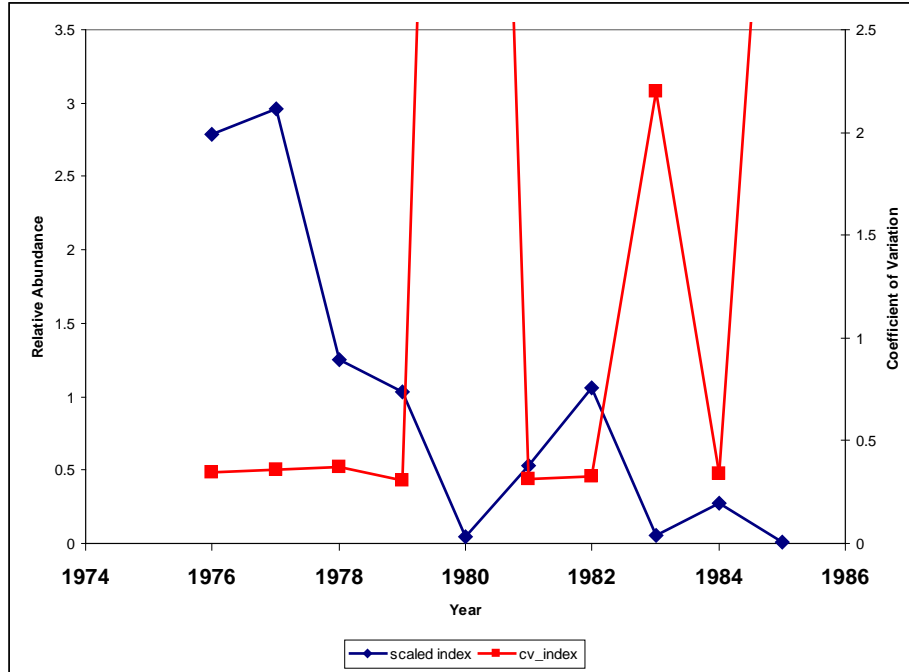


Analysis of Headboat Data for Goliath Grouper

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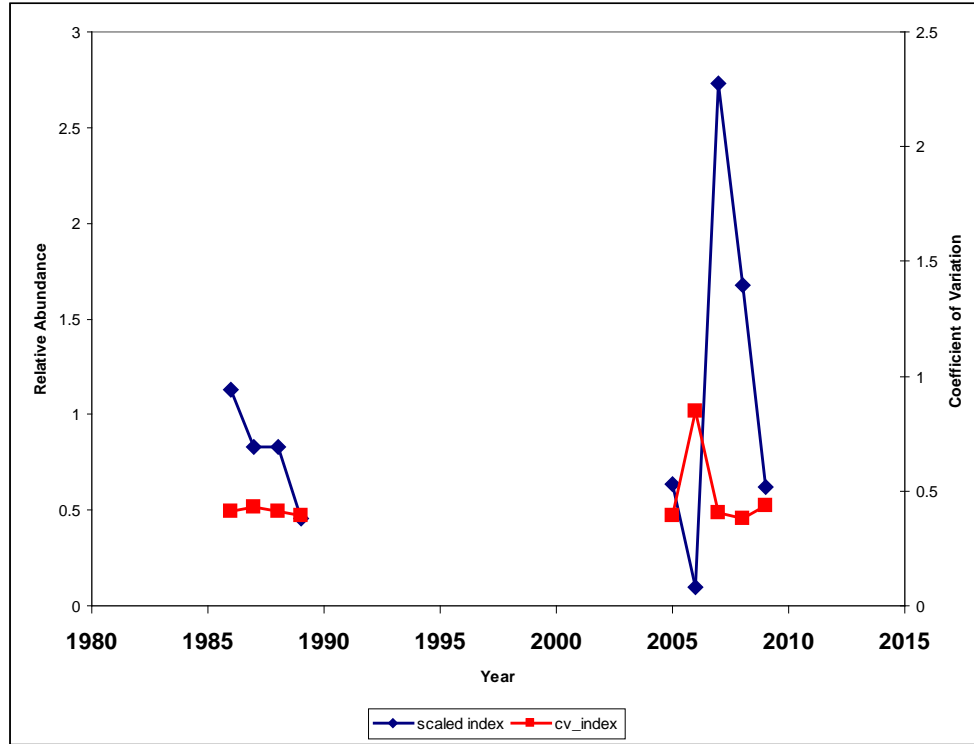
NOAA, NMFS, SEFSC, Pascagoula, MS

Headboat catch data was analyzed in order to develop abundance indices for Goliath grouper. The time series was split into two time series: 1976-1985; and 1986-2009, with a data holiday from 1990 to 2004. The reason for the split was the change in the sampling procedures where prior to 1986 data was only collected in the Atlantic. In 1986, sampling started included the Gulf of Mexico as well, which changed aerial coverage of sampling in and around the Florida Keys and South Florida. A delta-lognormal approach was used in modeling these two time series, with year and area included as variables in both the binomial and lognormal submodels. The headboat data was limited to the following headboat survey areas, which served as categories in the area variable: Northeast Florida (Section 1), Fernandina Beach through St. Augustine, FL; Northeast Florida (Section 2), Daytona Beach through Sebastian, FL; Southeast Florida, Fort Pierce through Miami, FL; Florida Keys, Key Largo through Key West, FL; Dry Tortugas, Florida, Fishing Area Around (Vessels docked in FL Keys) The Dry Tortugas, FL; Dry Tortugas, Florida, Fishing Area Around (Vessels docked on west coast of FL), The Dry Tortugas, FL; Southwest Florida, Naples through Cedar Key, FL. Due to the low frequency of Goliath in the data, variance estimates of index values were calculated using a bootstrap approach. With this approach 80% of the data were randomly selected from each time series and models were ran 1000. This provided a distribution of index values for each year. The standard deviation of the index values was derived for each to provide an annual standard error estimate, by which the coefficient of variation (CV) on the index value was derived. Figures X and XX summarize the results.



Year	Modeled Frequency	Modeled Non-zero CPUE	Index	Scaled Index	CV
1976	0.021126	1.836007	0.038787	2.78372341	0.348168
1977	0.020223	2.037252	0.041200	2.9569142	0.357341
1978	0.008159	2.135467	0.017422	1.25040206	0.370409
1979	0.007847	1.838026	0.014423	1.03515847	0.307089
1980	0.004488	0.134916	0.000606	0.04346123	9.798135
1981	0.004043	1.812455	0.007327	0.52585993	0.310760
1982	0.006990	2.118325	0.014806	1.06263963	0.324357
1983	0.005068	0.158117	0.000801	0.05750754	2.198148
1984	0.001886	2.015016	0.003801	0.27278837	0.342376
1985	0.001538	0.104614	0.000161	0.01154516	4.69872

Figure X. Annual abundance indices and corresponding CVs of Goliath grouper encountered by headboats from 1976 to 1985.



Year	Modeled Frequency	Modeled Non-zero CPUE	Index	Scaled Index	CV
1986	0.052703	1.125377	0.059311	1.128921	0.411015
1987	0.033821	1.285895	0.04349	0.827795	0.431727
1988	0.044337	0.984593	0.043654	0.830904	0.410809
1989	0.039106	0.609011	0.023816	0.453318	0.390926
2005	0.02329	1.44092	0.033559	0.638765	0.394512
2006	0.008477	0.589809	0.005	0.095165	0.850289
2007	0.038214	3.753649	0.143443	2.730288	0.404272
2008	0.042032	2.096232	0.08811	1.677079	0.382234
2009	0.034445	0.942242	0.032456	0.617765	0.433994

Figure XX. Annual abundance indices and corresponding CVs of Goliath grouper encountered by headboats from 1986 to 1989 and 2005 to 2009.