Report to SEDAR 82 Gray Triggerfish Research Track Panel: Data used in Morphometric Conversions in SEDAR 41

Jennifer C. Potts

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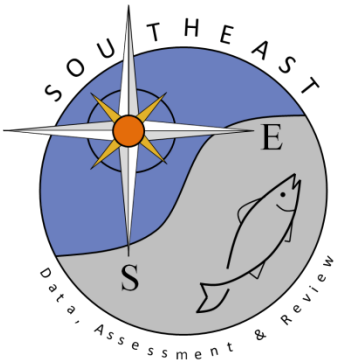

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Report to SEDAR 82 Gray Triggerfish Research Track Panel:

Data used in Morphometric Conversions in SEDAR 41

Jennifer C. Potts
NMFS/SEFSC/FATES/BLH Branch
Beaufort, NC
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Morphometric (aka Meristics) Conversion data used in SEDAR 41

Data used in SEDAR 41 to run regression models for length-length and weight-length conversions were confirmed. Data included in the analyses were taken from the Southeast Region Headboat Survey (SRHS), Marine Recreational Information Program (MRIP), and the South Carolina Department of Natural Resources Marine Monitoring and Assessment Program (MARMAP) and Southeast Fishery Independent Survey (SEFIS). All data sets were constrained to the U.S South Atlantic, North Carolina through the east coast of Florida and the Keys. The meristic conversion report and tables and figures from SEDAR41 assessment report are included in Appendix A. Specifics of each data set are detailed below.

SRHS data included in the analyses were from the years 1989 through 2013 (n = 21,980). The data were fairly evenly spread across the area with n = 6,851 from NC, n = 4,509 from SC/GA, and n = 10,620 from east coast of Florida, including the Atlantic portion of the Keys. For gray triggerfish, the primary length recorded in SRHS is fork length. Though SRHS data have been collected since 1972, there were some issues with the earliest data (1972 – 1976). When the whole weight-fork length data were plotted, there were two distinct trajectories, which could not be resolved. During 1980 – 1988, there appeared to be a lot of outlier data. The issue with both time periods may have been that total lengths were recorded instead of fork length in some of the records. If total lengths were taken, it was not clear if the port agents were instructed to take the natural total length including the filaments. Also, during that time period an update of the bio-profile database took place and it appeared that the data in the "Length" field were copied to a newly created "FL" field. Overall, the data from 1989 – 2013 were much cleaner, and the primary use of the data was for the whole weight – fork length relation.

MRIP data from 1981 – 2013 were used in the whole weight – fork length regression. The MRIP intercept survey records have fork length measurements only. Data used were distributed from NC (n = 4,539), SC/GA (n = 932), and the east coast of Florida, including Monroe County (n = 1,445).

One combined dataset of MARMAP and SEFIS were used in the morphometric conversions (n = 10,207). Data from MARMAP contained fishery-independent survey samples and some fishery-dependent samples from 1978- 2013, and data from SEFIS were collected 2010 - 2013. These data covered the full geographic scope of the surveys – NC through the east coast of Florida. These surveys collect maximum total length of gray triggerfish which includes the filaments on the caudal fin, (i.e., from the most forward point of the head, with the mouth closed, to the farthest tip of the tail with the tail compressed or squeezed), fork length, standard length, and whole weight. These surveys were the only ones with clearly defined maximum total length. Thus, these data were used for the various length – length regressions and were included in the whole weight – fork length regression. In the SEDAR 41 report, included in Appendix A, any regression including "TL" refers to maximum total length, because the data were from MARMAP and SEFIS.

Appendix A

SEDAR 41 Gray Triggerfish Life History Report section

Meristic Conversions

Data for the length-length and whole weight (g) – length (mm) regressions were pulled from the Southeast Region Headboat Survey (Atlantic portion only), Southeast fishery-independent survey (SCDNR MARMAP and SEFIS), and MRIP data base. Fork length was agreed upon to be the length type used in the assessment. When total length was measured by the fishery-independent survey, the max TL was taken including the caudal filaments. Linear regressions were run to convert total length and standard length to fork length. Log transformed whole

weight and length regressions were run for all three length types. The regression equations were then converted to power equations which included ½ mean squared error (MSE) to account for the transformation bias. Regression parameters are included in the following Tables, and figures illustrate the scatter plot of data points with obvious outliers excluded.

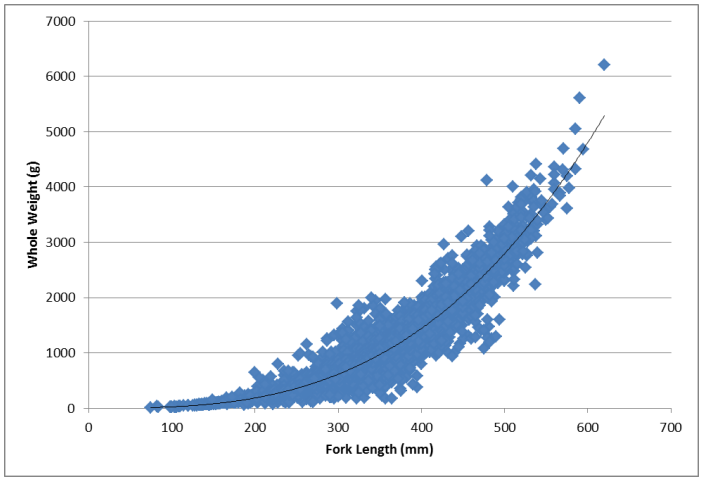
Gray Triggerfish: Length – length conversion equations: Total length is max TL including filaments

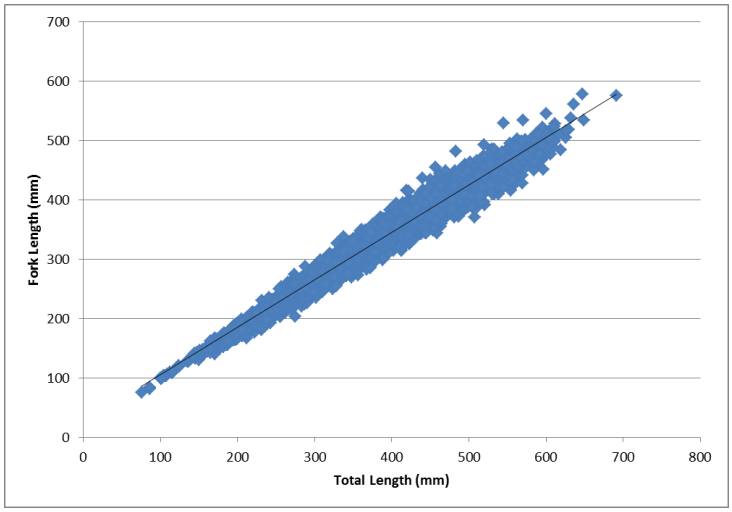
Equation	Units	n	R^2	SE	Range of X
FL = 25.58 + 0.80*TL	mm	10,127	0.97	0.57, 0.00	76 -691
FL = 16.61 + 1.14*SL	mm	10,175	0.98	0.42, 0.00	59 - 505
TL = -18.27 + 1.21*FL	mm	10,127	0.97	0.75, 0.00	75 - 578
TL = 1.73 + 1.38*TL	mm	10,137	0.95	0.86, 0.00	59 - 525
SL = -9.62 + 0.86*FL	mm	10,175	0.98	0.38, 0.00	75 - 578
SL = 12.12 + 0.69*TL	mm	10,137	0.95	0.60, 0.00	76 - 691

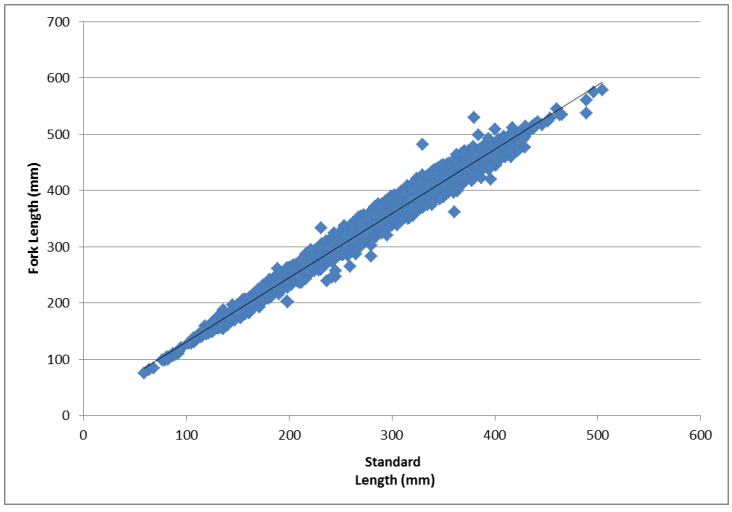
Gray Triggerfish: LN – Ln transformed whole weight (g)– length (mm) and the inverse of that regression converted to the power equation.

Variables	a (SE)	b (SE)	MSE	n	R^2	Range of X	Converted Power Equation
W - FL	-10.51 (0.02)	2.97 (0.00)	0.02	36,573	0.94	75 – 620	$W = 2.75*10^{-5} L^{2.97}$
W – TL	-9.53 (0.03)	2.74 (0.01)	0.02	10,068	0.96	76 – 691	$W = 7.37*10^{-5} L^{2.74}$
W - SL	-9.04 (0.02)	2.81 (0.00)	0.01	10,118	0.98	59 - 505	$W = 1.12*10^{-4} L^{2.81}$
FL - W	3.68 (0.00)	0.32 (0.00)	0.00	36,573	0.94	11 - 6200	$L = 39.65 W^{0.32}$

Gray Triggerfish: Scatter Plots of raw data used in conversion equations. Whole weight – length and length – length.


Whole Weight (g)
7000
6000
5000
4000
3000
2000
1000
0
0
100
200
300
400
500
600
700
Fork Length (mm)


Fork Length (mm)
700
600
500
400
300
200
100
0
0
100
200
300
400
500
600
700
800
Total Length (mm)


Fork Length (mm)
700
600
500
400
300
200
100
0
0
100
200
300
400
500
600
Standard
Length (mm)