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Post-stratification of the GRSC estimates by depth and state

GMFMC SSC Meeting
March 8-10, 2022

Overview

Analyses conducted after the CIE review of the GRSC have been conducted in order to address uncertainties in the population estimates provided by the study.

Specifically, too many fish in the shallow water stratum estimate off Florida raised a red flag with state and NMFS scientists alike.



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Post-stratification direction

- Started with Florida
 - The group compared state and NMFS survey data to the GRSC estimates in the shallowest depth stratum.
- In January, 2022, the SSC asked that the efforts be expanded to the other states where possible
 - “Include the results of the efforts to post-stratify the shallow depth strata (10-40 meters [m]) into two strata (10-25 m and 25-40 m) for all regions in the Gulf for which this is possible (e.g., Florida, Alabama/Mississippi, Louisiana, Texas).”
- Each state result is independent and can be included separately.



Additional technical details

- See “The Great Red Snapper Count: Population Estimation” by Rob Ahrens for the technical details of the original analysis.
- The 10-40 m depth zone was split into 2, otherwise other general details of the analysis are the same.
- https://gulfcouncil.org/wp-content/uploads/02div1.-Ahrens_Red_Snapper_GCSSC_Part-2-1.pdf



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Assumptions

- For Texas the total UCB area in 10-25m and 25-40m was approximated based on the overall proportion of UCB in 10-25m and 25-40m across the state.
- LA: assumed density in the 10-25 m depth was 0
- MS/AL: subtracted the total area in 10-25m assuming density was 0. Note that density is from CBASS deeper water estimates.
- FL: Some imputation from closest strata was done



Number of age 2+ red snapper and coefficient of variation (CV) estimated from the Great Red Snapper Count data by region and habitat type.

State/Region	Habitat Type	Number	CV(%)
TX	Natural	7,037,443	36
	Artificial	417,761	21
	Uncharacterized Bottom	14,569,830	46
	Total	22,025,035	32
LA	Natural	3,852,652	43
	Artificial	3,849,325	15
	Uncharacterized Bottom	9,729,387	59
	Total	17,431,364	34
AL/MS	Natural	3,751,988	20
	Artificial	1,509,625	11
	Uncharacterized Bottom	3,199,472	51
	Total	8,461,085	21
FL	Natural & Uncharacterized Bottom	48,124,414	22
	Artificial	127,560	17
	Total	48,251,974	22
ALL	Pipeline	507,661	43
Gulf of Mexico		96,677,118	14

Number of age 2+ red snapper and coefficient of variation (CV) estimated following a depth based post-stratification (original 0-40 meter depth strata split into 10-25 and 25-40) of the Great Red Snapper Count data by region and habitat type. CV's for total estimates were not re-calculated during post-stratification analysis.

State/Region	Habitat Type	Number	CV(%)
TX	Natural	7,037,443	36
	Artificial	417,761	21
	Uncharacterized Bottom	12,253,661	41
	Total	19,708,865	
LA	Natural	3,852,652	43
	Artificial	3,849,325	15
	Uncharacterized Bottom	5,869,365	61
	Total	13,571,342	
AL/MS	Natural	3,751,988	20
	Artificial	1,509,625	11
	Uncharacterized Bottom	2,271,625	51
	Total	7,533,238	
FL	Natural & Uncharacterized Bottom	46,838,220	22
	Artificial	127,560	17
	Total	46,965,780	
ALL	Pipeline	507,661	43
Gulf of Mexico		88,286,887	



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Conclusions

- For Florida, the analysis mainly moved fish from the 10-25m stratum to deeper depths.
- The larger relative abundance in the big bend region remains an issue, though we agreed that there was not a way to address that with this analysis.
- The analyses for the other states were not part of our group discussion, but are presented here for the SSC's review.



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