

Patterns of shark CPUE and environmental variability from ten years of bottom longline data



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Background

Since 1981, NOAA, in conjunction with the Gulf States Marine Fisheries Commission, have collected independent fisheries data, including data on shark populations via bottom longline surveys, as a part of the Southeast Area Monitoring and Assessment Program (SEAMAP). Beginning in 2007 the Gulf Coast Research Lab has sampled the inshore portion of this survey, collecting water quality samples along with shark and finfish catch and life history data, from Mississippi and Louisiana waters.

Objectives

Summarize and compare water quality parameters and shark catch from a long-term bottom longline data set.

Methods

- Water quality and biological samples were examined seasonally from 2009-2019
- Sharks were collected using a one mile bottom longline equipped with 100 hooks that soaked for one hour
- Trends in environmental variability were examined from bottom water samples collected via niskin and YSI
- Biological catch was enumerated, measured, sexed, and tagged
- CPUE was calculated as the number of sharks per set soak time in total minutes and averaged seasonally per year
- Mean CPUE for each year was compared seasonally with an ANOVA or Kruskal-Wallis test

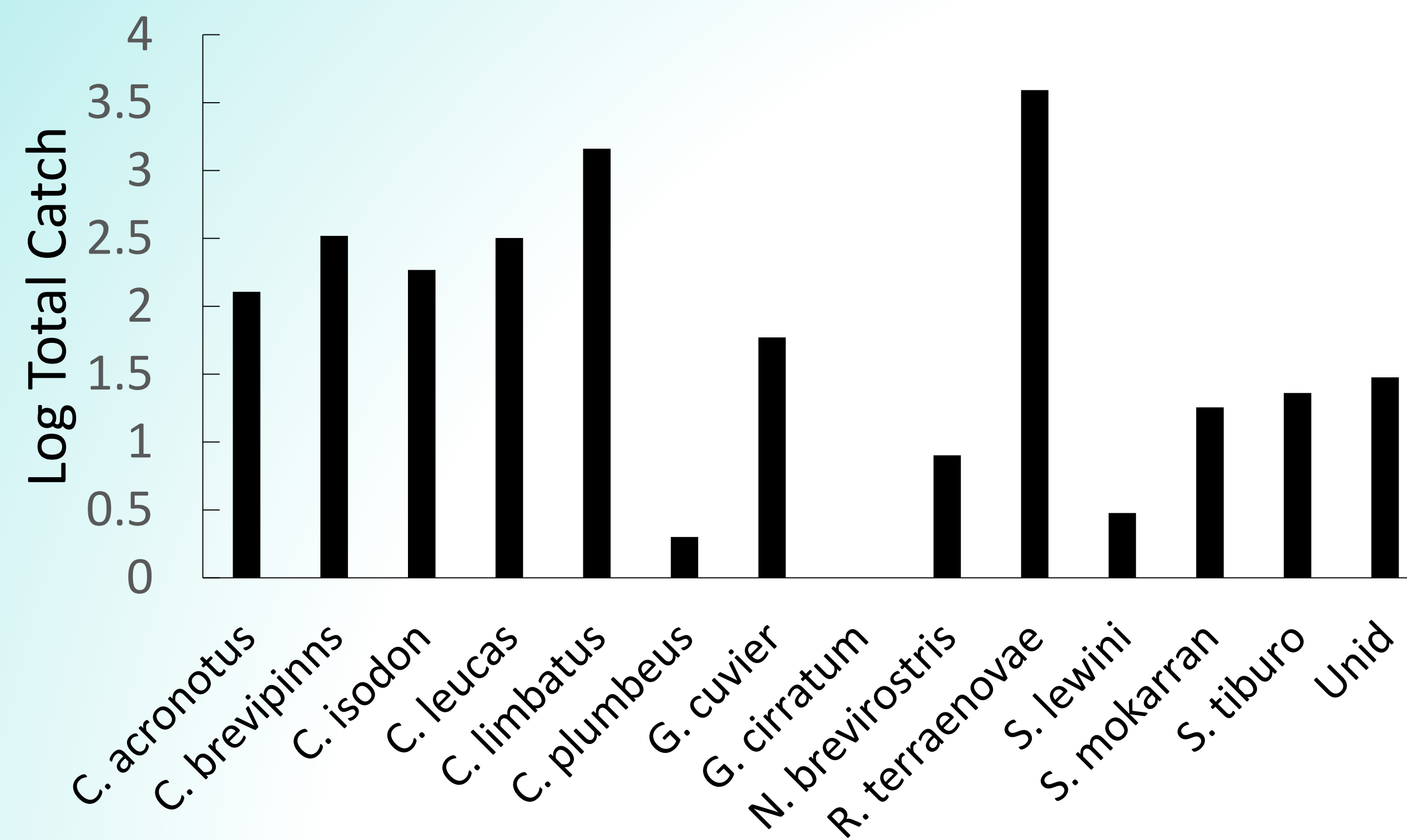


Figure 1. Log of total catch by species collected from 2009-2019.

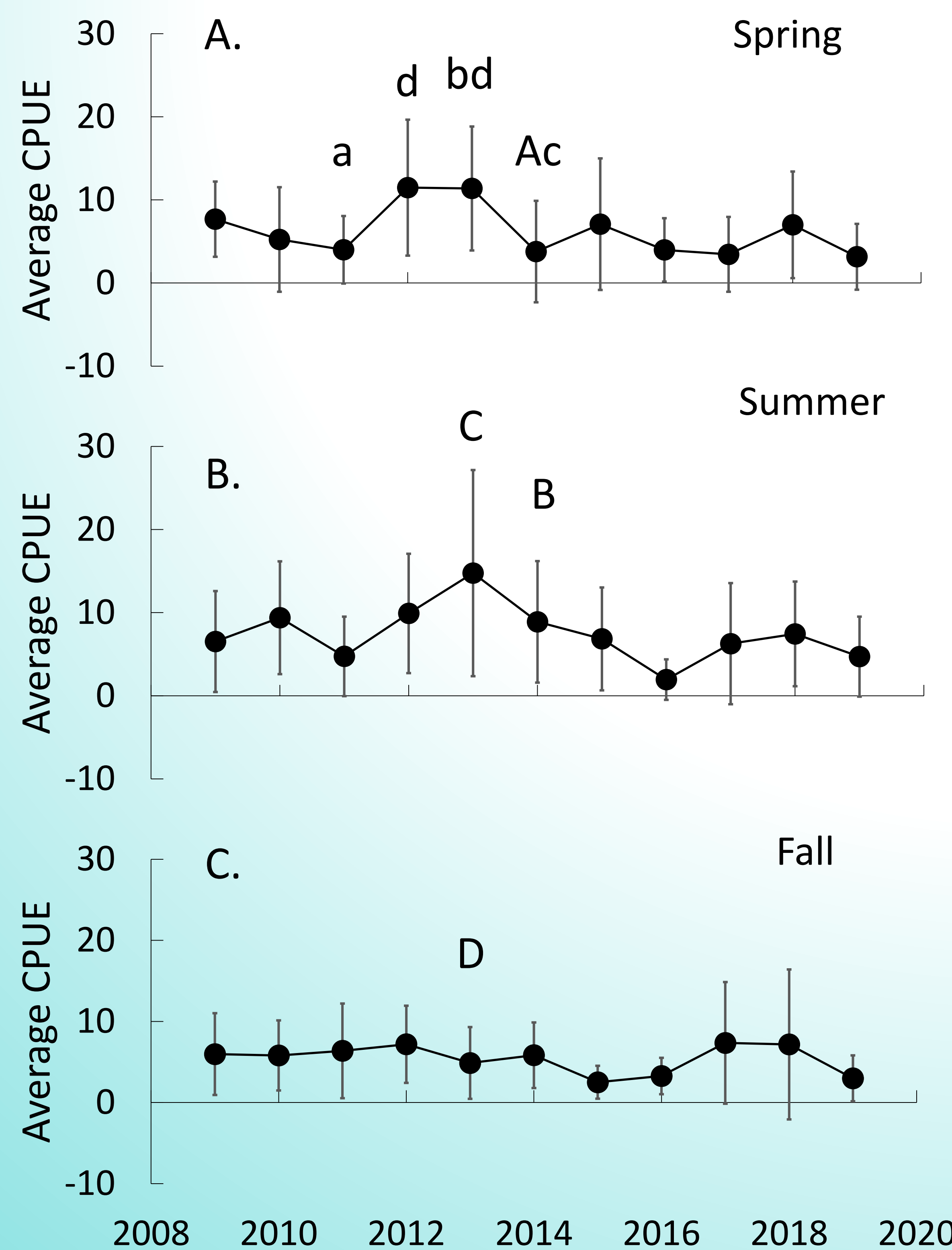


Figure 2. Comparison of mean shark CPUE with standard error for the (a) spring, (b) summer, and (c) fall sampling seasons.

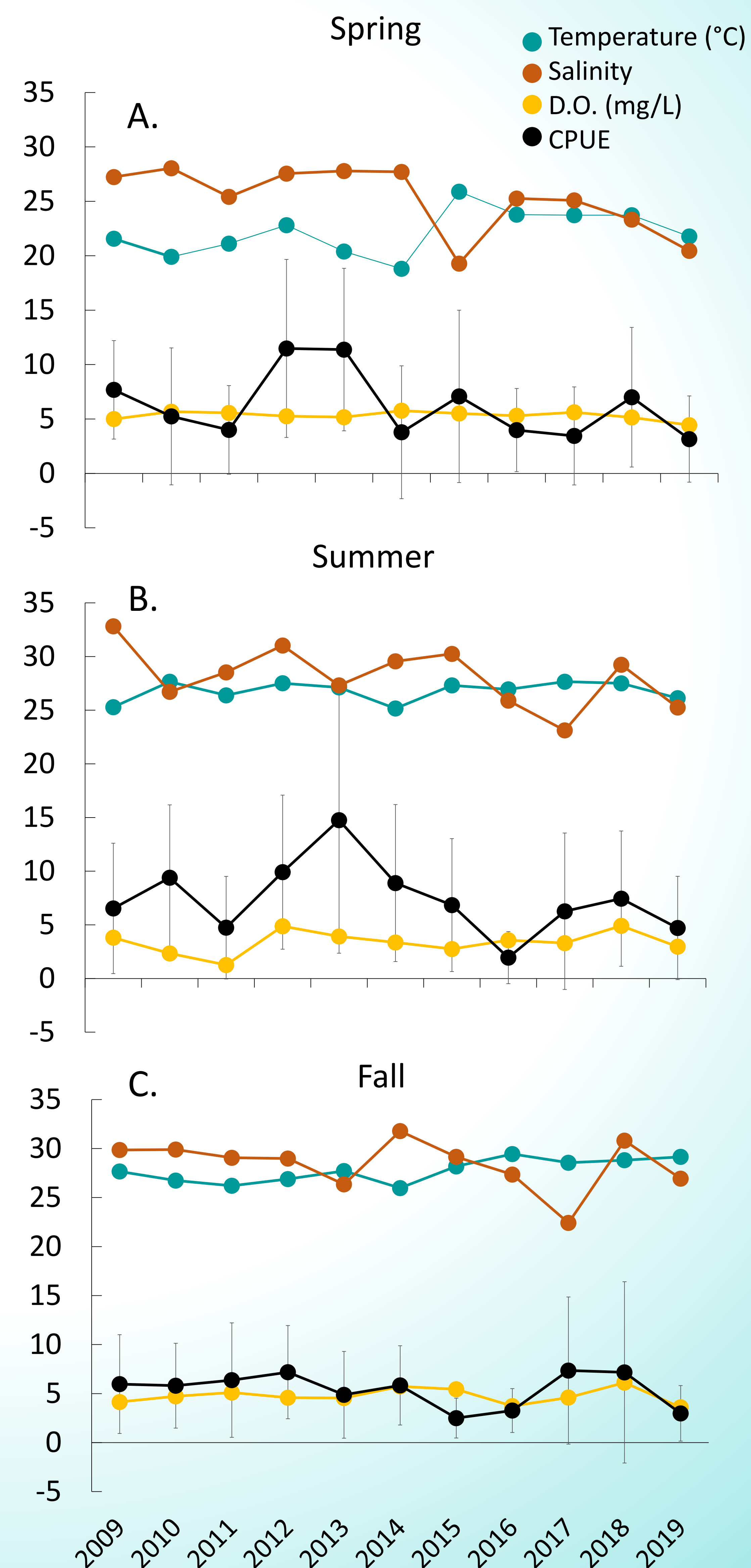


Figure 3. Mean shark CPUE with standard error bars overlaid with environmental parameters for the (a) spring, (b) summer, and (c) fall sampling seasons.

Results

- Rhizoprionodon terraenovae* and *Carcharinus limbatus* were the two most frequently encountered shark species (Figure 1)
- Mean CPUE only varied among seasons in two years (Figure 2)
 - 2013: fall CPUE (B) < summer CPUE (A)
 - 2014: spring CPUE (C) > summer CPUE (D)
- Mean CPUE only varied across years in the spring season (Figure 2)
 - 2011 (a) < 2013 (b)
 - 2014 (c) < 2012 (d), 2013 (d)
- Temperature and salinity were most variable in the spring and fall seasons, while dissolved oxygen was most variable in the summer (Figure 3)

Discussion/Future Directions

- No major trends in CPUE were seen across the decade of data
- CPUEs were averaged annually and may not be the most representative method for comparison (as seen with the wide margin in standard errors)
- Grouping on a finer scale, or comparison of further variables (species, life stage, sex, depth, etc.) may reveal trends not evident with this analysis

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