Gulf of America Tilefish (*Lopholatilus chamaeleonticeps*, *Caulolatilus microps*, and *Caulolatilus chrysops*) Length and Age Compositions from the U.S. Recreational Fishery

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Gulf of America Tilefish (*Lopholatilus chamaeleonticeps*, *Caulolatilus microps*, and *Caulolatilus chrysops*) length and age compositions from the U.S. recreational fishery

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Introduction

This document provides nominal length and age compositions and mean length-at-age (MLAA) of recreational landings, in U.S. waters, for the SEFSC 01 Gulf of America Tilefish assessment. For this assessment, data from Golden (*Lopholatilus chamaeleonticeps*), Blueline (*Caulolatilus microps*), and Goldface (*Caulolatilus chrysops*) Tilefish are being considered for inclusion. Two sets of compositions were requested. The first set included only Golden Tilefish data. The second set included data from all three Tilefish species (i.e. 'Tilefish Complex'). Only ages from Golden Tilefish were provided, so there are no nominal age or MLAA analyses for the Tilefish Complex.

Data Description

Compositions in this document only include biological samples from Golden, Blueline, and Goldface Tilefish harvested in U.S. waters from the Texas/Mexico border and eastward to the west coast of Florida at the Collier/Monroe county line. The majority of length (Figure 1) and age (Figure 2) samples are from Florida. A total of 474 lengths were included in nominal length compositions (Table 1). The majority of length samples (n=251) were from Blueline Tilefish. Lengths were sampled by 8 programs (Tables 2 and 3). There were 45 ages from 5 programs (Table 2 and 4) that were included in the nominal compositions and MLAA analyses. All ages were from Golden Tilefish. Golden Tilefish ages were only available for five years.

The sampling programs contributing the largest numbers of length and/or age samples are described below.

Marine Recreational Information Program (MRIP)

MRIP (formally known as the Marine Recreational Fishing Statistics Survey, MRFSS) began in March 1981. In the Gulf of America, the MRIP survey is conducted in FL, AL, and MS. MRIP was also conducted in LA from 1981-2013. The access point angler survey (APAIS) component of MRIP collects information on recreational catch and fishing trip characteristics, including fish lengths and weights, from anglers at public marine fishing access sites. In the Gulf of America, APAIS samples recreational fishers from private, shore, and charterboat modes. APAIS sampling was temporarily suspending during Wave 2 in 2020 because of the COVID pandemic. APAIS

sampling resumed in all states by August 2020 (Wave 4), however, sampling of fish lengths and weights were reduced due to social distancing guidelines and field officer safety protocols (NMFS OST 2023). For intercepted angler trips where both fish length and weight are missing, MRIP uses hot and cold-deck imputation to impute lengths (NMFS OST 2023). Imputed lengths were excluded from length composition analyses. MRIP provided 47 Golden, 14 Blueline, and 2 Goldface Tilefish lengths. MRIP dockside samplers do not collect age structures from intercepted fish.

Texas Parks and Wildlife Department Sportfish Monitoring Program (TPWD)

TPWD is a dockside-intercept survey that samples private and charterboat anglers in TX marine waters and began in May 1983. The TX coast is stratified into eight bay systems (Sabine Lake, Galveston Bay, Matagorda Bay, San Antonio Bay, Aransas Bay, Corpus Christi Bay, Upper Laguna Madre, and Lower Laguna Madre) and five Gulf of America strata. Sites are selected randomly based on proportional probability of expected fishing pressure. Within sites, sampling assignments are assigned to ensure that the samples are distributed across seasons (e.g. high-use and low-use) and day type (e.g. weekend, weekday). During the dockside interview, the maximum total lengths from up to 6 individuals per species (from a priority list) are recorded (Nuttall and Matter 2020). TPWD provided lengths from 19 Golden and 1 Blueline Tilefish. TPWD dockside samplers do not collect aging structures from intercepted fish.

Southeast Region Headboat Survey (SRHS)

The SRHS program estimates landings and effort for headboat vessels. In the Gulf of America, the SRHS program began in 1986 and extends from Monroe County, FL to South Padre Island, TX (Cheshire et al. 2023). Biological samples (e.g. length, weight, and age structures) are collected as part of the SRHS dockside intercept sampling program (DISP) component of the SRHS program (Fitzpatrick et al. 2017). DISP sampling was temporarily suspended in March 2020 due to the COVID pandemic and no biological samples were collected. DISP biological sampling resumed in July 2021 once NMFS/SEFSC approved safety measures were approved (Cheshire et al. 2023). SRHS sampled 25 Golden, 230 Blueline, and 55 Goldface Tilefish for length and of those fish, only 1 Golden Tilefish was also sampled for age.

FIN-BIOSTAT

FIN-BIOSTAT sampling began in 2001 and the program is administered by the Gulf State Marine Fisheries Commission (GSMFC) through GulfFIN. All recreational fishing modes are sampled through FIN-BIOSTAT (Bray, pers com 2024). FIN-BIOSTAT is conducted in every Gulf state, however, in FL it is called RECFIN from 2001-2018 and RepBio from 2018-2024 (Bray and Cermak, pers com 2023). RECFIN sampling assignments were not conducted using a randomized methodology in an effort to maximize the number of biological samples collected. While the sampling sites were not randomly assigned samplers would not sample the fish at a site in a biased fashion. A pilot phase for RepBio was initiated in 2018 and was fully implemented in 2019. Fishing access points identified from the MRIP Site Register are assigned weekly, by subregion, using a randomized draw process (Cermak, pers com 2023). No Tilefish samples from TX-AL were provided through FIN-BIOSTAT. RECFIN provided length samples for 12 Golden and 3 Blueline Tilefish and of those samples 11 Golden Tilefish were also sampled for age. RepBio provided 24 Golden Tilefish samples for length and 20 Golden Tilefish samples for age compositions.

Trip Interview Program (TIP)

The Trip Interview Program (TIP) is part of the State-Federal Cooperative Statistic Program and began in the 1980s. The primary focus of TIP is to collect detailed biological information from commercial fisheries. TIP samplers collect biological samples (e.g. otoliths, gonads) dockside while the catch is being offloaded or at a dealer site. TIP samples are collected randomly from stratified areas (Beggerly et al. 2025). While TIP is designed to sample commercial fisheries, during the 1990s and early 2000s, TIP samplers would collect samples from recreational charter and headboat vessels when commercial vessels were not available. (Barnett, pers comm). TIP sampled 28 Golden Tilefish for length and age from recreational vessels.

Stock and Fleet Structure

One recreational fleet (Rec) is being evaluated for SEFSC 01. This fleet is comprised of charter (CB), private (PR), and headboat (HB) modes.

Changes from SEDAR 22

Improvements in data provision, facilitated by the Life History Template, allowed unique records (n=45) in the age data to be added to the length-only data and included in length compositions analyses. These additional samples were not included in the length compositions for SEDAR 22.

SEDAR 22 only included biological samples from Golden Tilefish. SEFSC 01 is evaluating the inclusion of Blueline and Goldface Tilefish in addition to Golden Tilefish.

The length type used in SEDAR 22 was total length unspecified. For SEFSC 01, the length type being used in the assessment is fork length. New morphometrics developed for SEFSC 01 were also used (see below).

Morphometric Conversions

Natural total length (NTL) and maximum total length (MTL) were converted to fork length (FL) using new equations provided for SEFSC 01 by the SEFSC Panama City Biology and Life History Branch. The equations were developed only using Golden Tilefish samples, however, they were developed with the intent that they are applied to all three species. The conversion equations (in mm) used are:

Natural Total Length (NTL) to Fork Length:

$$FL = 20.58 + 0.91 * NTL$$

Maximum Total Length (MTL) to Fork Length:

$$FL = 10.48 + 0.93 * MTL$$

Nominal Length Compositions

Nominal length compositions were developed for SEFSC 01 Tilefish. Fish were assigned to 2 cm bins with bins ranging from 20 - 114 cm with the 114 cm bin representing a plus group. The label represents the floor of the bin. It is not recommended to use a length composition where there are not a minimum of 30 fish from at least 10 trips per stratum. There are no years that meet this criteria for the Golden Tilefish nominal length compositions. For the Tilefish Complex, four years had sufficient sample sizes for nominal length compositions (Table 5). Since annual sample sizes are low, samples were pooled across years for nominal length composition analysis. The nominal length distribution of the Golden Tilefish only compositions tends to skew larger than the Tilefish Complex nominal length distributions (Figure 3).

Comparison of Length and Age Data

The distribution of length samples included in the Golden Tilefish length compositions (length-only) and samples with both length and ages included in the age compositions are shown in Figure 4. The lengths included in the length compositions skews larger than the lengths from the samples included in the age compositions.

Nominal Age Compositions

Nominal age composition analysis was conducted for SEFSC 01 Golden Tilefish. For age compositions, it is recommended to exclude strata where there are not a minimum of 10 fish from 10 trips. No years met this minimum sample size requirement (Table 6) and years were pooled for analysis. Golden Tilefish ages ranged from 6-22 years old, with 84% of fish being between 8-18 years old (Figure 5). There is a wide spread of lengths associated with each age. Since there are limited (n=45) samples from the recreational fishery, it was unclear if the patterns observed in the recreational data were indicative of true variability in the data or potential data errors. To further evaluate this, length and age from recreational, commercial, and fishery-independent data was compared (Figure 6). The wide spread of lengths associated with each age appears to be indicative of true variability in the growth of Golden Tilefish.

Mean Length-at-Age

Mean length-at-age (MLAA) is the average length for each age and is calculated as

$$MLAA_{i,k} = \frac{\sum L_{i,k}}{a_{i,k}}$$

where L are lengths , a is the number of associated sample sizes, i is year, and k is age class. MLAA are provided to aide in model diagnostics and is presented in Figure 7.

Data Adequacy and Availability

Table 7 summarizes the adequacy of data available for composition analyses for SEFSC 01 Tilefish. For each data product (e.g. nominal length compositions, nominal age compositions) the year is color-coded either gray, red, or blue. Gray indicates that data are not available for that fishing year. Years in red indicate that the samples sizes were not sufficient for that data product and blue was used to indicate minimum sample size thresholds were met.

Data is very limited most years for all analyses and pooling is recommended.

References

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Nuttall, M.A. and V.M. Matter. 2020. Texas Parks and Wildlife Department's Marine Sport-Harvest Monitoring Program Metadata. SEDAR70-WP-03. SEDAR, North Charleston, SC. 25 pp. Available at: https://sedarweb.org/documents/sedar-70-wp-03-texas-parks-and-wildlife-departments-marine-sport-harvest-monitoring-program-metadata/

Tables

Table 1. Number of fish and trips sampled for length for Blueline, Golden, and Goldface Tilefish from recreational fisheries in the Gulf of America.

	Number of Fish			Number of Trips		
Year	Blueline	Golden	Goldface	Blueline	Golden	Goldface
1986	1	1	4	1	1	2
1987	0	2	9	0	1	9
1988	0	0	4	0	0	4
1989	0	1	2	0	1	1
1990	0	2	2	0	2	2
1991	0	0	1	0	0	1
1996	1	0	0	1	0	0
1999	0	1	0	0	1	0
2001	0	0	1	0	0	1
2004	4	0	0	3	0	0
2005	2	1	0	2	1	0
2006	2	0	0	1	0	0
2008	0	1	0	0	1	0
2009	1	0	0	1	0	0
2012	1	7	1	1	2	1
2013	1	7	3	1	2	2
2014	0	11	4	0	2	2
2015	5	11	1	3	5	1
2016	14	25	3	5	7	2
2017	3	5	1	3	2	1
2018	1	14	1	1	7	1
2019	0	11	6	0	3	5
2020	1	2	0	1	2	0
2021	2	9	1	2	4	1
2022	49	25	1	5	7	1
2023	134	12	11	16	5	4
2024	29	12	7	10	4	5

Table 2. Total number of fish and trips, for Blueline, Golden, and Goldface Tilefish sampled for length and age from each sampling program from recreational fisheries in the Gulf of America. No ages were provided for Blueline and Goldface Tilefish.

	Length						Age	
	Number of Fish			Number of Trips			Number of Fish	Number of Trips
Sampling Program	Blueline	Golden	Goldface	Blueline	Golden	Goldface	Golden	Golden
FWRI-OBS	3	2	3	3	1	1	0	0
MRIP	14	47	2	12	22	2	0	0
RECFIN	3	12	3	2	3	3	11	3
REPBIO	0	24	0	0	4	0	20	3
SRFS	0	3	0	0	1	0	3	1
SRHS	230	25	55	39	13	40	1	1
TIP	0	28	0	0	10	0	10	6
TPWD	1	19	0	1	6	0	0	0

Table 3. Annual number of fish sampled for length by each data source for Blueline, Golden, and Goldface Tilefish.

Year	Common	FWRI-OBS	MRIP	RECFIN	REPBIO	SRFS	SRHS	TIP	TPWD
1986	Blueline	0	0	0	0	0	1	0	0
1996	Blueline	0	0	0	0	0	1	0	0
2004	Blueline	0	2	2	0	0	0	0	0
2005	Blueline	0	2	0	0	0	0	0	0
2006	Blueline	0	2	0	0	0	0	0	0
2009	Blueline	0	1	0	0	0	0	0	0
2012	Blueline	1	0	0	0	0	0	0	0
2013	Blueline	0	1	0	0	0	0	0	0
2015	Blueline	1	2	0	0	0	2	0	0
2016	Blueline	0	1	1	0	0	12	0	0
2017	Blueline	0	0	0	0	0	3	0	0
2018	Blueline	0	1	0	0	0	0	0	0
2020	Blueline	0	1	0	0	0	0	0	0
2021	Blueline	0	0	0	0	0	2	0	0
2022	Blueline	0	1	0	0	0	48	0	0
2023	Blueline	1	0	0	0	0	132	0	1
2024	Blueline	0	0	0	0	0	29	0	0
1986	Golden	0	0	0	0	0	1	0	0
1987	Golden	0	2	0	0	0	0	0	0
1989	Golden	0	0	0	0	0	1	0	0
1990	Golden	0	2	0	0	0	0	0	0
1999	Golden	0	0	0	0	0	1	0	0
2005	Golden	0	1	0	0	0	0	0	0
2008	Golden	0	1	0	0	0	0	0	0
2012	Golden	0	1	0	0	0	0	6	0
2013	Golden	0	1	0	0	0	0	0	6
2014	Golden	0	11	0	0	0	0	0	0
2015	Golden	0	2	5	0	0	0	4	0
2016	Golden	0	10	7	0	0	4	4	0
2017	Golden	0	0	0	0	0	0	3	2
2018	Golden	0	4	0	0	0	0	10	0
2019	Golden	0	0	0	7	3	0	1	0

Year	Common	FWRI-OBS	MRIP	RECFIN	REPBIO	SRFS	SRHS	TIP	TPWD
2020	Golden	0	2	0	0	0	0	0	0
2021	Golden	2	6	0	0	0	1	0	0
2022	Golden	0	2	0	15	0	5	0	3
2023	Golden	0	2	0	0	0	2	0	8
2024	Golden	0	0	0	2	0	10	0	0
1986	Goldface	0	0	0	0	0	4	0	0
1987	Goldface	0	0	0	0	0	9	0	0
1988	Goldface	0	0	0	0	0	4	0	0
1989	Goldface	0	0	0	0	0	2	0	0
1990	Goldface	0	0	0	0	0	2	0	0
1991	Goldface	0	0	0	0	0	1	0	0
2001	Goldface	0	0	0	0	0	1	0	0
2012	Goldface	0	0	0	0	0	1	0	0
2013	Goldface	0	0	0	0	0	3	0	0
2014	Goldface	0	0	0	0	0	4	0	0
2015	Goldface	0	0	1	0	0	0	0	0
2016	Goldface	0	0	1	0	0	2	0	0
2017	Goldface	0	0	0	0	0	1	0	0
2018	Goldface	0	0	1	0	0	0	0	0
2019	Goldface	0	0	0	0	0	6	0	0
2021	Goldface	0	0	0	0	0	1	0	0
2022	Goldface	0	0	0	0	0	1	0	0
2023	Goldface	0	0	0	0	0	11	0	0
2024	Goldface	3	2	0	0	0	2	0	0

Table 4. Annual number of Golden Tilefish sampled for age by each data source. No age samples were provided for Blueline and Goldface Tilefish.

Year	Common	RECFIN	REPBIO	SRFS	SRHS	TIP
2012	Golden	0	0	0	0	3
2015	Golden	5	0	0	0	2
2016	Golden	6	0	0	1	4
2019	Golden	0	5	3	0	1
2022	Golden	0	15	0	0	0

Table 5. Number of fish and trips sampled from Golden Tilefish and the Tilefish Complex for lengths. The Tilefish Complex includes Golden, Blueline, and Goldface Tilefish. Values in red do not meet the recommended threshold of 30 fish per strata for lengths or 10 trips per strata.

	Number of Fish		Number of Trips	
Year	Golden	Complex	Golden	Complex
1986	1	6	1	4
1987	2	11	1	10
1988	0	4	0	4
1989	1	3	1	2
1990	2	4	2	4
1991	0	1	0	1
1996	0	1	0	1
1999	1	1	1	1
2001	0	1	0	1
2004	0	4	0	3
2005	1	3	1	3
2006	0	2	0	1
2008	1	1	1	1
2009	0	1	0	1
2012	7	9	2	4
2013	7	11	2	5
2014	11	15	2	4
2015	11	17	5	8
2016	25	42	7	12
2017	5	9	2	6
2018	14	16	7	9
2019	11	17	3	8
2020	2	3	2	3
2021	9	12	4	6
2022	25	75	7	12
2023	12	157	5	23
2024	12	48	4	15

Table 6. Number of fish and trips sampled from Golden Tilefish for age. No age samples were provided for Blueline and Goldface Tilfish. Values in red do not meet the recommended threshold of 10 fish or 10 trips per strata for age data.

Year	Number of Fish	Number of Trips
2012	3	1
2015	7	4
2016	11	4
2019	9	3
2022	15	2

Table 7. Data suitability table for SEFSC 01 Tilefish. Cells in gray have no data, cells in red do not meet minimum sample size requirements, and cells in blue meet sample size requirements.

Year	Nom Len Complex	Nom Len Golden	Nom Age Golden
1981			
1982			
1983			
1984			
1985			
1986			
1987			
1988			
1989			
1990			
1991			
1992			
1993			
1994			
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2010			
2011			
2012			
2013			
2014			
2015			
2016			
2017			
2018			

Year	Nom Len Complex	Nom Len Golden	Nom Age Golden
2019			
2020			
2021			
2022			
2023			
2024			

Figures

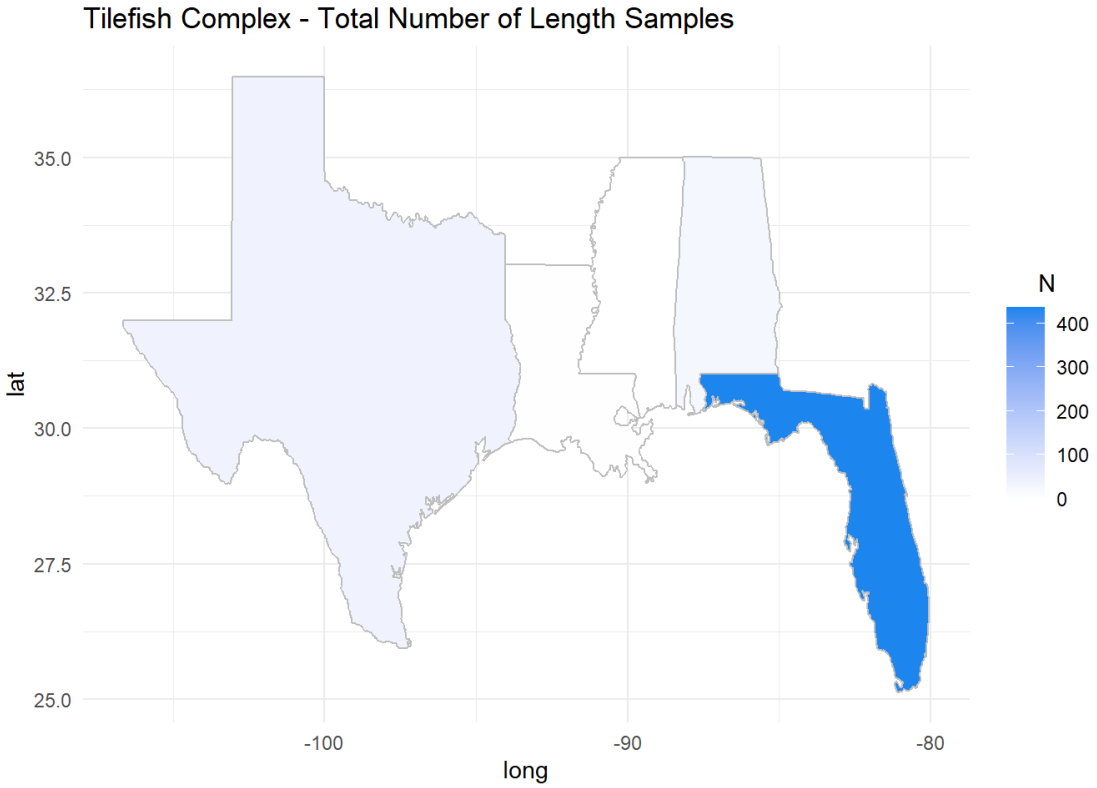

Figure 1. Number of length samples by state collected for the Tilefish Complex. The Tilefish Complex includes Golden, Blueline, and Goldfish Tilefish.

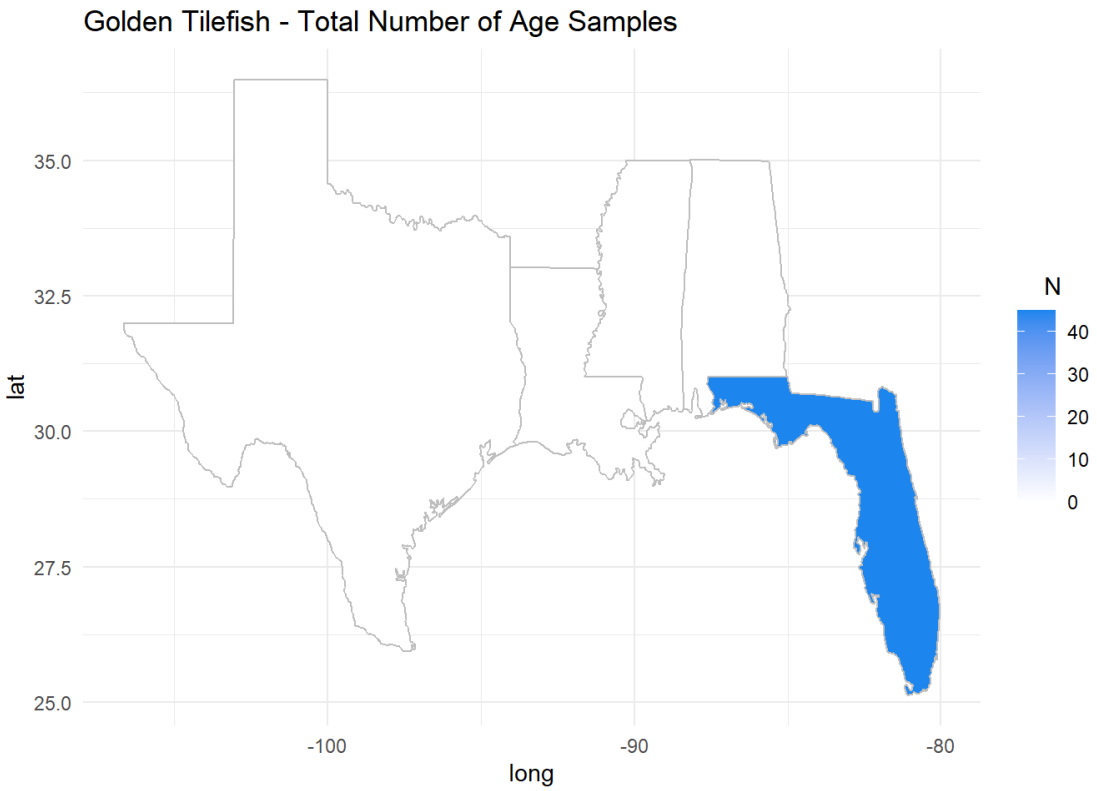

Figure 2. Number of age samples collected, by state, for Golden Tilefish. No ages were provided for Blueline and Goldface Tilefish.

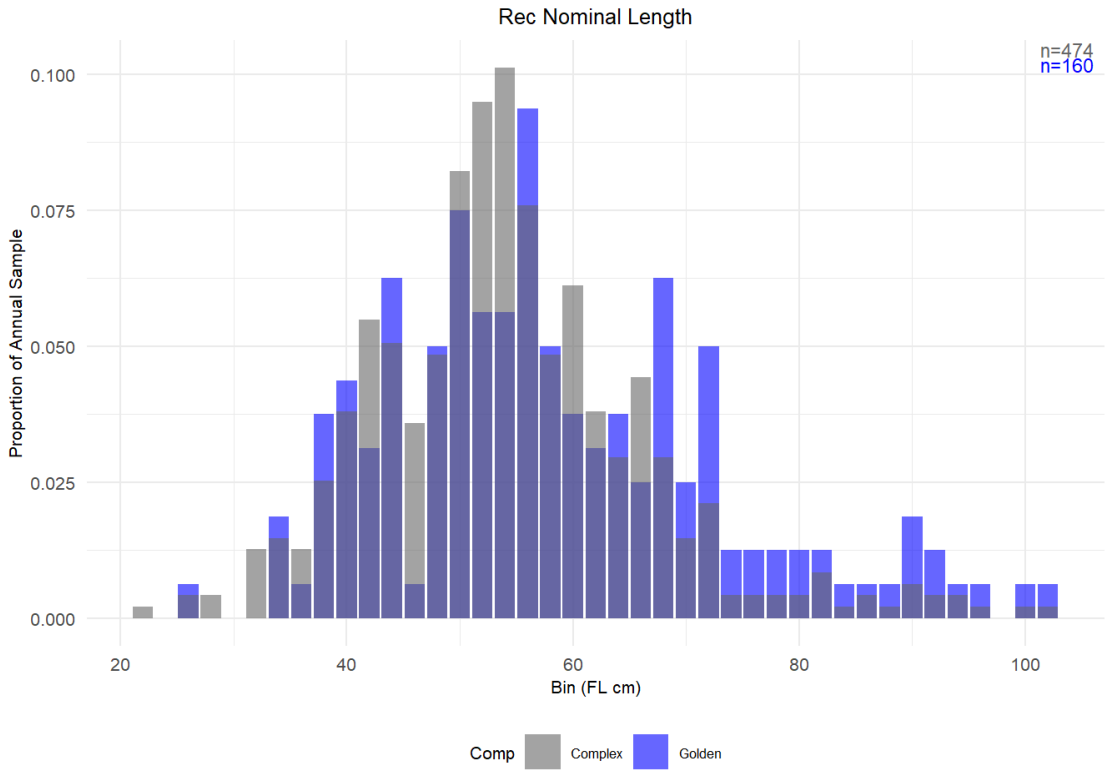

Figure 3. Nominal length distribution, pooled across all years, for Golden Tilefish and the Tilefish Complex. The Tilefish Complex is comprised of Golden, Blueline, and Goldface Tilefish. The number of fish included in the compositions is included in the top right corner.

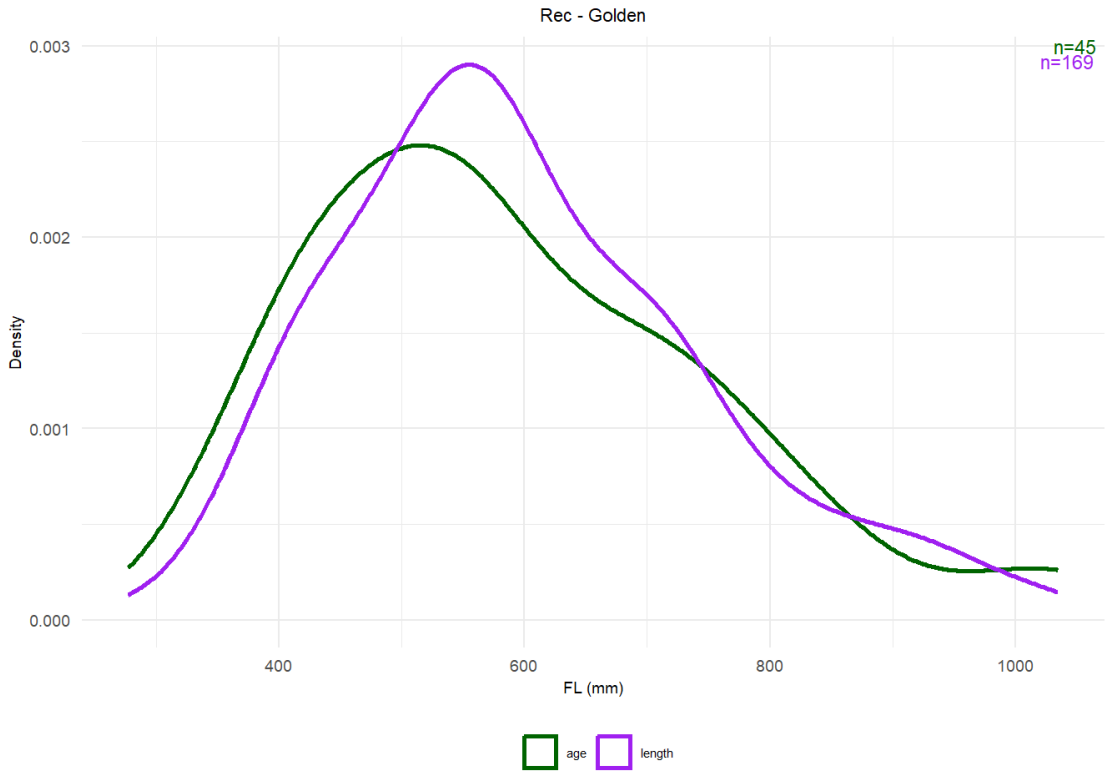

Figure 4. Comparison of the length distribution of Golden Tilefish lengths included in the length compositions and lengths from Golden Tilefish included in the age compositions. The number of fish included in the compositions is provided in the top right corner.

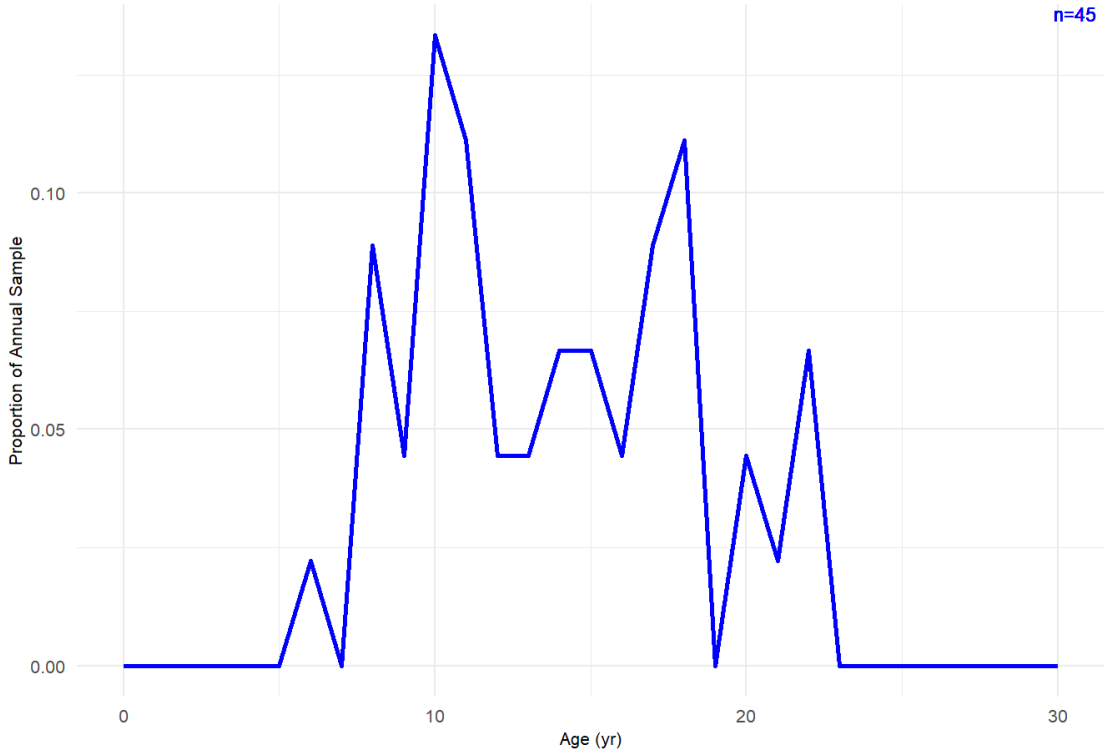

Figure 5. Nominal age distribution of Golden Tilefish, pooled across all years. The number of fish included in the composition is provided in the top right corner.

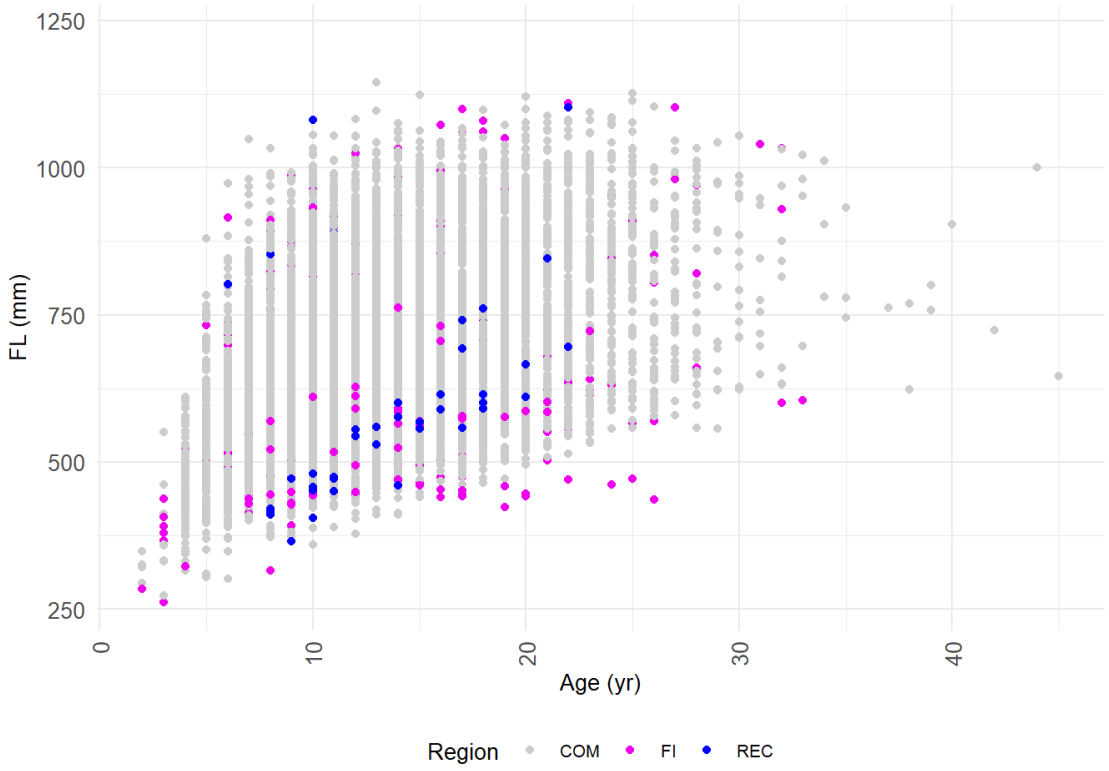

Figure 6. Length versus age of Golden Tilefish sampled from recreational (REC) and commercial (COM) fisheries and fisheries independent (FI) surveys.

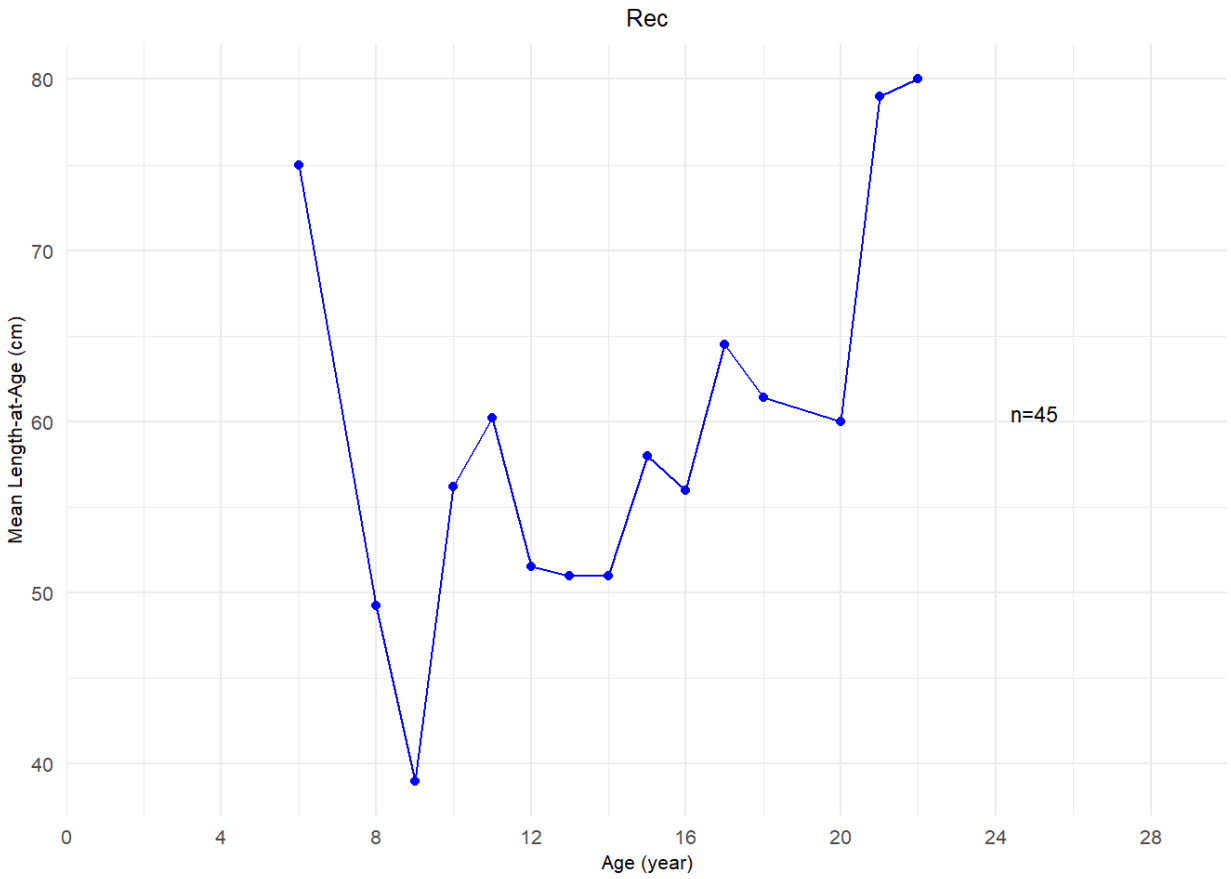

Figure 7. Mean length-at-age (MLAA) for Golden Tilefish sampled from Gulf recreational fisheries. The number of fish included in the analysis is provided in the top right corner.