quota	94,357 lb (42.8 mt)	81,322 (36.89 mt)	81,322 (36.89 mt)	81,322 (36.89 mt)	5% of the TAL

Table 1. Summary of SSC and MC recommendation for catch and landings limits for golden tilefish for 2018-2020 compared to 2017 measures.

Resulting IFQ and incidental landings limits under the process described under Framework 2 (where discards are directly subtracted from the specific fishery sector generating them to derive sector specific TALs).

	2017 (Current)	2018	2019	2020	Basis (2018-2020)
нолст	NA	1.554 m lb	1.554 m lb	1.554 m lb	IFQ 95% of ACL
IFQACI	NA	(705 mt)	(705 mt)	(705 mt)	Incidental 5% of ACL.
	NT A	0.08 m lb	0.08 m lb	0.08 m lb	Deduction for management
Incidental ACI	NA	(37 mt)	(37 mt)	(37 mt)	uncertainty = 0
IFQ Discards	NA	0	0	0	
Incidental Discards	NA	0.009	0.009 m lb	0.009 m lb	Avg. discard (2012-2016) mostly
		(4 mt)	(4 mt)	(4 mt)	sm/lg mesh OT and Gillnet gear
	<b>N</b> T 4	1.554 m lb	1.554 m lb	1.554 m lb	
IFQ TAL	NA	(705 mt)	(705 mt)	(705 mt)	IFQ AC1 – IFQ discards
T 11 ( 1774T	NT A	0.07 m lb	0.07 m lb	0.07 m lb	Incidental ACT –
Incidental TAL	NA	(33 mt)	(33 mt)	(33 mt)	Incidental discards
TOO	1,792,799 lb	1,554,038	1,554,038	1,554,038	
IFQ Quota	(813.2 mt)	(704.90 mt)	(704.90 mt)	(704.90 mt)	
	94,357 lb	72,398 lb	72,398 lb	72,398 lb	
Incidental Quota	(42.8 mt)	(32.84 mt)	(32.84 mt)	(32.84 mt)	

Note: all other catch and landings limit components are identical than those under the above Table. NA = Not Applicable.

# Report of the March 2017 Meeting of the MAFMC SSC

See Committee Reports *Tab # 10* 

### Golden Tilefish, *Lopholatilus chamaeleonticeps*, stock assessment update through 2016 in the Middle Atlantic-Southern New England Region



Paul Nitschke National Marine Fisheries Service Northeast Fisheries Science Center Woods Hole, MA 02543 February 28, 2017

This information is distributed solely for the purpose of pre-dissemination peer review. It has not been formally disseminated by NOAA. It does not represent any final agency determination or policy. **State of Stock:** This assessment of Golden tilefish is an update through 2016 of commercial fishery landings and size data, CPUE indices of abundance, and the analyses of those data. The Golden tilefish stock was not overfished and overfishing was not occurring in 2016 relative to the newly updated biological reference points (Figure 1).

The SARC 58 (NEFSC 2014) ASAP model was updated with landings, size/age distributions, and commercial CPUE data from 2013-2016 (Figures 2 to 6). During this update process the SARC 58 ASAP model was found to have the likelihood constants turned on. Since the SARC 58 assessment, it was determined that incorporation of likelihood constants into the objective function can cause biases in assessment models (Deroba and Miller 2016). This bias can result in reductions in the estimated recruitment and biomass. These biases also tend to occur more often at the end of the time series in models with limited data and dome-shaped selectivity assumptions (Legault 2015). In this 2017 update the likelihood constants were turned off and are no longer used, which tends to shift recruitment and SSB trends higher and fishing mortality lower, especially at the end of the time series relative to the SARC 58 assessment (Figure 1). This change in the standard ASAP model configuration requires, for this assessment model update only, that the biological reference points be updated following the procedure used in the SARC 58 assessment.

The  $F_{MSY}$  proxy was updated using the new average of the fishing mortality during 2002-2012 (a period when the stock was rebuilding under constant quota = 905 mt), providing an updated  $F_{MSY}$  proxy of 0.310 (equal to  $F_{38\%}$ ), compared to the SARC 58 value of 0.370 (equal to  $F_{25\%}$ ). The SSB<sub>MSY</sub> and MSY proxies were also updated using the same procedures as in the SARC 58 assessment. The updated SSB target = SSB<sub>MSY</sub> = SSB<sub>38\%</sub> = 9,492 mt (compared to the SARC 58 SSB<sub>25%</sub> = 5,153 mt) and the updated SSB threshold = one-half SSB<sub>38\%</sub> = 4,746 mt (compared to the SARC 58 one-half SSB<sub>25%</sub> = 2,577 mt). The updated MSY<sub>38%</sub> = 957 mt (compared to the SARC 58 MSY<sub>25%</sub> = 1,029 mt).

Based on the ASAP model the stock was at high biomass and lightly exploited during the early 1970s. As the longline fishery developed during the late 1970s, fishing mortality rates increased and stock biomass decreased to a time series low by 1998. Since the implementation of constant landings quota of 905 mt in 2002, the stock has increased approaching the biomass target reference point (SSBMsy proxy).

The fishing mortality rate was estimated to be 0.249 in 2016, below the updated reference point FMSY proxy = 0.310. There is a 90% probability that the fishing mortality rate in 2016 was between 0.179 and 0.359 (Figures 7 and 8). SSB was estimated to be 8,479 mt in 2016, 89% of the updated biomass target reference point SSBMSY proxy = 9,492 mt. There is a 90% chance that SSB in 2016 was between 4,061 and 12,888 mt (Figures 7 and 8). Average recruitment from 1971 to 2016 was 1.42 million fish at age 1. Recent large year classes occurred in 1998 (2.35 million), 1999 (2.39 million) and 2005 (1.85 million). A recent large year class is estimated at 2.85 million in 2013. This year class should recruit to the small and kitten market categories in 2017. The updated 2017 final run had a minor retrospective pattern in fishing mortality (Mohn's Rho = -0.15), spawning stock biomass (Mohn's Rho = -0.06) and age-1 recruitment (Mohn's Rho = +0.24) (Figures 9-11).

**Catch:** Total commercial landings (live weight) increased from less than 125 metric tons (mt) during 1967-1972 to more than 3,900 mt in 1979 during the development of the directed longline fishery (Figure 2). Landings prior to the mid-1960s were landed as a bycatch in the trawl fishery. Annual landings ranged between 454 and 1,838 mt from 1988 to 1998. Landings from 1999 to 2002 were below 900 mt (ranging from 506 to 874 mt). An annual quota of 905 mt was implemented in November of 2001. Landings in 2003 and 2004 were slightly above the quota at 1,130 mt and 1,215 mt respectively. Landings from 2005 to 2009 were at or below the quota, while landings in 2010 at 922 mt were slightly above the quota (Figure 2). Since 2010 landings have been below the quota and decreased to an estimated 502 mt in 2016. The Total Allowable Landings (TAL) was reduced for the first time in 2015 to 796 mt from the TAL of 905 mt which was in place from 2001-2014. The TAL in 2016 and 2017 was increased to 856 mt based on projections from the SARC 58 assessment.

During the late 1970s and early 1980s Barnegat, NJ was the principal tilefish port; more recently Montauk, NY has accounted for most of the landings. Most of the commercial landings are taken by the directed longline fishery. Discards in the trawl and longline fishery appear to be a minor component of the catch. Recreational catches are estimated to be low and were not included as a component of the removals in the assessment model.

#### Catch and Status Table: Golden Tilefish. Landings, SSB, Recruitment (age-1), and Fishing Mortality (FMULT) (weights in '000 mt live, recruitment in millions)

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Max <sup>1</sup>	$Min^1$	Mean <sup>1</sup>	
Commercial landings	0.8	0.7	0.9	0.9	0.9	0.8	0.8	0.8	0.6	0.5	4.0	0.1	1.3	
SSB	7.9	8.1	8.7	8.3	8.4	8.4	7.9	8.1	8.4	8.5	28.6	2.6	8.9	
Recruitment	1.5	1.0	0.9	0.8	0.8	0.5	1.0	2.9	1.5	1.2	3.9	0.5	1.4	
Fishing mortality	0.36	0.37	0.34	0.29	0.26	0.28	0.35	0.40	0.30	0.25	1.18	0.01	0.46	
1.0 1.1071.00	1 /													

<sup>1</sup> Over period 1971-2016.

**Commercial CPUE, market category and size composition data:** Changes in the CPUE can be generally explained by the impact of strong incoming year classes that track through the landings size composition over time. Since the SARC 58 assessment there appear to be increases in CPUE due to one or two new strong year classes. In general, strong year classes and proportion of larger fish in the catch appear to persist longer in the fishery after the FMP's quota based management came into effect, which is evident in both the CPUE and size composition data. The continued decrease in the CPUE since 2011 is consistent with the ageing of the last strong year class in 2005.

More recently, evidence of a new strong 2013 year class is beginning to enter the fishery. The 2016 data update showed a mode of very small tilefish (31 cm) in the 2015 catch at length from the unclassified market category (Figures 5 and 6). Now the update of the 2016 catch at length provides further evidence of this strong 2013 year class, which has just begun to enter the directed fishery in the extra small market category. A broad size distribution and market category proportions show evidence of small fish from the strong 2013 year class while also showing the presence of larger fish in the catch. CPUE is expected to increase from a 10 year low as the strong 2013 year class further recruits to the fishery. This year class is projected to enter the small/kitten market categories at age 4 during 2017 (Figure 4). However, the exact strength of this year class is still uncertain since it is estimated to be only 5% recruited to the fishery in 2016. The model suggests a 50% selection at age 4 in 2017 and full selection at age 5 in 2018.

**Projections:** The projections are conditioned on the 2017 ABC being taken (861 mt) in 2017 and fishing at the  $F_{MSY}$  proxy = 0.310 from 2018 to 2020. Overfishing is projected to occur in 2017 at a 58% probability with the removals of 861 mt.

	TT ( 1				
	Total				
Year	Catch	F	SSB	$P(F > F_{MSY})$	$P(SSB < SSB_{MSY}/2)$
2017	861	0.327	6,983	0.577	0.127
2018	1,058	0.310	7,407	-	0.094
2019	1,030	0.310	7,824	-	0.055
2020	944	0.310	7,856	-	0.047

Catch, Fishing Mortality (F), Spawning Stock Biomass (SSB), Probability of F>F<sub>MSY</sub> and SSB<SSB<sub>MSY</sub>/2 Catch and SSB in metric tons

**Stock Distribution and Identification:** Golden Tilefish, *Lopholatilus chamaeleonticeps*, inhabit the outer continental shelf from Nova Scotia to South America and are relatively abundant in the Southern New England to Mid-Atlantic region at depths of 80 to 440 m. Tilefish have a relatively narrow temperature preference of 9 to 14 °C. The Virginia- North Carolina border defines the boundary between the northern and southern Golden Tilefish management units.

Data, Assessment Model and Model Sensitivity Runs: The surplus production model ASPIC was used to assess the Golden Tilefish stock in assessments previous (Nitschke et al. 1998, NEFSC 2005, 2009) to SARC 58 (NEFSC 2014). The availability of length and age data facilitated application of a forward projecting age-structured model ASAP (Legault and Restrepo 1998; NFT 2013c) using a pooled age length key in the SARC 58 stock assessment. The same pooled age length key was used in this 2017 model update. However, new age data was available for 2007, 2014 and 2015. A sensitivity model run was done using 2014 and 2015 ages to estimate year specific catch at age for these two years and a pooled 2014 and 2015 key was used to estimate 2016 (Figure 12). An additional sensitivity run was done by pooling all the age data available and develop a new pooled age length key for the whole time series which was then used to re-estimate the time series catch and weight at age. In general there was little difference between the updated 2017 model using the pooled key from SARC 58 with the two sensitivity runs. Incomplete year specific age information in 2016 likely was responsible for the failure to estimate a strong 2013 year class in the year specific run. However, there is evidence of a strong 2013 year class in the catch at length. Note that the use of a pooled age length key will also contribute to the uncertainty in year class strength and in turn influence projected catches.

There are no fishery independent surveys available for this stock, so commercial catch per unit effort is relied upon for indications of population abundance. Over the last fifteen years, the commercial length and more recent age data indicate that increases in fishery CPUE and model estimated biomass are predominantly due to the influence of strong year classes in 1999 and 2005 (Figure 3). The 2005 year class has now passed through the fishery, and fishery CPUE has continued to decline to the terminal year in 2016 with the dome-shaped selectivity pattern. Review of commercial fishery practices and markets justified the use of a dome-shaped selectivity pattern used in the assessment model developed at SARC 58.

**Biological Reference Points (BRPs):** Golden Tilefish are estimated to live about 40 years, and this information along with the SARC 58 likelihood profiles of the ASAP model indicated that a value for instantaneous natural mortality (M) of 0.15 was appropriate (NEFSC 2014). The long lifespan and relatively low M would suggest that a fishing mortality rate BRP of F<sub>40%</sub> or higher %MSP would be appropriate. Under a management regime using a constant landings quota of 905 mt from 2002-2012, with actual landings close to the quota each year, the stock increased to 8,388 mt in 2012. SARC 58 (NEFSC 2014) therefore recommended using the average of the fishing mortality during 2002-2012, a period when the stock was rebuilding under constant quota = 905 mt, as the  $F_{MSY}$  proxy for Golden Tilefish.

This update indicates that fishing mortality rates have averaged 0.310 from 2002-2012, and the updated yield per recruit analysis shows that this fishing rate now corresponds to F<sub>38%</sub>, compared to the  $F_{25\%}$  estimate calculated in SARC 58. Therefore, the updated BRPs proxies using the same average F calculations as in SARC 58 produced a  $F_{MSY}$  proxy = 0.310 (overfishing threshold), with corresponding SSB<sub>MSY</sub> proxy = 9,492 mt (SSB target), one-half SSB<sub>MSY</sub> = 4,746 mt (SSB threshold), and MSY = 957 mt. SSB<sub>MSY</sub> was calculated from median estimates of long term (100 years) stochastic projections fishing at the  $F_{MSY}$  proxy = 0.310 which resampled from the CDF of empirical recruitment from 1971-2016.

**Fishing Mortality:** Fishing mortality on the fully selected age class (age 5, FMULT) increased with the development of the directed longline fishing from near zero in 1971 to 1.179 in 1987 (Figure 7). Fishing mortality then remained relatively high through the 1990s. Fishing mortality has been lower since 1999 and was estimated to be 0.249 in 2016. FMULT 90% confidence intervals were 0.179 and 0.359 in 2016 (Figure 8).

**Spawning Stock Biomass:** Spawning stock biomass decreased substantially early in the time series from 28,608 mt in 1974 to 2,591 mt in 1998, lowest in the time series (Figure 7). SSB has since increased to 8,479 mt in 2016. Spawning stock biomass 90% confidence intervals were 4,061 and 12,888 mt in 2016 (Figure 8).

**Recruitment:** Average recruitment from 1971 to 2016 was 1.4 million fish. Recent large year classes have occurred in 1998 (2.93 million), 1999 (3.02 million) and 2005 (2.05 million) (Figure 1). A new recent large year class was estimated in 2013 (2.85 million). However, this year class has just started to enter the directed longline fishery in 2016, and so this estimate has higher uncertainty than those prior.

#### **References and Further Information:**

Deroba, J., T. Miller. 2016. Correct in theory but wrong in practice: Bias caused by using a lognormal distribution to penalize annual recruitments in fish stock assessment models. Fish. Res. 176; 86-93.

Freeman B, Turner S. 1977. Biological and fisheries data on tilefish, *Lopholatilus chamaeleonticeps* Goode and Bean. NEFSC Tech Rep. 5.

Legault, C. 2015. The ASAP likelihood constants explained.

Legault CM, Restrepo VR. 1998. A flexible forward age-structured assessment program. ICCAT.Col. Vol. Sci. Pap. 49:246-253.

Mid-Atlantic Fishery Management Council. 2000. Tilefish fishery management plan. NOAA award No. NA57FC0002.

Nitschke, P., G. Shepherd, and M. Terceiro. 1998. Assessment of tilefish in the middle Atlantic – southern New England region. NEFSC. 1-12.

NEFSC. 2005. Northeast Regional Stock Assessment Workshop (41st SAW). 41st SAW Assessment Report. U.S. Dept. Commerce, Northeast Fisheries Science Center Ref. Doc. 05-14; 237 p.

NEFSC. 2009. Northeast Regional Stock Assessment Workshop (48st SAW). 48st SAW Assessment Report. U.S. Dept. Commerce, Northeast Fisheries Science Center Ref. Doc. 09-15; 834 p.

NEFSC. 2014. 58th Northeast Regional Stock Assessment Workshop (58th SAW) Assessment Report. US Dept Commer, Northeast Fish Sci Cent Ref Doc. 14-04; 784 p. (Internet address: http://nefsc.noaa.gov/publications/)

Turner, S.C. 1986. Population dynamics of and, impact of fishing on tilefish, *Lopholatilus chamaeleonticeps*, in the Middle Atlantic-Southern New England region during the 1970's and early 1980's. New Brunswick, N.J.: Rutgers University. Ph.D. dissertation.

NOAA Fisheries Toolbox (NFT) 2013a. Age Structured Assessment Program (ASAP) version 3.0.17. (Internet address: http://nft.nefsc.noaa.gov).

NOAA Fisheries Toolbox (NFT). 2013b. Yield per recruit (YPR) version 3.2.1. (Internet address: http://nft.nefsc.noaa.gov).

NOAA Fisheries Toolbox (NFT) 2013c. Age Structured Projection Model (AGEPRO) version 4.2.2 [Internet address: http://nft.nefsc.noaa.gov ].



Figure 1.  $F_{MULT}$ , spawning stock biomass (SSB), and age-1 recruitment comparison of the SARC 58 final ASAP model (terminal year 2012) with the likelihood constants on, the SARC 58 model (terminal year 2012) with the likelihood constants turned off and the final update 2017 model (terminal year 2016) with the likelihood constants turned off. The SARC 58 and 2017 updated estimated  $F_{MSY}$  and SSB<sub>MSY</sub> biological reference points are also shown for comparison.



Figure 1. Cont.  $F_{MULT}$ , spawning stock biomass (SSB), and age-1 recruitment comparison of the SARC 58 final ASAP model (terminal year 2012) with the likelihood constants on, the SARC 58 model (terminal year 2012) with the likelihood constants turned off and the final update 2017 model (terminal year 2016) with the likelihood constants turned off. The SARC 58 and 2017 updated estimated  $F_{MSY}$  and SSB<sub>MSY</sub> biological reference points are also shown for comparison.



Figure 2. Landings of tilefish in metric tons from 1915-2016 (top) and from 2000-2016 (bottom). Landings in 1915-1972 are from Freeman and Turner (1977), 1973-1989 are from the general canvas data, 1990-1993 are from the weighout system, 1994-2003 are from the dealer reported data, and 2004-2016 is from dealer electronic reporting. Red line is the Total Allowable Landings (TAL) from 2001-2017.



Figure 3. General Linear Model (GLM) Catch Per Unit Effort (CPUE) for the Weighout and Vessel Trip report (VTR) data split into two series with additional New York logbook CPUE data from three vessels (1991-1994) added to the VTR series. Four years of overlap between the Turner (1986) and Weighout CPUE series can also be seen. ASAP relative changes in qs among CPUE series were not incorporated into the plot. Assumed total landings are also shown. Landings in 2005 were taken from the Interactive Voice Reporting (IVR) system. Red line is the Total Allowable Landings (TAL).



Figure 4. Bubble plot of Golden tilefish landings by market category. Large-medium market category code was added in 2013. Smalls and Kittens (s&k) were combined since these categories possess similar size fish.



Figure 5. Expanded length frequency distributions from 2002 to 2016. Kittens lengths were used to characterize the extra small category in 2013. Y-axis is allowed to rescale.



Figure 6. Expanded length frequency distributions from 2007 to 2016. No lengths for extra small (xs) exist in 2013. Kittens lengths were used to characterize the extra small category in 2013. No length samples for unclassified were used from 2007-2014. Unclassifieds in 2015 are based on two samples. Y-axis is allowed to rescale.





Figure 7. Updated 2017 ASAP model estimated fishing mortality (FMULT) and SSB with MCMC estimated 90% confidence intervals.



Figure 8. MCMC 2016 distributions for fishing mortality (FMULT) and SSB. The percent confidence intervals can be taken from the cumulative frequency. The 2016 point estimate for fishing mortality = 0.249 and SSB = 8,479 mt.





Figure 9. Updated 2017 model 7 peel retrospective analysis: fully recruited F age  $5 = F_{Mult}$ ; Mohn's Rho = -0.15.



Figure 10. Updated 2017 model 7 peel retrospective analysis: Spawning Stock Biomass; Mohn's Rho = -0.06.





Figure 11. Updated 2017 model 7 peel retrospective analysis: Age-1 Recruitment; Mohn's Rho = +0.24.



Figure 12.  $F_{MULT}$ , spawning stock biomass (SSB), and age-1 recruitment comparison of the 2017 final update run using the SARC 58 pooled age length key to age 2013-2016 to a sensitivity run which used year specific keys in 2014 and 2015 and 2014-2015 pooled to age 2016 and a second sensitivity run which used all age data available 2007-2015 to estimate an update pooled age length key that was used to estimate the catch at age and weights at age in all years.

Golden Tilefish, *Lopholatilus chamaeleonticeps*, tables and figures update through 2016 in the Middle Atlantic-Southern New England Region



Paul Nitschke National Marine Fisheries Service Northeast Fisheries Science Center Woods Hole, MA 02543 February 27, 2017

This information is distributed solely for the purpose of pre-dissemination peer review. It has not been formally disseminated by NOAA. It does not represent any final agency determination or policy.

year	mt	year	mt	year	mt
1915	148	1960	1,064	2005	676
1916	4,501	1961	388	2006	907
1917	1,338	1962	291	2007	749
1918	157	1963	121	2008	737
1919	92	1964	596	2009	864
1920	5	1965	614	2010	922
1921	523	1966	438	2011	864
1922	525	1967	50	2012	834
1923	623	1968	32	2013	846
1924	682	1969	33	2014	814
1925	461	1970	61	2015	601
1926	904	1971	66	2016	*502
1927	1,264	1972	122		
1928	1,076	1973	394		
1929	2,096	1974	586		
1930	1,858	1975	710		
1931	1,206	1976	1,010		
1932	961	1977	2,082		
1933	688	1978	3,257		
1934	-	1979	3,968		
1935	1,204	1980	3,889		
1936	-	1981	3,499		
1937	1,101	1982	1,990		
1938	533	1983	1,876		
1939	402	1984	2,009		
1940	269	1985	1,961		
1941	-	1986	1,950		
1942	62	1987	3,210		
1943	8	1988	1,361		
1944	22	1989	454		
1945	40	1990	874		
1946	129	1991	1,189		
1947	191	1992	1,653		
1948	465	1993	1,838		
1949	582	1994	786		
1950	1,089	1995	666		
1951	1,031	1996	1,121		
1952	964	1997	1,810		
1953	1,439	1998	1,342		
1954	1,582	1999	525		
1955	1,629	2000	506		
1956	707	2001	874		
1957	252	2002	851		
1958	672	2003	1,130		
1959	380	2004	1,215		

Table 1. Landings of tilefish in live metric tons from 1915-2014. Landings in 1915-1972 are from Freeman and Turner (1977), 1973-1989 are from the general canvas data, 1990-1993 are from the weighout system, 1994-2003 are from the dealer reported data, and 2004-2016 is from Dealer electronic reporting. - indicates missing data. \* Preliminary data retrieved on 2/2/17.

Table 2. Total commercial and vessel trip report (VTR) landings in live mt and the commercial catch-per-unit effort (CPUE) data used for tilefish. Dealer landings before 1990 are from the general canvas data. CPUE data from 1979 to the first half of 1994 are from the NEFSC weighout database, while data in the second half of 1994 to 2016 are from the vtr system (below the dotted line). Effort data are limited to longline trips which targeted tilefish (= or >75% of the landings were tilefish) and where data existed for the days absent. Nominal CPUE series are calculated using landed weight per days absent minus one day steam time per trip. Da represents days absent.

	Weighout		Commerical CPUE data subset								
	& Dealer	vtr	interview	No.	% interview	No.	subset	days	No.	da per	nominal
year	landings	landings	landings	interviews	trips	vessels	landings	absent	trips	trip	cpue
1979	3,968		0.0	0	0.0%	20	1,807	1,187	330	3.6	1.93
1980	3,889		0.8	1	0.3%	18	2,153	1,390	396	3.5	1.99
1981	3,499		35.0	4	1.2%	21	1,971	1,262	333	3.8	1.95
1982	1,990		90.7	13	5.7%	18	1,267	1,282	229	5.6	1.10
1983	1,876		85.8	16	8.9%	21	1,013	1,451	179	8.1	0.73
1984	2,009		140.1	25	18.2%	20	878	1,252	138	9.1	0.72
1985	1,961		297.1	64	30.6%	25	933	1,671	209	8.0	0.59
1986	1,950		120.7	31	16.5%	23	767	1,186	188	6.3	0.71
1987	3,210		198.5	38	18.5%	30	1,014	1,343	206	6.5	0.82
1988	1,361		148.2	30	19.4%	23	422	846	154	5.5	0.56
1989	454		92.8	11	15.7%	11	165	399	70	5.7	0.46
1990	874		32.4	8	11.9%	11	241	556	68	8.2	0.45
1991	1,189		0.8	3	2.8%	7	444	961	107	9.0	0.48
1992	1,653		58.0	9	8.6%	13	587	969	105	9.2	0.62
1993	1,838		71.9	11	10.5%	10	571	959	105	9.1	0.61
1994	-		0	0	0.0%	7	127	385	42	9.2	0.34
1994	786	30				4	53	150	18	8.3	0.37
1995	666	547				5	466	954	99	9.6	0.50
1996	1,121	865				8	822	1,318	134	9.8	0.64
1997	1,810	1,439				6	1,427	1,332	133	10.0	1.09
1998	1,342	1,068				9	1,034	1,517	158	9.6	0.70
1999	525	527				10	516	1,185	133	8.9	0.45
2000	506	446				11	421	932	110	8.5	0.47
2001	874	705				8	691	1,046	116	9.0	0.68
2002	851	724				8	712	951	114	8.3	0.78
2003	1,130	790				7	788	691	101	6.8	1.22
2004	1,215	1,153				12	1,136	811	134	6.1	1.54
2005	676	808				11	802	470	93	5.1	1.95
2006	907	870				12	852	682	105	6.5	1.35
2007	749	710				12	691	727	101	7.2	1.01
2008	737	675				14	672	1,119	124	9.0	0.62
2009	864	812				12	800	1,106	130	8.5	0.75
2010	922	871				11	853	694	108	6.4	1.33
2011	864	822				9	781	517	89	5.8	1.68
2012	834	799				12	795	651	100	6.5	1.32
2013	846	844				11	796	831	112	7.4	1.02
2014	814	790				13	716	961	120	8.0	0.78
2015	601	593				12	515	920	111	8.3	0.58
2016	502	477				11	381	806	98	8.2	0.49

Table 3. Landing (metric tons) by market category. A large-medium (lg/med) code was developed in 2013. Smalls and Kittens were combined since these categories possess similar size fish. Xs is extra small and xl is extra large.

year	XS	small & kittens	medium	lg/med	large	xl	unclassified	total
1990	0	38	103	-	46	0	687	874
1991	0	59	154	-	85	0	891	1189
1992	0	330	88	-	86	0	1,149	1653
1993	0	368	206	-	66	4	1,193	1838
1994	0	19	89	-	54	7	617	786
1995	0	99	88	-	91	2	386	666
1996	0	592	149	-	156	2	221	1121
1997	0	1,130	260	-	111	2	307	1810
1998	0	475	700	-	103	6	58	1342
1999	0	181	201	-	106	8	29	525
2000	0	210	153	-	115	8	20	506
2001	0	564	161	-	124	6	19	874
2002	0	369	311	-	128	3	40	851
2003	0	776	171	-	144	5	35	1130
2004	20	397	523	-	129	9	137	1215
2005	0	18	335	-	149	1	173	676
2006	1	16	233	-	369	1	287	907
2007	3	96	142	-	397	4	106	749
2008	17	149	195	-	299	17	60	737
2009	35	334	179	-	226	28	61	864
2010	16	269	373	-	166	17	81	922
2011	6	142	339	-	216	10	152	864
2012	8	95	308	-	285	17	121	834
2013	19	138	281	14	290	21	82	846
2014	13	227	195	88	238	47	5	814
2015	12	93	161	81	189	57	5	601
2016	42	93	75	65	182	44	3	502



Figure 1. Landings of tilefish in metric tons from 1915-2016 (top) and from 2000-2016 (bottom). Landings in 1915-1972 are from Freeman and Turner (1977), 1973-1989 are from the general canvas data, 1990-1993 are from the weighout system, 1994-2003 are from the dealer reported data, and 2004-2016 is from dealer electronic reporting. Red line is the Total Allowable Landings (TAL) from 2001-2017.



Figure 2. Number of vessels and length of trip (days absent per trip) for trips targeting tilefish (= or >75% tilefish) from 1979-2016. Total Dealer landings are also shown.



Figure 3. Number of interviewed trips and interviewed landings for trips targeting tilefish (= or >75% tilefish) for the Weighout data from 1979-1994. Total Weighout landings and the subset landings used in CPUE estimate are also shown.



Figure 4. Total number of trips and days absent for trips targeting tilefish (= or >75% tilefish) from 1979-2016. Total Dealer and CPUE subset landings are also shown



Figure 5. General Linear Model (GLM) Catch Per Unit Effort (CPUE) for the Weighout and Vessel Trip report (VTR) data split into two series with additional New York logbook CPUE data from three vessels (1991-1994) added to the VTR series. Four years of overlap between the Turner (1986) and Weighout CPUE series can also be seen. ASAP relative changes in qs among CPUE series were not incorporated into the plot. Assumed total landings are also shown. Landing in 2005 was taken from the Interactive Voice Reporting (IVR) system. Red line is the Total Allowable Landings (TAL).



Figure 6. Comparison of the nominal and GLM VTR CPUE indices for golden tilefish with additional New York logbook CPUE data from three vessels (1991-1994) added to the VTR series.



Figure 7. Bubble plot of Golden tilefish landings by market category. Large-medium market category code was added in 2013. Smalls and Kittens (s&k) were combined since these categories possess similar size fish.


Figure 8. Expanded length frequency distributions by year. Large market category lengths used from 1995 to 1999 were taken from years 1996, 1998, and 1998. Smalls and kittens were combined and large and extra large were also combined.



Figure 9. Expanded length frequency distributions from 2002 to 2016. Kittens lengths were used to characterize the extra small category in 2013. Y-axis is allowed to rescale.



Figure 10. Expanded length frequency distributions from 2007 to 2016. No lengths for extra small (xs) exist in 2013. Kittens lengths were used to characterize the extra small category in 2013. No length samples for unclassified were used from 2007-2014. Unclassifieds in 2015 are based on two samples. Y-axis is allowed to rescale.



Figure 11. Expanded length frequency distributions from 2002 to 2016. Kittens lengths were used to characterize the extra small category in 2013. No length samples for unclassified were used from 2007-2014. Unclassifieds in 2015 are based on two samples. Y-axis scales is fixed.



# **MEMORANDUM**

**Date:** March 6, 2017

To: Chris Moore, Executive Director

From: José Montañez, Staff

Subject: Golden Tilefish Management Measures (2018, 2019, 2020)

#### **Executive Summary**

Based on the results of the stock assessment update received in February 2017, the tilefish resource is not overfished and overfishing is not occurring in assessment terminal year (2016; Nitschke 2017). The 2016 stock is at 89% of the accepted reference point (SSB<sub>MSY</sub> proxy = SSB<sub>38%</sub>). The fishing mortality rate (F) in 2016 was 0.249, 20% below the fishing mortality threshold reference point  $F_{MSY proxy} = F_{38\%} = 0.310$ .<sup>1</sup>

Staff recommend specifications be set for 3 years. Staff recommends the acceptable biological catch (ABC) for each year 2018, 2019, and 2020 be set at 1.638 million pounds  $(743 \text{ mt})^2$ . This is based on the stock assessment being classified as an SSC-modified OFL probability distribution, the application of the Council risk policy for a typical stock, and an averaged ABC for 2018-2020. The FMP specifies that the annual catch limit (ACL) equals the ABC. Staff recommend an annual catch target (ACT) = ACL of 1.638 million pounds (743 mt) for each year. After removing projected discards, the resulting IFQ quota is 1.547 million pounds (701.80 mt) and the incidental category quota is 0.081 million pounds (36.94 mt) for each year.

Staff do not recommend any changes to the current recreational possession limit (8-fish per angler per trip with no minimum size), or incidental trip limit (500 pounds live weight or 455 pounds gutted weight).

#### **Introduction**

The Magnuson-Stevens Act (MSA) requires each Council's SSC (Scientific and Statistical Committee) to provide ongoing scientific advice for fishery management decisions, including recommendations for ABC, preventing overfishing, and maximum sustainable yield. The Council's catch limit recommendations for the upcoming fishing year(s) cannot exceed the ABC recommendation of the SSC. In addition, the Monitoring Committee (MC) established by the Fishery Management Plan (FMP) is

<sup>&</sup>lt;sup>1</sup> See discussion under biological reference points section for further details.

 $<sup>^{2}</sup>$  1 mt = 2,204.6226 lb.

responsible for developing recommendations for management measures designed to achieve the recommended catch limits.

Multi-year specifications may be set for golden tilefish for up to three years at a time. The SSC must recommend ABCs that addresses scientific uncertainty, while the MC must recommend ACTs that address management uncertainty. Based on the SSC and MC recommendations, the Council will make a recommendation to the National Marine Fisheries Service (NMFS) Greater Atlantic Regional Administrator. In this memorandum, information is presented to assist the SSC and MC in developing recommendations for the Council to consider for the 2018-2020 fishing years for golden tilefish.

Additional relevant information about fishery performance and past management measures is presented in the February 2017 Golden Tilefish Information Document prepared by Council staff, and the February 2017 Fishery Performance Report developed by the Council Tilefish Advisory Panel. Stock status information is presented in the Stock Assessment Update (Nitschke 2017).<sup>3</sup>

### **Catch and Landings Update**

Commercial landings (calendar year) from 1970 to 2016 are presented graphically in Figure 1 of the Advisory Panel Information Document (APID) and landings for fishing years (FY) 2002 through 2016 are presented in Table 1 below. Except for FYs 2003, 2004, and 2010 commercial golden tilefish landings have been below the commercial quota specified each year since the FMP was first implemented.

Commercial discards are described in the APID (page 15). According to VTR data, very little (< 0.3%) discarding was reported by longline vessels that targeted tilefish for the 2005 through 2014 period (Table 11 of the APID). According to the "Discard Estimation, Precision, and Sample Size Analysis" conducted by the Northeast Fisheries Science Center (NEFSC), discard estimations for commercial fisheries (mostly large/small mesh trawls and gillnets) appears to be low (several metric tons per gear type).<sup>4</sup> For the last five years (2012-2016), on average 9,393 pounds (4.26 mt) of tilefish were discarded.

<sup>&</sup>lt;sup>3</sup> These documents are available at: <u>http://www.mafmc.org/council-events/2017/march-2017-ssc-meeting</u>.

<sup>&</sup>lt;sup>4</sup> 2012-2016 Discard Estimation, Precision, and Sample Size Analysis available at: http://www.nefsc.noaa.gov/femad/fsb/SBRM/.

Management measures	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
ABC (m lb)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.013	2.013	1.766	1.898	1.898
TAL (m lb)	1.995	1.995	1.995	1.995	1.995	1.995	1.995	1.995	1.995	1.995	1.995	1.995	1.995	1.755	1.887	1.887
Com. quota-initial (m lb)	1.995	1.995	1.995	1.995	1.995	1.995	1.995	1.995	1.995	1.995	1.995	1.995	1.995	1.755	1.887	1.887
Com. quota- adjusted (m lb)	1.995	1.995	1.995	1.995	1.995	1.995	1.995	1.995	1.995	1.995	1.995	1.995	1.995	1.755	1.887	1.887
Com. landings	1.935	2.318 <sup>b</sup>	2.622 <sup>b</sup>	1.497	1.897	1.777	1.672	1.887	1.997	1.946	1.874	1.841	1.830	1.354	1.043	-
Com. overage/underage (m lb)	-0.060	+0.323	+0.627	-0.498	-0.098	-0.218	-0.323	-0.108	+0.002	-0.049	-0.121	-0.154	-0.165	-0.401	-0.844	-
Incidental trip limit (lb)	300	300	300	133	300	300	300	300	300	300	500	500	500	500	500	500
Rec. possession limit	-	-	-	-	-	-	-	-	8°	8°	8°	8°	8°	8°	8°	8°

Table 1. Summary of management measures and landings for FY<sup>a</sup> 2002 through 2017.

<sup>a</sup> FY 2002 (November 1, 2001 - October 31, 2002).
<sup>b</sup> Lawsuit period (see 5<sup>th</sup> paragraph on page 4 of the APID).
<sup>c</sup> Eight fish per angler per trip.

Recreational catches and landings are described in the APID (pages 18-22). A small recreational fishery briefly occurred during the mid 1970's, with less than 100,000 pounds annually (MAFMC 2000). Recreational catches have been low for the 1982 - 2016 period, ranging from zero for most years to approximately 30,000 fish in 2010 according to NMFS recreational statistics (Table 13 of the APID). VTR data indicates that the number of tilefish caught by party/charter vessels from Maine through Virginia is low, ranging from 81 fish in 1996 to 8,297 fish in 2015 (Table 11 of the APID). On average, 2,236 tilefish were caught by party/charter vessels during the 1996-2016 period. However, recreational catches have been traditionally considered an insignificant component of the removals and not included into the assessment.

### **Review of SSC Recommendations from March 2014**

In March 2014, the SSC met to recommend an ABC for tilefish for FYs 2015, 2016, and 2017. The SSC deemed that the golden tilefish benchmark stock assessment (SAW/SARC 58; NEFSC 2014)<sup>5</sup> was a Level 3 assessment. The SSC reached this recommendation based on "consistency between input data and model dynamics, the substantial improvements in available model diagnostics, and the lack of a pathological retrospective pattern."

The SSC accepted the recommendations of from the peer-reviewed assessment that an  $F_{MSY proxy}$  is F=0.37. Based on the  $F_{MSY proxy}$  of F=0.37 (F<sub>25%</sub>), the SSC identified an overfishing limit (OFL) for golden tilefish for 2015, 2016, and 2017 of 2.180 million pounds (989 mt), 2.343 million pounds (1,063 mt), and 2.405 million pounds (1,091 mt), respectively.

The SSC recommended an ABC for 2015, 2016, and 2017, of 1.766 million pounds (801 mt), 1.898 million pounds (861 mt), and 1.949 million pounds (884 mt), respectively. These were based on the stock assessment being classified as a Level 3 assessment, the Council risk policy ( $P^* = 0.40$ ) for a typical stock, and assuming a lognormal OFL distribution with a coefficient of variation (CV) around the OFL of 100%.

The SSC identified the following to be the most significant sources of uncertainty associated with determination of OFL and ABC:

- Reliance on fishery-dependent data in the assessment.
- Reliability of the F<sub>MSY proxy</sub> and its relationship to potential SPR-based reference points.
- The method used to adjust assessment-based estimates of recruitment for the last three years.
- The dome-shape selectivity curve that makes a strong assumption about the presence of older fish in the population, for which we lack strong empirical evidence.
- Possibility of localized depletion.

<sup>&</sup>lt;sup>5</sup> Northeast Fisheries Science Center. 2014. 58th Northeast Regional Stock Assessment Workshop (58th SAW) Assessment Report. US Dept Commer, Northeast Fish Sci Cent Ref Doc. 14-04; 784 p. Available from: National Marine Fisheries Service, 166 Water Street, Woods Hole, MA 02543-1026, or online at <a href="http://nefsc.noaa.gov/publications/">http://nefsc.noaa.gov/publications/</a>.

- Lack of knowledge of the stock range and the distribution of fish within that range.
- Potential for changes in the reproductive ecology of tilefish.

# **Biological Reference Points**

The biological reference points for golden tilefish were updated during the 2017 stock assessment update, as a result of a change to the recruitment penalty used in the assessment model (i.e., likelihood constant turned off). <sup>6</sup> The fishing mortality threshold for golden tilefish is  $F_{38\%}$  (as  $F_{MSY proxy}$ ) = 0.310, and SSB<sub>38%</sub> (SSB<sub>MSY proxy</sub>) is 21 million pounds (9,492 mt).

# Stock Status

The last full assessment update was completed in February 2017. This update indicates that the golden tilefish stock was not overfished and overfishing was not occurring in 2016, relative to the newly updated biological reference points. Fishing mortality in 2016 was estimated at F=0.249; 20% below the fishing mortality threshold of F=0.310 ( $F_{MSY proxy}$ ). SSB in 2016 was estimated at 18.69 million pounds (8,479 mt), and was at 89% of the biomass target (SSB<sub>MSY proxy</sub>).

# Advisory Panel Fishery Performance Report

Some relevant key points of the 2017 AP Fishery Performance Report (FPR) for consideration include:

- Fishermen are not moving around much as they are finding a healthy mix of animals in traditional fishing grounds.
- Overall landings are on the rise for the current fishing year (November 1, 2016 October 31, 2017) when compared to the same time last year and the Kitten fish size category (2 to 3.5 pounds) continues to be a large percentage of their overall catch composition.
- Dogfish interactions reduces tilefish catches and significantly affects where people fish.
- Severe winter conditions experienced in the Northeast in 2013-2016 significantly affected the effectiveness of tilefish operations/practices, resulting in longer fishing trips.
- Tilefish landings are in alignment with the TAL specified for the fishery; observed differences in the data are small. It is believed that tilefish landings for 2016 FY (1.043 million pounds) were below the quota (1.887 million pounds) due to several reasons; including, inactive vessels (some IFQ allocations were not fished), three vessels with large allocations were out of the water for repairs and maintenance for over two months each, severe winter weather and storm conditions, lower catch rates, and smaller vessels with IFQ allocations participate in other fisheries to maintain history on their other permits.

<sup>&</sup>lt;sup>6</sup> Incorporation of likelihood constants into the objective function can cause biases in assessment models. This bias can result in reductions in the estimated recruitment and biomass. For additional details see: Nitschke, P. 2017. Golden Tilefish, *Lopholatilus chamaeleonticeps*, stock assessment update through 2016 in the Middle Atlantic-Southern New England Region. NMFS/NEFSC, Woods Hole, MA. Available at: <u>http://www.mafmc.org/council-events/2017/march-2017-ssc-meeting</u>.

- Constant harvest strategy worked well in rebuilding the fishery. Industry would like to get back to a constant ACL in the future given healthy trends in the catch. Industry does not want to see different ACL every year.
- Advisors are concerned about directed trip in the incidental category by non-trawl vessels. AP members indicated that they understand that the Council has discussed this issue and it is being addressed under Framework 2.
- AP members are concerned about the fishermen targeting golden tilefish under the incidental limit rules. Some of the vessels engaging in this practice do not have the required permitting requirements to sell fish and do not have the Coast Guard Safety requirements needed to be in compliance with Federal regulations as applicable to commercial vessels.
- Two AP members would like the Council to consider a differential trip limit (for hire vs private) and longer recreational trips. In addition, they suggested that the Council considers recreational management strategies (e.g., longer recreational trips), structured after the Gulf of Mexico regulations.
- Some AP members would like the Council to consider a recreational allocation.
- Some AP members indicated concerns about relaxing recreational regulations (as they could potentially lead to higher recreational landings) while the commercial quota could remain at status quo levels or potentially decrease in the future.
- All commercial AP members expressed concerns over increasing any effort, bag limit or quota in the fishery at this time. They felt it would be unfair to allow for an increase in effort/bag limit in the recreational sector while maintaining status quo for the commercial sector.

### **Projections<sup>7</sup> and Basics for 2018-2020 ABC Recommendation**

Estimated 2018-2020 OFLs and ABCs following the Council's risk policy assuming lognormal distributions CVs of 100% (scenario 1) and a 60% (scenario 2) are shown in Table 2.<sup>8</sup> The estimated fishing mortality and the projected probability of overfishing and probability of being overfished are also given. Constant ABC scenarios are also shown for 742 mt (1.636 million pounds; Scenario 3) which was calculated from the average in scenario 1 (100% CV), 822 mt (1.812 million pounds; scenario 4) which was calculated from the average in scenario 2 (60% CV), and status quo ABC (861 mt or 1.898 million pounds) in scenario 5. The 742 mt (1.636 million pounds) constant (100% CV; scenario 3) and 822 mt (1.812 million pounds) constant (60% CV; scenario 4) allowed the p\* to vary among years but still resulted in an average p\* of 0.33 from 2018-2020.<sup>9</sup> The status quo (861 mt; 1.898 million pounds) scenario in 5 and 6 do not specifically adhere to the Mid-Atlantic council SSC's control rule. However, comparison of status quo ABC

<sup>&</sup>lt;sup>7</sup> The approach used to specify biomass projections assumes that the ABC was caught in the preceding year. The ABC in the current year is then updated based on the assumed catch.

<sup>&</sup>lt;sup>8</sup> All ABCs assumed the SSC's determination that tilefish should be treated as a typical species.

<sup>&</sup>lt;sup>9</sup> The procedure used to derive the average ABC under scenarios 4 and 5 is consistent with the procedure proposed under the Omnibus Acceptable Biological Catch Framework Adjustment to the Tilefish FMP (Framework 3 to the Tilefish FMP). This document is currently awaiting rule making.

(861 mt; 1.898 million pounds) effects on estimated CVs or p\* with CV fixed at 100% from the control rule can be seen in the table between scenarios 5 and 6.

Both, scenarios 3 and 4, are based on a constant ABC that resulted in average probability of overfishing of 33% over the three years.<sup>10</sup> For example, under scenario 3, an ABC of 742 mt (1.636 million pounds) was found to have overfishing probabilities of 33.5%, 31.9%, and 34.3% in 2018, 2019, and 2020, respectively; for an average of 33.2% assuming a CV of 100%. When comparing the ABCs derived under scenario 3 to the ABCs derived under scenario 1 (which assumes status quo process used by the SSC in March 2014) since the catch in the first year under scenario 3 is slightly higher than it would occur under scenario 1, its probability of overfishing is slightly higher; and since the second and last year catch under scenario 3 is slightly lower than it would occur under scenario 3 is slightly lower. However, the average probability of overfishing under alternative 3 is near identical to the average probability of overfishing under scenario 1 over the three-year period.

<u>Staff recommend measures be developed for 3-years</u>, the maximum under the FMP to provide for continued stability in the fishery and markets.

<u>Staff recommend ABCs for 2018-2020 consistent with the projection methodology under scenario</u> <u>3</u>. The recommended ABC in each 2018, 2019, and 2020 is 1.636 million pounds (742 mt) to provide for continued stability in the fishery and markets (Table 3).

<sup>&</sup>lt;sup>10</sup> The procedure used to derive the average ABC under scenarios 4 and 5 is consistent with the procedure proposed under the Omnibus Acceptable Biological Catch Framework Adjustment to the Tilefish FMP. This document is currently awaiting rule making.

Scenario 1		100	% CV					projection probability			
year	OFL	ABC SS	SB/SSB <sub>MSY</sub> AB	C/OFL	p*	CV	F	overfishing	overfished		
2018	1,058	687	0.78	0.65	0.30	100%	0.19	0.06	0.00		
2019	1,109	783	0.86	0.71	0.34	100%	0.21	0.12	0.00		
2020	1,040	756	0.89	0.73	0.35	100%	0.22	0.14	0.00		
avg	1,069	742	0.84	0.69	0.33		0.21	0.11	0.00		
Scenario 2		60%	CV					projection probability			
year	OFL	ABC SS	SB/SSB <sub>MSY</sub> AB	C/OFL	p*	CV	F	overfishing	overfished		
2018	1,058	794	0.78	0.75	0.30	60%	0.23	0.14	0.10		
2019	1,088	857	0.85	0.79	0.33	60%	0.24	0.21	0.06		
2020	1,014	815	0.88	0.80	0.35	60%	0.25	0.24	0.06		
avg	1,053	822	0.84	0.78	0.33		0.24	0.20	0.07		
Scenario 3	-	742 consta	ant avg 100%	CV				projection p	probability		
year	OFL	ABC SS	SB/SSB <sub>MSY</sub> AB	C/OFL	p*	CV	F	overfishing	overfished		
2018	1,058	742	0.79	0.70	0.34	100%	0.21	0.10	0.09		
2019	1,098	742	0.87	0.68	0.32	100%	0.20	0.09	0.06		
2020	1,039	742	0.91	0.71	0.34	100%	0.22	0.13	0.05		
avg	1,065		0.86	0.70	0.33		0.21	0.11	0.07		
Scenario 4	8	322 consta	ant avg 60% C	CV				projection p	orobability		
year	OFL	ABC SS	SB/SSB <sub>MSY</sub> AB	C/OFL	p*	CV	F	overfishing	overfished		
2018	1,058	822	0.79	0.78	0.32	60%	0.24	0.17	0.10		
2019	1,083	822	0.86	0.76	0.31	60%	0.23	0.18	0.06		
2020	1,016	822	0.89	0.81	0.35	60%	0.25	0.24	0.06		
avg	1,052		0.85	0.78	0.33		0.24	0.20	0.07		
Scenario 5	861 cor	istant stat	us quo (CV eff	fect)				projection p	probability		
year	OFL	ABC SS	SB/SSB <sub>MSY</sub> AB	C/OFL	p*	CV	F	overfishing	overfished		
2018	1,058	861	0.79	0.81	0.31	43%	0.25	0.22	0.10		
2019	1,076	861	0.85	0.80	0.33	56%	0.24	0.23	0.07		
2020	1,004	861	0.88	0.86	0.35	41%	0.26	0.31	0.06		
avg	1,046		0.84	0.82	0.33	46%	0.25	0.25	0.07		
Scenario 6	361 const	ant status	quo (P* effec	t with 100	%CV)			projection p	probability		
year	OFL	ABC SS	SB/SSB <sub>MSY</sub> AB	C/OFL	<u>p*</u>	CV	F	overfishing	overfished		
2018	1,058	861	0.79	0.81	0.40	100%	0.25	0.22	0.10		
2019	1,076	861	0.85	0.80	0.41	100%	0.24	0.23	0.07		
2020	1,004	861	0.88	0.86	0.43	100%	0.26	0.31	0.06		
avo	1,046		0.84	0.82	0.41	100%	0.25	0.25	0.07		

Table 2. Tilefish projected OFL and ABC (in mt) levels and associated fishing mortalities for 2018-2020.

Source: Paul Nitschke, Pers. comm. 2017. Note: The approach used to specify biomass projections assumes that the ABC was caught in the preceding year. The OFL and ABC in the current year is then updated based on the assumed catch. Scenarios 3 to 6 are based on constant catch projections and not from a ABC determination from the OFL.

### **Other Management Measures**

#### Annual Catch Limits

As defined in the Omnibus ACLs and AMs Amendment (Amendment 3 to the Tilefish FMP), ABC is equivalent to the total allowable catch (ACL) (Figure 1). Table 3 shows the ACLs associated with the staff recommendations for ABC based on a Level 3 stock assessment for tilefish.



Figure 1. Flowchart for tilefish catch and landings limits.

	2017 (Current)	2018	2019	2020	Basis (2018-2020)
OFL	2.405 m lb (1,063 mt)	2.332 m lb (1,058 mt)	2.421 m lb (1,098 mt)	2.291 m lb (1,039 mt)	Projections
ABC	1.898 m lb (861 mt)*	1.636 m lb (742 mt)	1.636 m lb (742 mt)	1.636 m lb (742 mt)	Staff recommendation based on overfishing
ABC % of OFL	79%	70%	68%	71%	probability averaging
ACL	1.898 m lb (861 mt)	1.636 m lb (742 mt)	1.636 m lb (742 mt)	1.636 m lb (742 mt)	ABC = ACL
ACT	1.898 m lb (861 mt)	1.636 m lb (742 mt)	1.636 m lb (742 mt)	1.636 m lb (742 mt)	Deduction for management uncertainty = 0
Discards	0.011 m lb (5 mt)	0.009 (4 mt)	0.009 m lb (4 mt)	0.009 m lb (4 mt)	Avg. discard (2012- 2016) mostly sm/lg mesh OT and Gillnet gear
TAL	1.887 m lb (856 mt)	1.626 m lb (738 mt)	1.626 m lb (738 mt)	1.626 m lb (738 mt)	ACT - discards
Quota – IFQ	1,792,799 lb (813.2 mt)	1,545,115 (700.85 mt)	1,545,115 (700.85 mt)	1,545,115 (700.85 mt)	95% of the TAL
Quota – Incidental	94,357 lb (42.8 mt)	81,322 (36.89 mt)	81,322 (36.89 mt)	81,322 (36.89 mt)	5% of the TAL

 Table 3. Staff recommendation for catch and landings limits for golden tilefish for 2018-2020 compared to 2017 measures.

\*The Council reduced the SSC recommended ABC of 1.949 m lb (884 mt) to 1.898 m lb (861 mt) for 2017 to maintain stability from year to year.

# Annual Catch Targets

The Tilefish MC is responsible for recommending annual catch targets (ACTs), which are intended to account for management uncertainty, for the Council to consider. The MC is responsible for considering all relevant sources of management uncertainty in the tilefish fishery and providing the technical basis, including any formulaic control rules, for any reduction in catch when recommending an ACT. The ACTs, technical basis for ACTs considerations, and sources of management uncertainty should be described and provided to the Council. The relationship between the ACT and other catch components are given in Figure 1.

Management uncertainty is comprised of two parts: uncertainty in the ability of managers to control catch and uncertainty in quantifying the true catch (i.e., estimation errors). Management uncertainty can occur because of a lack of sufficient information about the catch (e.g., due to late reporting, underreporting, and/or misreporting of landings or discards) or because of a lack of management precision (i.e., the ability to constrain catch to desired levels).

Staff recommend the MC consider past specific landings performance, as a basis for quantifying management uncertainty (i.e., implementation error) and as an indicator of future ability to achieve catch target when developing the 2018-2020 ACT recommendation for the fishery (Table 3). The MC should also consider the potential imprecision/variability in expected observed commercial and recreational catch<sup>11</sup> to ensure the ACL is not exceeded. As indicated in the tilefish flow chart (Figure 1), recreational catches can be accommodated under scientific uncertainty or management uncertainty.

The tilefish fishery is managed via an IFQ system and managers believe that all tilefish commercial landings values under this program are reliable. The IFQ monitoring system is timely and successful in managing the landings. The commercial landings performance for the last six years has been near or below the commercial quotas. The recreational catch is minimal. <u>Staff recommend no reduction in catch from the ACL</u>. The recommended ACT in each 2018, 2019, and 2020 is 1.636 million pounds (742 mt; Table 3).

# Total Allowable Landings

Management uncertainty can occur because of insufficient information about discards (Figure 1). Development of a time series of discards was not done in the assessment model since discarding was considered negligible and information on discards do not exist for most of the time series. Therefore, discards have not been included in the assessment due to the high uncertainty associated with the discard estimates over the time series. Very low or insignificant discards have been estimated for recent years according to the discard estimation, precision, and sample size analysis conducted by the NEFSC (see page 2 for additional information). There is higher uncertainty (CVs) on the low recent discard estimates since the discarding of tilefish is a rare event on observed trips. Therefore, an average of several years was used to judge recent relative magnitude of discarding for this fishery. For the last five years (2012-2016), on average 9,393 pounds (4.26 mt) of tilefish were discarded according to the discard estimation, precision, and sample size analysis conducted by the NEFSC. Staff recommends a reduction in catch from the ACT to account for discards in the fishery. For most years, the commercial quota has been almost entirely taken since the IFQ system went in effect. The landings-based allocations (IFQ 95%, incidental 5%) were maintained in the derivation of the sector-specific TALs. The recommended TAL in each 2018, 2019, and 2020 is 1.626 million pounds (738 mt; Table 3).

It is important to note that the current golden tilefish catch and landings limits flow chart indicates that discards are to be deducted from the overall ACT to derive the TAL. However, commercial discards are not generated by the IFQ fishery since all fish caught (given the standard hook size/type use by the industry) are marketable. Furthermore, the FMP prohibits discarding when fishing under an IFQ allocation. Framework 2 to the Tilefish FMP, which is currently under review by the NMFS would modify the structure of the golden tilefish catch and landings limits flow chart

<sup>&</sup>lt;sup>11</sup> Recreational tilefish trips appear to be limited and a minor component of the catch as indicated in the APID, the AP FPR, and the Golden Tilefish Assessment Summary for 2014.

to allow for discards to be deducted from the specific component of the commercial sector (IFQ fishery and/or incidental fishery) generating them.

# IFQ Quotas and Incidental Quotas

The overall TAL is allocated to the IFQ fishery (95%) and the incidental fishery (5%) according to the FMP. The IFQ quotas and incidental quotas based on the staff recommendations are presented in Table 3.

### **Recreational Bag Limit**

A recreational bag limit was implemented under Amendment 1 in 2009. Current regulations require an 8-fish recreational bag-size limit per angler per trip. This limit was set at the upper range of mean effort observed during the 1996-2005 period. VTR data indicates that mean effort for the 2006 to 2016 period has ranged from 1.2 to 4.2 fish per angler. The recreational bag limit may be changed through specifications based on the recommendations of the MC. <u>Staff does not recommend any changes to the recreational bag limit</u>.

### Incidental Trip Limit

When the Tilefish FMP was implemented, a 300 lb incidental trip limit was adopted. If the incidental category landed more than 5 percent of the TAL for a given year, the Regional Administrator could reduce this limit in the following fishing year. The incidental trip limit was increased to 500 lb in 2012. The Council thought that increasing the trip limit in the commercial tilefish incidental fishery from 300 lb to 500 lb would not be expected to change fishing practices and that discarding of tilefish would be reduced. The regulations state that if the incidental category landed more than 5 percent of the TAL for a given year, the Regional Administrator could reduce this limit in the following fishing year. In addition, The Regional Administrator monitors the harvest of the tilefish incidental TAL based on dealer reports and other available information, and determines the date when the incidental tilefish TAL has been landed. The Regional Administrator publishes a notice in the Federal Register notifying vessel and dealer permit holders that, effective upon a specific date, the incidental tilefish fishery is closed (in-season closure of the incidental fishery) for the remainder of the fishing year.

Industry members expressed concern about directed trips in the incidental category by non-trawl vessels. The incidental tilefish quota monitoring report<sup>12</sup> indicated that for the 2013 fishing year, incidental landings were 5,424 lb (6% of the incidental quota). In fact, for the last five fishing year, incidental landings have been well below the incidental quota. <u>Staff does not recommend any changes to the incidental trip limit</u>.

It is important to note that to address concerns related to golden tilefish directed trips by non-trawl vessels, the Council added to Framework 2 to the FMP (currently under review) "Landings

<sup>&</sup>lt;sup>12</sup> As of the week ending January 21, 2017 (see Figure 4 of the APID).

Ratios/Qualifiers for the Incidental Fishery." More specifically, Framework 2 would require vessels fishing under the golden tilefish incidental fishery regulations do not possess golden tilefish at the time of landings in excess of 50%, by weight, of the total of all combined species landed.

Fishing Year	Landings (pounds)	Incidental Quota (pounds)	Percent of Quota Landed (%)		
2012	36,330	99,750	36		
2013	36,442	99,750	37		
2014	44,594	99,750	45		
2015	18,839	87,744	21		
2016	20,929	94,357	22		

 Table 4. Incidental commercial landings for 2012-2016 fishing years.

Source: <u>http://www.nero.noaa.gov/ro/fso/reports/reports frame.htm</u>.

# <u>References</u>

MAFMC. 2014. Golden Tilefish Advisory Panel Information Document. 23 pp. Found online at <a href="http://www.mafmc.org/council-events/2017/march-2017-ssc-meeting">http://www.mafmc.org/council-events/2017/march-2017-ssc-meeting</a>.

MAFMC. 2000. Tilefish Fishery Management Plan. Dover, DE. 443 pp. + appends. Found online at <u>http://www.mafmc.org/fisheries/fmp/tilefish</u>.

NEFSC. 2014. 58<sup>th</sup> Northeast Regional Stock Assessment Workshop (58th SAW) Assessment Report. US Dept Commer, Northeast Fish Sci Cent Ref Doc. 14-04; 784 p. Available from: National Marine Fisheries Service, 166 Water Street, Woods Hole, MA 02543-1026, or found on line at <u>http://nefsc.noaa.gov/publications/</u>.

Nitschke, P. 2017. Golden Tilefish, *Lopholatilus chamaeleonticeps*, stock assessment update through 2016 in the Middle Atlantic-Southern New England Region. NMFS/NEFSC, Woods Hole, MA. Found online at <u>http://www.mafmc.org/council-events/2017/march-2017-ssc-meeting</u>.

Nitschke, P. 2017. Personal communication. NMFS/NEFSC/PDB (Tilefish Assessment Lead), Woods Hole, MA.

#### 2017 Tilefish Advisory Panel (AP) Golden Tilefish Fishery Performance Report (FPR)

The Mid-Atlantic Fishery Management Council's (Council's) Tilefish Panel met via Webinar on February 9, 2017 to review the fishery information document and develop the Golden Tilefish Fishery Performance Report (FPR) based on advisor perspectives on catch and landings patterns and other trends in this fishery. The following is the report from the Tilefish AP.

The Advisers in attendance were: David Arbeitman, Ron Callis, Denny Dobbins, Dan Farnham, Frank Green, Jeffry Gutman, Michael Johnson, Jan McDowell, and John Nolan III. They represent tilefish commercial fisherman (from New York and New Jersey); recreational fishermen (private/head boats, bait and tackle business, from New Jersey and Virginia); and research/academia (VIMS). Also in attendance were: Laurie Nolan and Tom Baum - Council Members; Doug Potts - GARFO; Paul Nitschke and Barbara Rountree - NEFSC; Fred Akers; Greg DiDomenico – GSSA; Jason Didden and José Montañez - Council Staff.

### Market Issues

Prices continue to increase and have been strong in recent years. A major reason for this is that the tilefish industry is able to coordinate times of landings to avoid market gluts and spread tilefish landings throughout the year. The ability to do this has improved since IFQs came into place.

Golden tilefish caught in the Mid-Atlantic region are sold as whole or gutted fish. Traditionally, most the tilefish landings were sold to the Korean markets. Due to marketing efforts, tilefish has become a very well-known popular item. They are found as a "regular" on restaurant menus rather than an occasional "special." Local fish markets, as well as grocery stores like Whole Foods, carry tilefish. Businesses like Sea to Table, a door-to-door seafood delivery service, have also helped spread the word on what a great eating fish tilefish are. Having a steady year-round supply of tilefish has influenced the positive market development for this product.

Traditionally, large tilefish were worth up to \$1.00 more per pound than extra-large tilefish. Due to the head size of an extra-large tilefish, there is a lot of waste. Recently, price spread (\$/pound) between large and extra-large fish is decreasing. Industry has been getting specific requests for extra-large fish. Rather than discarding the head and the rack of an extra-large, soups and broth are being made and the waste is eliminated. Extra-large fish have been marketed as 25+ pound fish in both New York and New Jersey in past years. However, more recently (since around 2014), New Jersey has change the extra-large to 20+ pounds fish. This may explain some of the small increase in extra-large market category landings that has been observed in the last few years. Industry and Council/NEFSC staff will work to improve coordination across tilefish ports to better define fish market size (weight) to maintain reporting consistency.

Fishing trip expenses continue to rise (e.g., gear, bait, ice, tackle, and food). Due to the high cost of operations, tilefish vessels fish as close to home port as possible.

### **Environmental Issues**

The industry has observed no tilefish aggregation changes due to changes in water temperatures, in contrast with what they observe with other fishes. The temperatures where Golden tilefish are found seem stable due to extreme depth. (Note: tilefish are generally found in rough bottom, small burrows, and sheltered areas at bottom water temperatures ranging from 48.2°F to 57.2°F [9°C to 14°C], generally in depths between 328 and 984 ft [100 to 300 m]).

Dogfish interaction reduces tilefish catches and strongly affects where people fish. The dogfish are so thick now, when fishermen encounter them, they have no choice but to move to other fishing areas. The dogfish interaction used to be about two or three months in the winter. However, in the last six years, dogfish presence is about eight months, and extends to June. Skate interaction also reduces tilefish catches; this is limited to the winter period. Skates can severely damage tilefish gear. When fishermen encounter skates they move to other fishing areas.

Adverse weather conditions (e.g., storms, rough seas, high winds, and tide) can impact fishing operations. Severe winter conditions experienced in the Northeast in 2013-2016 significantly affected the effectiveness of tilefish fishing operations/practices, resulting in longer fishing trips.

Recreational and commercial fishermen continue to see aggregations of fish in small areas in the spring/summer time around the Wilmington canyon (>80 to 90 fathoms).

Commercial fishermen indicated that they continue to see aggregations of large fish in all canyons in the Mid-Atlantic region. Overall landings are on the rise for the current fishing year (November 1, 2016 – October 31, 2017) when compared to the same time last year and the Kitten fish size category (2 to 3.5 pounds) continues to be a large percentage of their overall catch composition.

Two advisors representing the recreational fishery indicated that the amount of large fish aggregations in some southern mid-Atlantic canyons (e.g., Washington, Baltimore, Poor Man's, Wilmington, and Norfolk) have decreased in size. They also indicated that a higher percentage of their catch is comprised of smaller fish.

Industry members indicated that that some lobster trap fishermen have caught small tilefish ( $\sim 2$  inches) in 40/50 fathom range in statistical areas 613 (and perhaps 615 as well) in the fall. This is something that they have not seen before.

### Management Issues & Management Induced Effort Shifts

The number of tilefish vessels participating in the fishery was steady since the onset of the IFQ management system, until 2015. Four vessels constitute the vast bulk of the landings (80% of the landings/IFQ allocation). Industry reported that one boat from NY that had about 11% of the overall IFQ allocation did not fish their allocation in 2015. Sometime in 2016, that 11% allocation was purchase by a shore side entity in NJ and became available for lease; but it is not known how much of it has been leased out.

Tilefish landings are in alignment with the TAL specified for the fishery; observed differences in the data are small. It is believed that tilefish landings for 2016 FY (1.043 million pounds) were below the quota (1.887 million pounds) due to several reasons; including, inactive vessels (some IFQ allocations were not fished), three vessels with large allocations were out of the water for repairs and maintenance for over two months each, severe winter weather and storm conditions, lower catch rates, and smaller vessels with IFQ allocations participate in other fisheries to maintain history on their other permits.

The implementation of the IFQ system has particularly benefited those in the former "part-time" and "tier 2" vessel categories of the old limited access program. These vessels can plan their fishing activities throughout the year, rather than being forced into a derby fishery on November 1 (start of the fishing year) if they plan to harvest tilefish in a given year. These vessels participate in several fisheries (e.g., monkfish, scallop, and swordfish) and the IFQ system allows them to "fill in" tile fishing when it works best for them. Under the IFQ system, the former "part-time, tier 2, and full-time" vessels are working closely with each other and dealers to avoid landing large quantities of tilefish at the same time and avoid drastic price reductions.

One panel member indicated that even smaller participants in the tilefish IFQ fishery (smaller in terms of IFQ allocation and/or boat size) have greatly benefited from the IFQ management system as they can better plan their fishing operations (fish when and where they need to) and the fact that tilefish prices are relatively good and stable, and in fact, a large proportion of their ex-vessel revenues come from tilefish.

#### **General Fishing Trends**

AP members pointed out that for the last four winter seasons (Jan-March, 2013-2016) fishing practices have been impacted by severe weather resulting in longer fishing trips than on average. Panel members indicated that the slight increase in trip length is due to severe winter storm patterns. Severe winter conditions in the last four years have made fishing less productive and longer trips than average as fishing operations are significantly impacted. While severe weather conditions affect all fishing boats, smaller boats are particularly susceptible to severe winter and wind conditions.

One advisor indicated that during bad weather the window of opportunity to get out fishing decreases for some vessels. One panel member indicated that since he has a lower allocation he spends a little bit of time exploring fishing grounds to harvest more valuable fish according to market demands. This in turn may also affect CPUE.

Industry indicated that CPUE in the current fishing year (2017 FY) is increasing and the percentage of kitten size category (2 to 3.5 pounds) in the catch is also increasing. The influx of kittens is all over the place.

Industry tries to fish as close to port as possible. Basically, fishing in same areas to maintain low trip expenses. Increasing operating costs keep people from going further out and searching. Industry also indicated that due to recent Northeast Canyons and Seamounts Marine National

Monument closures, they do not have access to fishing grounds in the Oceanographer, Gilbert, and Lydonia canyons.

Fishermen are not moving around much as they are finding a healthy mix of animals in traditional fishing grounds. However, there are areas that are thought to have more quantities of larger fish than smaller fish that could be targeted if needed.

The topography of the traditional fishing areas is well known and they have the advantage of little or no gear conflict, unlike some of the potential tile fishing areas which are used for other fisheries.

#### **Other Issues**

- AP would like to see carry-over of unused portions (with a small proportion of the cap) to the next fishing year such as it is done in the scallop fishery. It was also stated that having a carry-over of unused quota may benefit vessels that may not be able to land their entire allocation in one fishing years due to vessel repairs and maintenance.

- Extra-large fish have been marketed as 25+ pound fish in both New York and New Jersey in past years. However, more recently (since around 2014), New Jersey has change the extra-large to 20+ pounds fish. This may explain some of the small increase in extra-large market category landings that has been observed in the last few years. Industry and Council/NEFSC staff will work to improve coordination across tilefish ports to better define fish market size (weight) to maintain reporting consistency.

-Constant harvest strategy worked well in rebuilding the fishery. Industry would like to get back to a constant ACL in the future given healthy trends in the catch. Industry does not want to see different ACL every year.

-One headboat captain indicated that five or six headboats<sup>1</sup> directly fish for golden tilefish but not 100% or full time. Some AP members commented that while the headboat participation in the golden tilefish recreational fishery appears stable they have seen an increase in participation by recreational private boats (July through September) and that private golden tilefish recreational landings are not recorded.

-Another advisor indicated that while there are five headboats that fish for tilefish (both blueline and golden) in the mid-Atlantic they have a limited number of dedicated tilefish trips throughout the season (summer time). For example, the boat that has the largest number of trips scheduled during the year (a boat Point Pleasant) has about 24 scheduled trips per year and not all trips are conducted. The other four boats have substantially less tilefish trips scheduled per year. A reporting system for recreational landings would enhance the management of the golden tilefish fishery.

<sup>&</sup>lt;sup>1</sup> Two from New Jersey, one from New York, one from Ocean City, MD (direct tilefish but only a few times per year), and 1 from Rudee Inlet, VA.

-Panel members raised concerns and questioned the tilefish catches reported in the NMFS recreational statistics database as they are inaccurate and unreliable. It was recommended that this type of data is not use for the management of this species. It was also stated that recreational values reported under the VTR data seems to be more realistic of tilefish catches.

-Advisors are concerned about directed trip in the incidental category by non-trawl vessels. AP members indicated that they understand that the Council has discussed this issue and it is being addressed under Framework 2.

-AP members are concerned about the fishermen targeting golden tilefish under the incidental limit rules. Some of the vessels engaging in this practice do not have the required permitting requirements to sell fish and do not have the Coast Guard Safety requirements needed to be in compliance with Federal regulations as applicable to commercial vessels.

-The AP members indicated that the landings monitoring program of the IFQ system is very reliable. In all, there is good accountability mechanisms to track landings in the directed commercial fishery (IFQ vessel) and VTR data (commercial and recreational vessels). However, there is concern that directed incidental trips (non-otter trawl vessels) may be missing. In addition, there is no accurate information of catch/landings by private recreational anglers.

-Two AP members would like the Council to consider a differential trip limit (for hire vs private) and longer recreational trips. In addition, they suggested that the Council considers recreational management strategies (e.g., longer recreational trips), structured after the Gulf of Mexico regulations.

-Some AP members would like the Council to consider a recreational allocation.

-Some AP members indicated concerns about relaxing recreational regulations (as they could potentially lead to higher recreational landings) while the commercial quota could remain at status quo levels or potentially decrease in the future.

-All commercial AP members expressed concerns over increasing any effort, bag limit or quota in the fishery at this time. They felt it would be unfair to allow for an increase in effort/bag limit in the recreational sector while maintaining status quo for the commercial sector.

#### Montanez, Jose

Subject:

FW: 2017 Tilefish Advisory Panel Meeting

From: DAVID ARBEITMAN [] Sent: Saturday, February 11, 2017 5:38 PM To: Montanez, Jose <jmontanez@mafmc.org> Subject: RE: 2017 Tilefish Advisory Panel Meeting

Jose,

I have read over the document and would like to add something that was not discussed. It took me a while to process this information, and that is I am concerned about the 1800-1900 incidental permits that are out there. As discussed the other day and during past webinars the incidental category is not being used for the most part with the original intent. Many vessels possess this permit and they should not have it. They are essentially targeting golden tilefish and not using that 500lbs as bycatch. I also question their reported landings as I have heard from several of my customers that they know of small commercial boats possessing an incidental golden tilefish permit and selling their catch to restaurants and fish markets, bypassing the proper chain of commands resulting in unreported landings. Perhaps it is time to examine the landing history of all the boats that possess the incidental permit.

Thanks,

David Arbeitman

On February 9, 2017 at 4:06 PM "Montanez, Jose" <<u>jmontanez@mafmc.org</u>> wrote:

Dear TF AP Members,

Once again, thank you for your assistance in developing the 2017 GTF FPR. Please review the attached draft and provide comments by COB on Monday February the 13<sup>th</sup>.

Please call me if you have any questions.

Best regards,

jm



### **Golden Tilefish - Advisory Panel Information Document<sup>1</sup> February 2017**

#### **Management System**

The Fishery Management Plan (FMP) which initiated the management for this species became effective November 1, 2001 (66 FR 49136; September 26, 2001) and included management and administrative measures to ensure effective management of the golden tilefish resource. The FMP also implemented a limited entry program and a tiered commercial quota allocation of the overall TAL. Amendment 1 to the Golden Tilefish FMP created an IFQ (Individual Fishing Quota) program that took effect on November 1, 2009 (74 FR 42580; September 24, 2009). The commercial golden tilefish fisheries (IFQ and incidental) are managed using catch and landings limits, commercial quotas, trip limits, gear regulations, permit requirements, and other provisions as prescribed by the FMP. While there is no direct recreational allocation, Amendment 1 implemented a recreational possession limit of eight golden tilefish per angler per trip, with no minimum fish length. Golden tilefish was under a stock rebuilding strategy beginning in 2001 The Golden Tilefish FMP, including subsequent until it was declared rebuilt in 2014. available Council Amendments and Frameworks. on the website are at: http://www.mafmc.org/fisheries/fmp/tilefish.

#### **Basic Biology**

The information presented in this section can also be found in the Golden Tilefish FMP (MAFMC, 2001; <u>http://www.mafmc.org/fmp/history/tilefish.htm</u>). Golden tilefish (*Lopholatilus chamaeleonticeps*; tilefish from this point forward in this section) are found along the outer continental shelf and slope from Nova Scotia, Canada to Surinam on the northern coast of South America (Dooley 1978 and Markle et al. 1980) in depths of 250 to 1500 feet. In the southern New England/mid-Atlantic area, tilefish generally occur at depths of 250 to 1200 feet and at temperatures from 48°F to 62°F or 8.9°C to 16.7°C (Nelson and Carpenter 1968; Low et al. 1983; Grimes et al. 1986).

Katz et al. (1983) studied stock structure of tilefish from off the Yucatan Peninsula in Mexico to the southern New England region using both biochemical and morphological information. They identified two stocks -- one in the mid-Atlantic/southern New England and the other in the Gulf of Mexico and the south of Cape Hatteras.

Tilefish are shelter seeking and perhaps habitat limited. There are indications that at least some of the population is relatively nonmigratory (Turner 1986). Warme et al. (1977) first reported

<sup>&</sup>lt;sup>1</sup> This document was prepared by the MAFMC staff. Data employed in the preparation of this document are from unpublished National Marine Fisheries Service (NMFS) Dealer, Vessel Trip Reports (VTRs), Permit, and Marine Recreational Statistics (MRFSS/MRIP) databases.

that tilefish occupied excavations in submarine canyon walls along with a variety of other fishes and invertebrates, and they referred to these areas as "pueblo villages." Valentine et al. (1980) described tilefish use of scour depressions around boulders for shelter. Able et al. (1982) observed tilefish use of vertical burrows in Pleistocene clay substrates in the Hudson Canyon area, and Grimes et al. (1986) found vertical burrows to be the predominant type of shelter used by tilefish in the mid-Atlantic/southern New England region. Able et al. (1982) suggested that sediment type might control the distribution and abundance of the species, and the longline fishery for tilefish in the Hudson Canyon area is primarily restricted to areas with Pleistocene clay substrate (Turner 1986).

Males achieved larger sizes than females, but they apparently did not live as long (Turner 1986). The largest male was 44.1 inches at 20 years old, and the largest female was 39 years at 40.2 inches FL. The oldest fish was a 46 year old female of 33.5 inches, while the oldest male was 41.3 inches and 29 years. On average, tilefish (sexes combined) grow about 3.5 to 4 inches fork length (FL) per year for the first four years, and thereafter growth slows, especially for females. After age 3, mean last back-calculated lengths of males were larger than those of females. At age 4 males and females averaged 19.3 and 18.9 inches FL, respectively, and by the tenth year males averaged 32.3 while females averaged 26.4 inches FL (Turner 1986).

The size of sexual maturity of tilefish collected off New Jersey in 1971-73 was 24-26 inches TL in females and 26-28 inches TL in males (Morse 1981). Idelberger (1985) reported that 50% of females were mature at about 20 inches FL, a finding consistent with studies of the South Atlantic stock, where some males delayed participating in spawning for 2-3 years when they were 4-6 inches larger (Erickson and Grossman 1986). Grimes et al. (1988) reported that in the late 1970s and early 1980s, both sexes were sexually mature at about 19-26 inches FL and 5-7 years of age; the mean size at 50% maturity varied with the method used and between sexes. Grimes et al. (1986) estimated that 50% of the females were mature at about 19 inches FL using a visual method and about 23 inches FL using a histological method. For males, the visual method estimated 50% maturity at 24 inches FL while the histological method estimated 50% maturity at 21 inches FL. The visual method is consistent with NEFSC (Northeast Fisheries Science Center) estimates for other species (O'Brien et al. 1993). Grimes et al. (1988) reported that the mean size and age of maturity in males (but not females) was reduced after 4-5 years of heavy fishing effort. Vidal (2009) conducted an aging study to evaluate changes in growth curves since 1982, the last time the reproductive biology was evaluated by Grimes et al (1988). Histological results from Vidal's study indicate that size at 50% maturity was 18 inches for females and 19 inches for males (NEFSC 2009).

"These results show a significant decrease in size and age at maturation since the last evaluation of this stock in the early 1980's (Grimes et al. 1986). An environment in which survival rates are low for potentially reproducing individuals, often favors selection of individuals that are able to reproduce at smaller sizes and younger ages (Hutchings 1993; Reznick et al. 1990). In a hook fishery, it is assumed that the smallest fish in the population are less vulnerable to the gear depending on

the hook size. In this fishery, hook size has been intentionally increased to avoid catch of the smallest fish in the population. The fact that such dramatic changes have manifested in this stock may suggest a density-dependent effect of decreased population size. It is uncertain at this point in time, whether these changes are consequences of phenotypic plasticity or selection towards genotypes with lower size and age at maturation."

Nothing is known about the diets and feeding habits of tilefish larvae, but they probably prey on zooplankton. The examination of stomach and intestinal contents by various investigators reveal that tilefish feed on a great variety of food items (Collins 1884, Linton 1901a and 1901b, and Bigelow and Schroeder 1953). Among those items identified by Linton (1901a and 1901b) were several species of crabs, mollusks, annelid worms, polychaetes, sea cucumbers, anemones, tunicates and fish bones. Bigelow and Schroeder (1953) identified shrimp, sea urchins and several species of fishes in tilefish stomachs. Freeman and Turner (1977) reported examining nearly 150 tilefish ranging in length from 11.5 to 41.5 inches. Crustaceans were the principal food items of tilefish with the squat lobster (*Munida*) and spider crabs (*Euprognatha*) were by far the most important crustaceans. The authors report that crustaceans were the most important food item regardless of the size of tilefish, but that small tilefish fed more on mollusks and echinoderms than larger tilefish. Tilefish burrows provide habitat for numerous other species of fish and invertebrates (Able et al. 1982 and Grimes et al. 1986) and in this respect they are similar to "pueblo villages" (Warme et al. 1977).

Able et al. (1982) and Grimes et al. (1986) concluded that a primary function of tilefish burrows was predator avoidance. The NEFSC database only notes goosefish as a predator. While tilefish are sometimes preyed upon by spiny dogfish and conger eels, by far the most important predator of tilefish is other tilefish (Freeman and Turner 1977). It is also probable that large bottom-dwelling sharks of the genus *Carcharhinus*, especially the dusky and sandbar, prey upon free swimming tilefish.

#### Status of the Stock

The golden tilefish stock assessment was peer reviewed and approved for use by management at Stock Assessment Workshop 58 (SAW 58; NEFSC 2014). A statistical catch at age model called ASAP (Age Structured Assessment Program) was used in this assessment to incorporate newly available length and age data to better characterize the population dynamics of the stock. The golden tilefish resource is not overfished and overfishing is not occurring in 2012. SSB was estimated to be 11.53 million pounds (5,229 mt) in 2012, about 101% of the biomass target SSB<sub>MSY</sub> proxy = SSB<sub>25%</sub> = 11.36 million pounds (5,153 mt). The fishing mortality rate was estimated to be 0.275 in 2012, below the fishing mortality threshold  $F_{MSY}$  proxy =  $F_{25\%}$  = 0.370. The golden tilefish stock was previously under a rebuilding plan, but was declared rebuilt by NMFS in 2014 based on SAW 58. The assessment report can be found at: http://nefsc.noaa.gov/publications/crd/crd1404/.

#### Assessment Update

The NEFSC is developing a golden tilefish assessment update through 2016. The update will contain recent trends in the golden tilefish fishery, including, commercial landings, stock size, fishing mortality rate, catch per unit effort, commercial landings by market category (size composition), and landings by area. The update will be posted at the Council's website (http://www.mafmc.org/) as soon as it is available.

#### **Fishery Performance**

For the 1970 to 2016 calendar years, golden tilefish landings have ranged from 128 thousand pounds (1970) to 8.7 million pounds (1979). For the 2001 to 2016 period, golden tilefish landings have averaged 1.8 million pounds, ranging from 1.1 (2016) to 2.5 (2004) million pounds (Figure 1).

The principal measure used to manage golden tilefish is monitoring via dealer weighout data that is submitted weekly. The directed fishery is managed via an IFQ program. If a permanent IFQ allocation is exceeded, including any overage that results from golden tilefish landed by a lessee in excess of the lease amount, the permanent allocation will be reduced by the amount of the overage in the subsequent fishing year. If a permanent IFQ allocation overage is not deducted from the appropriate allocation before the IFQ allocation permit is issued for the subsequent fishing year, a revised IFQ allocation permit reflecting the deduction of the overage will be issued. If the allocation cannot be reduced in the subsequent fishing year because the full allocation had already been landed or transferred, the IFQ allocation permit would indicate a reduced allocation for the amount of the overage in the next fishing year.

A vessel that holds a Commercial/Incidental Permit can possess up to 500 pounds live weight (455 pounds gutted) at one time without an IFQ Allocation Permit. If the incidental harvest exceeds 5 percent of the TAL for a given fishing year, the incidental trip limit of 500 pounds may be reduced in the following fishing year.

Table 1 summarizes the golden tilefish management measures for the 2002-2017 fishing years (FYs). With the exception of FY 2003, 2004, and 2010 commercial golden tilefish landings have been below the commercial quota specified each year since the Golden Tilefish FMP was first implemented. As a result of the decision of the Hadaja v. Evans lawsuit, the permitting and reporting requirements for the FMP were postponed for close to a year (May 15, 2003 through May 31, 2004). During that time period, it was not mandatory for permitted golden tilefish vessels to report their landings. In addition, during that time period, vessels that were not part of the golden tilefish limited entry program also landed golden tilefish.



Figure 1. Commercial U.S. Golden Tilefish Landings (live weight) from Maine-Virginia, 1970-2016. Source: 1970-1993 Golden Tilefish FMP. 1994-2016 NMFS unpublished dealer data.

Golden tilefish are primarily caught by longline and bottom otter trawl. Based on dealer data from 2012 through 2016, the bulk of the golden tilefish landings are taken by longline gear (98%) followed by bottom trawl gear (~1%). No other gear had any significant commercial landings. Minimal catches were also recorded for hand line and gillnets (Table 2).

Intentionally Left Blank

Management measures	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
ABC (m lb)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.013	2.013	1.766	1.898	1.898
TAL (m lb)	1.995	1.995	1.995	1.995	1.995	1.995	1.995	1.995	1.995	1.995	1.995	1.995	1.995	1.755	1.887	1.887
Com. quota-initial (m lb)	1.995	1.995	1.995	1.995	1.995	1.995	1.995	1.995	1.995	1.995	1.995	1.995	1.995	1.755	1.887	1.887
Com. quota- adjusted (m lb)	1.995	1.995	1.995	1.995	1.995	1.995	1.995	1.995	1.995	1.995	1.995	1.995	1.995	1.755	1.887	1.887
Com. landings	1.935	2.318 <sup>b</sup>	2.622 <sup>b</sup>	1.497	1.897	1.777	1.672	1.887	1.997	1.946	1.874	1.841	1.830	1.354	1.043	-
Com. overage/underage (m lb)	-0.060	+0.323	+0.627	-0.498	-0.098	-0.218	-0.323	-0.108	+0.002	-0.049	-0.121	-0.154	-0.165	-0.401	-0.844	-
Incidental trip limit (lb)	300	300	300	133	300	300	300	300	300	300	500	500	500	500	500	500
Rec. possession limit	-	-	-	-	-	-	-	-	8°	8°	8°	8°	8°	8°	8°	8°

Table 1. Summary of management measures and landings for FY<sup>a</sup> 2002 through 2017.

<sup>a</sup> FY 2002 (November 1, 2001 - October 31, 2002).

<sup>b</sup> Lawsuit period (see text above). <sup>c</sup> Eight fish per person per trip.

Gear	pounds	Percent
Otter Trawl Bottom, Fish	95	1.2
Otter Trawl Bottom, Other	*	*
Gillnet, Anchored/Sink/Other	16	*
Lines Hand	38	*
Lines Long Set with Hooks	7,705	97.9
Pot & Trap	*	*
Dredge	5	*
Unknown, Other Combined Gears	6,9	*
All Gear	7,866	100.0

Table 2. Golden tilefish commercial landings ('000 pounds live weight) by gear, Maine through Virginia, 2012-2016 combined.

Note: \* =less than 1,000 pounds or less than 1 percent.

Approximately 55 percent of the landings for 2016 were caught in statistical area 616; statistical area 537 had 32 percent; statistical area 626 had 6 percent; and statistical areas 526 had 5 percent (Table 3). NMFS statistical areas are shown in Figure 2.

For the 1999 to 2016 period, commercial golden tilefish landings are spread across the years with no strong seasonal variation (Tables 4 and 5). However, in recent years, a slight downward trend in the proportion of golden tilefish landed during the winter period (November-February) and a slight upward trend in the proportion of golden tilefish landed during the May-June period are evident when compared to earlier years (Table 5).

Intentionally Left Blank

Year	Unk	513	525	526	533	536	537	539	612	613	614	615	616	622	626	Other
1996	19.76	0.14	0.07	5.15	0.61	-	43.76	0.38	*	1.06	-	-	27.82	0.01	-	1.24
1997	23.29	0.39	0.03	0.67	0.01	-	56.21	0.02	*	2.59	-	*	16.40	0.01	*	0.37
1998	16.21	*	1.24	2.15	0.04	-	65.84	0.04	-	5.44	-	0.03	8.53	*	*	0.46
1999	2.57	*	0.97	0.22	0.01	-	55.07	0.01	0.11	3.68	-	0.16	36.78	0.02	0.02	0.38
2000	*	-	0.36	3.76	0.99	-	45.64	0.01	0.05	2.35	-	1.26	43.49	0.47	0.14	1.49
2001	-	0.03	0.23	3.09	0.01	-	23.91	*	0.01	3.16	-	0.02	68.96	*	0.10	0.46
2002	-	-	0.12	8.73	-	-	35.86	0.07	0.01	15.39	-	*	39.64	0.02	0.02	0.13
2003	-	-	0.88	1.79	0.08	-	38.45	0.10	-	11.84	0.01	*	46.47	0.05	0.05	0.28
2004	-	*	1.02	2.59	0.01	-	61.66	0.06	5.28	0.70	-	0.02	25.91	0.03	0.06	2.64
2005	-	-	0.12	0.24	1.98	-	6174	0.02	0.03	5.99	-	1.81	25.17	0.03	0.20	2.66
2006	-	-	*	1.54	*	1.96	61.69	0.50	1.24	0.71	-	0.07	30.09	0.04	0.05	2.09
2007	-	-	0.02	0.40	*	4.56	52.45	0.01	-	5.26	4.95	0.38	30.00	0.81	0.41	0.78
2008	-	-	1.02	0.05	*	7.61	36.83	*	-	4.30	6.92	0.94	40.27	1.91	0.02	0.13
2009	-	-	2.06	0.01	-	3.97	40.53	1.23	0.04	4.15	4.90	0.01	39.67	1.27	1.11	1.04
2010	-	-	0.01	0.01	0.01	-	57.13	0.55	0.02	7.28	*	0.05	33.94	0.69	0.04	0.26
2011	-	2.86	0.02	*	-	-	53.06	0.01	-	3.12	-	0.37	39.98	0.31	0.06	0.21
2012	-	-	0.01	0.01	-	-	52.54	0.03	*	0.58	-	2.58	43.92	0.20	0.10	0.03
2013	-	-	*	0.67	-	-	56.23	1.06	0.03	0.69	-	0.01	35.39	1.21	4.59	0.13
2014		-	0.01	0.43	*		48.55	1.92	0.01	1.31	-	0.34	43.62	2.72	0.36	0.74
2015	-	-	3.06	0.98	*	-	30.00	2.55	-	0.01	-	*	54.02	2.34	5.53	1.50
2016	-	-	1.06	4.88	-	-	31.74	0.01	-	0.96	0.09	*	54.75	0.17	5.97	0.37
All	4.29	0.18	0.55	1.72	0.15	0.77	49.80	0.38	0.48	3.83	0.71	0.33	34.76	0.52	0.69	0.85

Table 3. Golden tilefish percent landings by statistical area and year, 1996-2016.

Note: - = no landings; \* = less than 0.01 percent.

Voor	Month												
1 eai	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1999	118	114	124	103	93	91	55	106	83	59	77	75	1,096
2000	52	105	159	101	107	99	34	91	42	107	96	112	1,105
2001	107	151	159	188	153	179	177	157	156	156	161	176	1,920
2002	143	232	257	144	164	117	107	141	148	146	68	200	1,866
2003	183	181	295	254	209	185	152	180	210	202	189	223	2,463
2004	197	355	514	332	132	77	113	119	183	187	120	189	2,519
2005	127	159	235	168	33	57	92	129	96	94	141	158	1,487
2006	159	245	324	108	127	142	86	138	129	141	169	228	1,996
2007	122	118	192	147	141	96	131	133	125	174	77	189	1,646
2008	235	206	202	173	124	123	62	90	101	90	109	104	1,619
2009	90	145	185	200	219	211	184	157	156	127	94	134	1,902
2010	128	152	274	216	195	157	149	157	156	186	119	137	2,025
2011	152	95	269	234	203	137	160	127	120	194	65	150	1,905
2012	146	114	142	207	151	131	158	203	186	221	39	139	1,837
2013	106	119	174	245	226	193	152	152	126	169	74	126	1,863
2014	114	93	146	183	187	233	214	172	134	153	46	102	1,777
2015	68	70	144	128	181	146	130	127	123	89	41	62	1,308
2016	43	53	91	71	110	119	130	135	91	96	81	60	1,082
Total	2,289	2,708	3,885	3,201	2,756	2,493	2,286	2,516	2,365	2,591	1,766	2,562	31,415

 Table 4. Golden tilefish commercial landings (1,000 live pounds) by month and year, Maine through Virginia, 199-2016.

Veen		Month													
i ear	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total		
1999	10.75	10.38	11.28	9.41	8.50	8.29	4.99	9.66	7.55	5.36	6.98	6.86	100.00		
2000	4.68	9.48	14.41	9.13	9.67	8.95	3.05	8.26	3.78	9.71	8.70	10.18	100.00		
2001	5.59	7.88	8.30	9.77	7.95	9.32	9.24	8.16	8.13	8.11	8.40	9.14	100.00		
2002	7.64	12.43	13.76	7.70	8.78	6.28	5.74	7.57	7.92	7.85	3.63	10.70	100.00		
2003	7.44	7.33	11.98	10.31	8.47	7.52	6.18	7.32	8.52	8.19	7.68	9.05	100.00		
2004	7.81	14.11	20.42	13.20	5.25	3.06	4.47	4.74	7.26	7.43	4.76	7.49	100.00		
2005	8.54	10.70	15.78	11.28	2.24	3.82	6.16	8.66	6.44	6.32	9.46	10.60	100.00		
2006	7.95	12.30	16.22	5.39	6.38	7.10	4.33	6.93	6.46	7.06	8.46	11.41	100.00		
2007	7.43	7.15	11.67	8.93	8.58	5.85	7.94	8.08	7.61	10.60	4.68	11.47	100.00		
2008	14.53	12.72	12.47	10.68	7.68	7.58	3.81	5.59	6.25	5.55	6.73	6.42	100.00		
2009	4.72	7.62	9.74	10.50	11.52	11.08	9.66	8.26	8.22	6.69	4.93	7.04	100.00		
2010	6.33	7.51	13.51	10.67	9.62	7.73	7.37	7.75	7.69	9.17	5.90	6.75	100.00		
2011	7.96	4.96	14.13	12.26	10.66	7.20	8.40	6.66	6.31	10.18	3.42	7.87	100.00		
2012	7.95	6.23	7.71	11.26	8.21	7.12	8.60	11.06	10.15	12.01	2.15	7.55	100.00		
2013	5.67	6.39	9.34	13.17	12.14	10.37	8.18	8.17	6.75	9.07	3.97	6.78	100.00		
2014	6.42	5.26	8.21	10.32	10.51	13.12	12.05	9.65	7.54	8.62	2.58	5.72	100.00		
2015	5.21	5.38	10.98	9.79	13.87	11.16	9.91	9.72	9.40	6.97	3.12	4.73	100.00		
2016	3.96	4.88	8.39	6.56	10.18	11.04	12.04	12.50	8.44	8.90	7.53	5.57	100.00		
Total	7.29	8.62	12.37	10.19	8.77	7.93	7.28	8.01	7.53	8.25	5.62	8.15	100.00		

 Table 5. Percent of golden tilefish commercial landings (live pounds) by month and year, Maine through Virginia, 1999-2016.



Figure 2. NMFS Statistical Areas.

Commercial golden tilefish ex-vessel revenues have ranged from \$2.5 (year 2000) to \$5.9 (year 2013) million for the 1999 through 2016 period. The mean price for golden tilefish (adjusted) has ranged from \$1.16 per pound in 2004 to \$4.29 per pound in 2016 (Figure 3).



Figure 3. Landings, ex-vessel value, and price for golden tilefish, Maine through Virginia combined, 1999-2015. Note: Price data have been adjusted by the GDP deflator indexed for 2015.

The 2012 through 2016 coastwide average ex-vessel price per pound for all market categories combined was \$3.64. Price differential indicates that larger fish tend to bring higher prices (Table 6). Nevertheless, even though there is a price differential for various sizes of golden tilefish landed, golden tilefish fishermen land all fish caught as the survival rate of discarded fish is very low (L. Nolan 2006; Kitts et al. 2007). Furthermore, Amendment 1 to the Golden Tilefish FMP prohibited the practice of highgrading (MAFMC 2009).

Market Category	Landed Weight (pounds)	Value (\$)	Price (\$/pound)	Approximate Market Size Range (pounds)
Extra large	378,374	1,618,674	4.28	> 25
Large	2,355,186	9,953,295	4.23	7 – 24
Large/Medium <sup>a</sup>	506,822	2,148,597	4.24	5 -7
Medium	2,054,232	6,999,306	3.41	3.5 – 5
Small or Kittens	1,360,231	3,770,760	2.77	2-3.5
Extra small	134,910	322,814	2.39	< 2
Unclassified	428,391	1,463,497	3.42	
All	7,218,146	26,276,943	3.64	

Table 6. Landings, ex-vessel value, and price of golden tilefish by size category, from Maine thought Virginia, 2012 through 2016.

<sup>a</sup>Large/medium code was implemented on May 1, 2016. Prior to that, golden tilefish sold in the large/medium range were sold as unclassified fish.

The ports and communities that are dependent on golden tilefish are fully described in Amendment FMP (section 6.5; MAFMC 2009: found 1 to the at http://www.mafmc.org/fmp/pdf/Tilefish Amend 1 Vol 1.pdf). Additional information on Profiles "Community for the Northeast US Fisheries" found can be at http://www.nefsc.noaa.gov/read/socialsci/community\_profiles/.

To examine recent landings patterns among ports, 2015-2016 NMFS dealer data are used. The top commercial landings ports for golden tilefish are shown in Table 7. A "top port" is defined as any port that landed at least 10,000 pounds of golden tilefish. Ports that received 1% or greater of their total revenue from golden tilefish are shown in Table 8.

Intentionally Left Blank
Table 7. Top ports of landing (in pounds) for golden tilefish, based on NMFS 2015 - 2016 dealer data. Since this table includes only the "top ports," it may not include all of the landings for the year.

<b>D</b> (	20	015	2016		
Port	Landings (pounds)	# Vessels	Landings (pounds)	# Vessels	
Montauk, NY	822,746	7	519,130	14	
	(821,198) <sup>a</sup>	(3)	(514,426)	(3)	
Barnegat Light/Long Beach, NJ	362,981	10	329,076	9	
	(361,250)	(8)	(326,815)	(7)	
Hampton Bays, NY	56,940	3	208,661	6	
	(C)	(1)	(C)	(1)	
Point Judith, RI	4,953	47	11,730	48	
	(0)	(0)	(0)	(0)	
Shinnecock, NY	C	1	7,286	4	
	(C)	(1)	(C)	(1)	
East Hampton, NY	C	1	0	0	
	(C)	(1)	(0)	(0)	

<sup>a</sup>Values in parenthesis correspond to IFQ vessels.

Note: C = Confidential.

Table 8. Ports that generated 1% or greater of total revenues from golden tilefish, 2012-2016.

Port	State	Ex-vessel revenue all species combined	Ex-vessel revenue golden tilefish	Golden tilefish contribution to total port ex-vessel revenues
East Hampton	NY	396,012	94,023	24%
Montauk	NY	77,880,005	14,188,019	18%
Hampton Bays	NY	26,562,371	2,280,189	9%
Barnegat Light/Long Beach	NJ	106,203,298	5,027,414	5%
Shinnecock	NY	5,629,862	252,519	4%
Other Monmouth	NJ	1,018,053	8,918	1%

In 2015 there were 49 federally permitted dealers who bought golden tilefish from 97 vessels that landed this species from Maine through Virginia. In addition, 53 dealers bought golden tilefish from 104 vessels in 2016. These dealers bought approximately \$5.1 and \$4.2 million of

golden tilefish in 2015 and 2016, respectively, and are distributed by state as indicated in Table 9. Table 10 shows relative dealer dependence on golden tilefish.

#	MA RI		I	СТ		NY		NJ		VA		Other		
of Dealers	'15	'16	'15	'16	'15	'16	'15	'16	'15	'16	'15	'15	'15	'16
Dealers	6	7	9	9	7	6	14	17	7	12	4	С	2	1

Table 9. Dealers reporting buying golden tilefish, by state in 2015 - 2016.

Note: C = Confidential.

## Table 10. Dealer dependence on golden tilefish, 2012-2016.

Number of Dealers	Relative Dependence on Tilefish
72	<5%
6	5%-10%
4	10% - 25%
2	25% - 50%
1	50% - 75%
2	90%+

According to VTR data, very little (< 0.3%) discarding was reported by longline vessels that targeted golden tilefish for the 2005 through 2014 period (Table 11). In addition, the 2014 golden tilefish stock assessment indicates that golden tilefish discards in the trawl and longline fishery are negligible (NEFSC 2014).

Intentionally Left Blank

Common Name	Kept pounds	% species	% total	Discarded pounds	% species	% total	Total pounds	Disc: Kept Ratio
GOLDEN TILEFISH	15,549,080	100.00%	99.08%	0	0.00%	0.00%	15,549,080	0.00
SPINY DOGFISH	94,828	85.55%	0.60%	16,018	14.45%	37.63%	110,846	0.17
BLUELINE TILEFISH	15,388	100.00%	0.10%	0	0.00%	0.00%	15,388	0.00
CONGER EEL	9,013	93.87%	0.06%	589	6.13%	1.38%	9,602	0.07
BLACK BELLIED ROSEFISH	4,269	100.00%	0.03%	0	0.00%	0.00%	4,269	0.00
SKATES, OTHER	3,201	67.66%	0.02%	1,530	32.34%	3.59%	4,731	0.48
SNOWY GROUPER	3,100	100.00%	0.02%	0	0.00%	0.00%	3,100	0.00
TILEFISH, OTHER	2,692	100.00%	0.02%	0	0.00%	0.00%	2,692	0.00
DOGFISH SMOOTH	2,634	76.26%	0.02%	820	23.74%	1.93%	3,454	0.31
EEL, OTHER	1,809	100.00%	0.01%	0	0.00%	0.00%	1,809	0.00
WRECKFISH	1,240	100.00%	0.01%	0	0.00%	0.00%	1,240	0.00
BLUEFISH	898	22.63%	0.01%	3,070	77.37%	7.21%	3,968	3.42
MONKFISH	742	100.00%	0.00%	0	0.00%	0.00%	742	0.00
YELLOWFIN TUNA	680	100.00%	0.00%	0	0.00%	0.00%	680	0.00
DOLPHIN FISH	627	100.00%	0.00%	0	0.00%	0.00%	627	0.00
BLACK SEA BASS	563	100.00%	0.00%	0	0.00%	0.00%	563	0.00
MAKO SHORTFIN SHARK	524	100.00%	0.00%	0	0.00%	0.00%	524	0.00
BLUEFIN TUNA	440	91.67%	0.00%	40	8.33%	0.09%	480	0.09
RED HAKE	438	79.20%	0.00%	115	20.80%	0.27%	553	0.26
SILVER HAKE (WHITING)	300	93.75%	0.00%	20	6.25%	0.05%	320	0.07
MAKO SHARK, OTHER	284	89.03%	0.00%	35	10.97%	0.08%	319	0.12
FISH, OTHER	218	100.00%	0.00%	0	0.00%	0.00%	218	0.00
AMERICAN EEL	150	100.00%	0.00%	0	0.00%	0.00%	150	0.00
REDFISH	147	100.00%	0.00%	0	0.00%	0.00%	147	0.00
MIX RED & WHITE HAKE	125	100.00%	0.00%	0	0.00%	0.00%	125	0.00
CUSK	97	100.00%	0.00%	0	0.00%	0.00%	97	0.00
ALBACORE TUNA	75	100.00%	0.00%	0	0.00%	0.00%	75	0.00
PORBEAGLE SHARK	75	100.00%	0.00%	0	0.00%	0.00%	75	0.00
WHITE HAKE	74	100.00%	0.00%	0	0.00%	0.00%	74	0.00

Table 11. Catch disposition for directed golden tilefish trips<sup>a</sup>, Maine through Virginia, 2005-2014 combined.

Common Name	Kept pounds	% species	% total	Discarded pounds	% species	% total	Total pounds	Disc: Kept Ratio
SUMMER FLOUNDER	72	100.00%	0.00%	0	0.00%	0.00%	72	0.00
BLACK WHITING	24	100.00%	0.00%	0	0.00%	0.00%	24	0.00
AMBER JACK	18	100.00%	0.00%	0	0.00%	0.00%	18	0.00
POLLOCK	17	100.00%	0.00%	0	0.00%	0.00%	17	0.00
TIGER SHARK	0	0.00%	0.00%	10,400	100.00%	24.43%	10,400	
SKATE BARNDOOR	0	0.00%	0.00%	3,881	100.00%	9.12%	3,881	
DOGFISH CHAIN	0	0.00%	0.00%	2,722	100.00%	6.39%	2,722	
JONAH CRAB	0	0.00%	0.00%	1,273	100.00%	2.99%	1,273	
LOBSTER	0	0.00%	0.00%	775	100.00%	1.82%	775	
BLUE SHARK	0	0.00%	0.00%	725	100.00%	1.70%	725	
SKATE ROSETTE	0	0.00%	0.00%	398	100.00%	0.93%	398	
HAMMERHEAD SHARK	0	0.00%	0.00%	100	100.00%	0.23%	100	
SHARK, OTHER	0	0.00%	0.00%	60	100.00%	0.14%	60	
ALL SPECIES	15,693,842	99.73%	100.00%	42,571	0.27%	100.00%	15,736,413	0.00

Table 11 (continued). Catch disposition for directed golden tilefish trips<sup>a</sup>, Maine through Virginia, 2005-2014 combined.

<sup>a</sup> Directed trips for golden tilefish were defined as trips comprising 75 percent or more by weight of golden tilefish landed. Number of trips = 1,161.

Golden tilefish incidental commercial fishery landings in FY 2017 are slightly ahead of FY 2016 landings (Figure 4; as of week ending January 21, 2017). Incidental golden tilefish commercial landings for the last four fishing years are shown in Table 12.

Intentionally Left Blank



Incidental Golden Tilefish Quota Monitoring Report

Figure 4. Incidental commercial landings for 2017 FY to date (Through January 21, 2017). Blue Line = FY 2017, Orange Line = FY 2016. Source: http://www.nero.noaa.gov/ro/fso/reports/reports\_frame.htm.

Fishing Year	Landings (pounds)	Incidental Quota (pounds)	Percent of Quota Landed (%)		
2012	36,330	99,750	36		
2013	36,442	99,750	37		
2014	44,594	99,750	45		
2015	18,839	87,744	21		
2016	20,929	94,357	22		

Table 12 Incidental commercial landings for 2012-2016 fishing years

Source: http://www.nero.noaa.gov/ro/fso/reports/reports frame.htm.

## **Recreational Fishery**

A small recreational fishery briefly occurred during the mid 1970's, with less than 100,000 pounds annually (MAFMC 2001). Subsequent recreational catches have been low for the 1982 -2016 period, ranging from zero for most years to approximately 30,000 fish in 2010 according to NMFS recreational statistics (Table 13). In 2016, approximately 8,500 fish were landed.

Vessel trip report (VTR) data indicates that the number of golden tilefish kept by party/charter vessels from Maine through Virginia is low, ranging from 81 fish in 1996 to 8,297 fish in 2015 (Table 14). In 2016, party/charter anglers kept 5,778 fish. Mean party/charter effort ranged from less than one fish per angler in 1999 throughout 2002 and 2005 to approximately eight fish per angler in 1998, averaging 2.5 fish for the 1996-2016 period.

According to VTR data, for the 1996 through 2016 period, the largest amount of golden tilefish caught by party/charter vessels were made by New Jersey vessels (34,643), followed by New York (10,001), Virginia (768), Delaware (628), Massachusetts (496), Maryland (381), Rhode Island (182), New Hampshire (14), and Connecticut (3). Party/charter boats from New Jersey have shown a significant uptrend in the number of golden tilefish caught during the time series while the boats from Rhode Island have shown a significant downward trend in the number of fish caught (Table 15).

The number of golden tilefish discarded by recreational anglers is low. According to VTR data, on average, approximately 6 fish per year were discarded by party/charter recreational anglers for the 1996 through 2016 period. The quantity of golden tilefish discarded by party/charter recreational anglers ranged from zero in most years to 60 in 2015.

Recreational anglers typically fish for golden tilefish when tuna fishing especially during the summer months (Freeman, pers. comm. 2006). However, some for hire vessels from New Jersey and New York are golden tilefish fishing in the winter months (Caputi pers. comm. 2006). In addition, recreational boats in Virginia are also reported to be fishing for golden tilefish (Pride pers. comm. 2006). However, it is not known with certainty how many boats may be targeting golden tilefish. Nevertheless, accounting for information presented in the Fishery Performance Reports (2012-2014) and a brief internet search conducted by Council Staff in 2014 indicates that there have been approximately 10 headboats actively engaged in the tilefish fishery in the Mid-Atlantic canyons in recent years. It is estimated that approximately 4 of these boats conducted direct tilefish fishing trips, while the other 6 boats may have caught tilefish while targeting tuna/swordfish or fishing for assorted deep water species. In addition, it appears that recreational interest onboard headboats for tilefish has increase in the last few years as seen in the FPRs, internet search conducted by Council staff, and recent VTR recreational party/charter statistics (MAFMC 2014).

Anglers are highly unlikely to catch golden tilefish while targeting tuna on tuna fishing trips. However, these boats may fish for golden tilefish at any time during a tuna trip (i.e., when the tuna limit has been reached, on the way out or on the way in from a tuna fishing trip, or at any time when tuna fishing is slow). While fishing for tuna recreational anglers may trawl using rod and reel (including downriggers), handline, and bandit gear. Rod and reel is the typical gear used in the recreational golden tilefish fishery. Because golden tilefish are found in relatively deep waters, electric reels may be used to facilitate landing (Freeman and Turner 1977).

Veen		Landed no	Release	Released no. B2			
rear	party/c	charter	Priv	vate	private		
1982	0		984	(72.4)	0		
1983	0		0		0		
1984	0		0		0		
1985	0		0		0		
1986	0		0		0		
1987	0		0		0		
1988	0		0		0		
1989	0		0		0		
1990	0		0		0		
1991	0		0		0		
1992	0		0		0		
1993	0		0		0		
1994	608	(100.0)	0		0		
1995	0		0		0		
1996	6,842	(50.9)	0		0		
1997	0		0		0		
1998	0		0		0		
1999	0		0		0		
2000	0		0		0		
2001	148	(100.0)	0		0		
2002	0		20,068	(59.4)	1,338	(100.0)	
2003	722	(69.1)	0		0		
2004	62	(99.3)	0		0		
2005	0		0		0		
2006	541	(100.4)	0		0		
2007	1,330	(78.3)	0		0		
2008	0		0		0		
2009	177	(87.8)	0		0		
2010	2,812	(90.5)	27,514	(77.2)	0		
2011	0		0		0		
2012	0		0		0		
2013	1,248	(100.0)	0		0		
2014	0		0		0		
2015	0		0		0		
2016	0		8,449	(106.4)	0		

Table 13. Recreational golden tilefish data from the NMFS recreational statistics databases, 1982-2016.

Source: Recreational Fisheries Statistics Queries: <u>http://www.st.nmfs.noaa.gov/recreational-fisheries/access-data/run-a-data-query/queries/index</u>. PSE (proportional standard error) expresses the standard error of an estimate as a percentage of the estimate and is a measure of precision. A PSE value greater than 50 indicates a very imprecise estimate. 2016 values are preliminary.

Year	Number of golden tilefish kept	Mean effort
1996	81	1.4
1997	400	7.5
1998	243	8.1
1999	91	0.4
2000	147	0.5
2001	172	0.7
2002	774	0.9
2003	991	1.6
2004	737	1.2
2005	498	0.9
2006	477	1.2
2007	1,077	1.2
2008	1,100	1.3
2009	1,451	1.3
2010	1,866	2.0
2011	2,938	3.4
2012	6,424	2.8
2013	6,560	3.2
2014	6,856	3.2
2015	8,297	4.2
2016	5,778	4.1
All	46,958	2.5

Table 14. Number of golden tilefish kept by party/charter anglers and mean effort fromMaine through Virginia, 1996 through 2016.

Intentionally Left Blank

Year	NH	МА	RI	СТ	NY	NJ	DE	MD	VA	All
1996	0	0	0	0	81	0	0	0	0	81
1997	0	0	0	0	400	0	0	0	0	400
1998	0	0	102	0	141	0	0	0	0	243
1999	0	0	1	0	88	0	0	2	0	91
2000	0	0	0	0	108	39	0	0	0	147
2001	0	0	0	0	122	51	0	0	0	173
2002	0	0	0	0	401	373	0	0	0	774
2003	0	0	3	0	86	902	0	0	0	991
2004	0	0	0	0	12	628	0	0	104	744
2005	0	0	72	0	82	318	14	0	16	502
2006	0	0	0	0	265	65	2	133	12	477
2007	0	0	0	0	447	459	88	5	80	1,079
2008	0	0	3	0	488	545	22	32	10	1,100
2009	0	0	0	0	720	675	18	7	31	1,451
2010	0	0	0	0	595	1,194	19	23	48	1,879
2011	0	496	0	0	720	1,654	60	5	14	2,949
2012	0	0	1	0	1,116	5,146	42	23	98	6,426
2013	0	0	0	0	1,900	4,568	78	12	41	6,599
2014	0	0	0	3	957	5,677	116	40	73	6,866
2015	14	0	0	0	637	7,376	100	56	174	8,357
2016	0	0	0	0	635	4,973	69	43	67	5,787
All	14	496	182	3	10,001	34,643	628	381	768	47,116

Table 15. Number of golden tilefish caught by party/charter vessels by state, 1996 through2016.

## References

Caputi, G. 2006. Personal communication. Ex-member of the MAFMC, recreational angler, and offshore editor for the saltwater sportsman magazine. Brick, NJ.

Kitts, A., P. Pinto da Silva, and B. Rountree. 2007. The evolution of collaborative management in the Northeast USA tilefish fishery. Marine Policy 31(2), 192-200.

Mid-Atlantic Fishery Management Council. 2001. Tilefish Fishery Management Plan. Dover, DE. 443 pp. + appends.

Mid-Atlantic Fishery Management Council. 2009. Amendment 1 to the Tilefish Fishery Management Plan. Dover, DE. Volume 1, 496 pp.

Mid-Atlantic Fishery Management Council. 2014. Tilefish white paper. Dover, DE. 33 pp.

Nolan, L. 2006. Personal communication. Member of the MAFMC and tilefish commercial fisher. Montauk, NY.

Northeast Fisheries Science Center. 2009. 48th Northeast Regional Stock Assessment Workshop (48th SAW) Assessment Report. US Dept Commer, Northeast Fish Sci Cent Ref Doc. 09-15; 834 p. Available from: National Marine Fisheries Service, 166 Water Street, Woods Hole, MA 02543-1026, or online at <a href="http://nefsc.noaa.gov/publications/">http://nefsc.noaa.gov/publications/</a>.

Northeast Fisheries Science Center. 2014. 58th Northeast Regional Stock Assessment Workshop (58th SAW) Assessment Report. US Dept Commer, Northeast Fish Sci Cent Ref Doc. 14-04; 784 p. Available from: National Marine Fisheries Service, 166 Water Street, Woods Hole, MA 02543-1026, or online at http://nefsc.noaa.gov/publications/.

Pride, B. 2006. Personal communication. Ex-member of the MAFMC. Newport News, VA.