B. *Loligo*-Figures

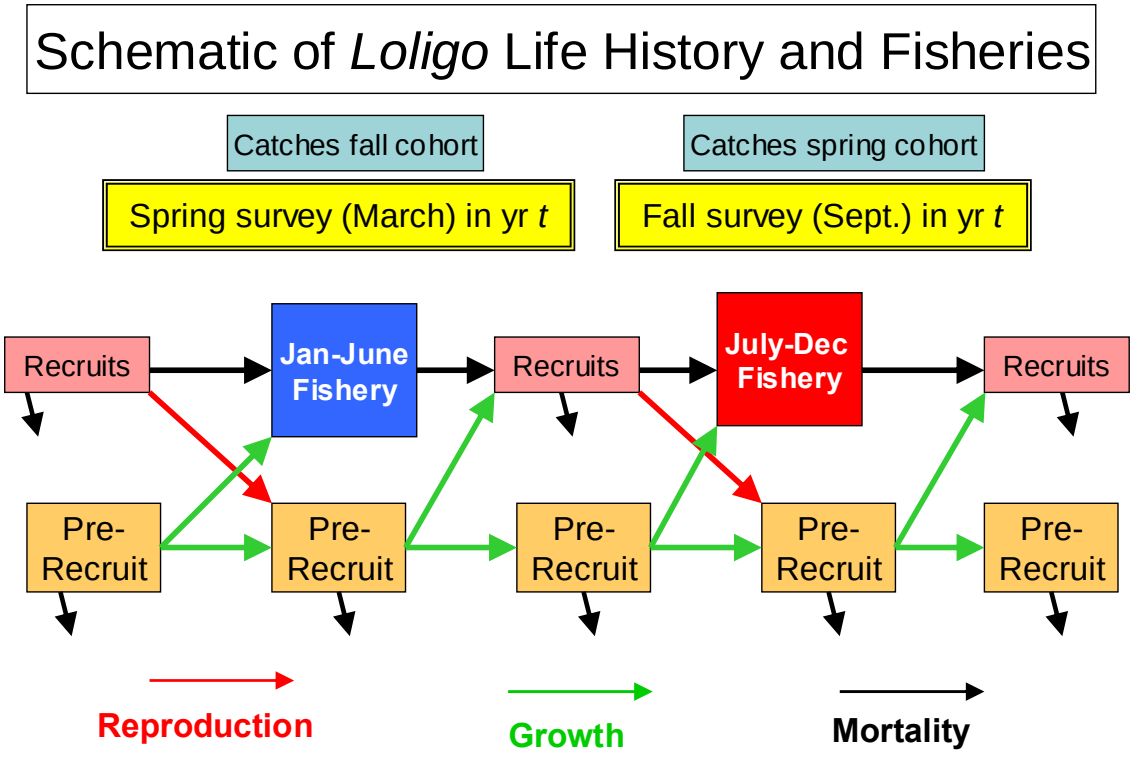


Figure B1. Schematic of *Loligo pealeii* life history in relation to NEFSC spring and fall surveys and the January-June and July-December *Loligo* fisheries. Fishery pre-recruits are ≤ 8 cm DML and recruits are > 8 cm DML.

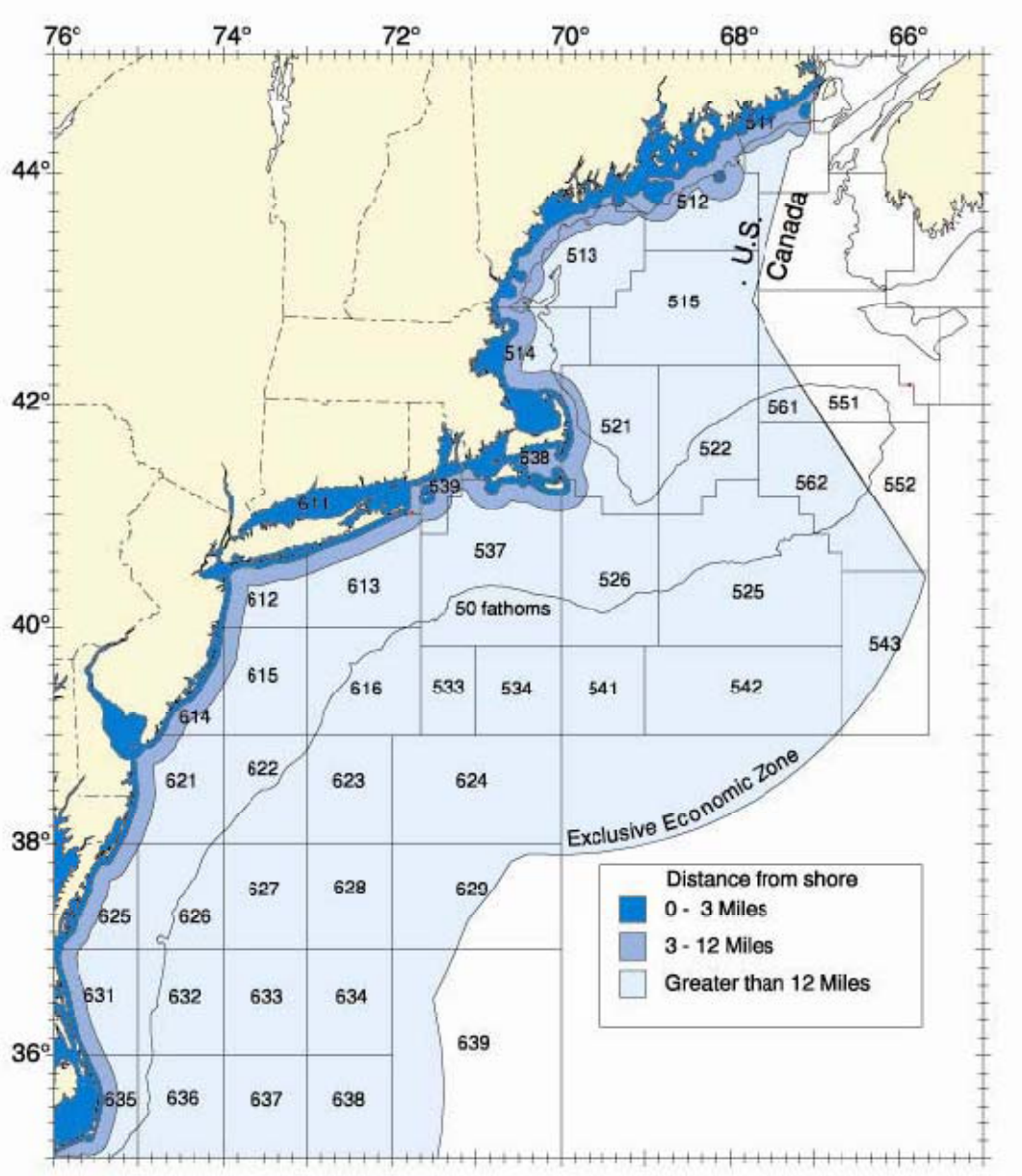


Figure B2. Statistical Areas used for reporting fishery data in the Northeast region of the U.S. and Federal (Exclusive Economic Zone) and state (0-3 miles) jurisdictional limits.

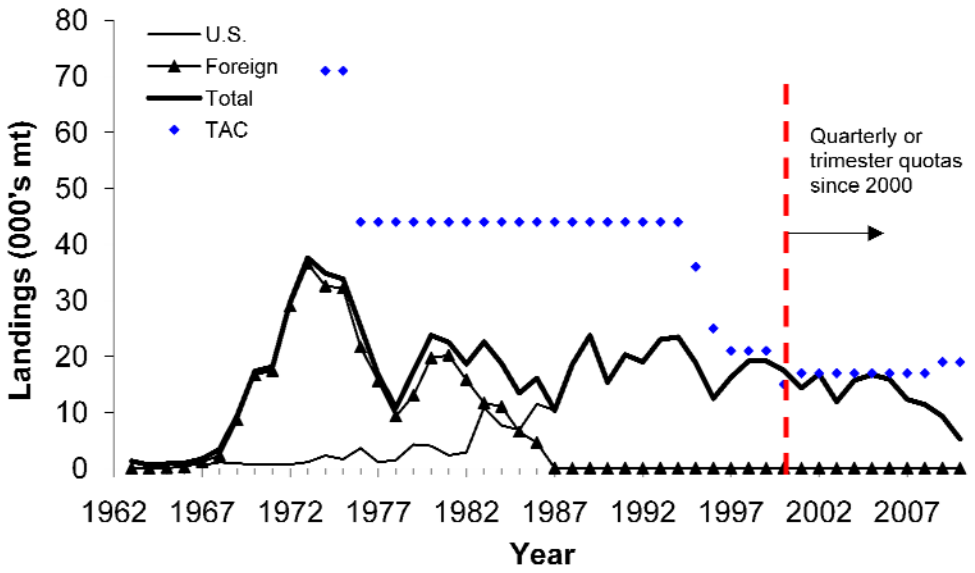
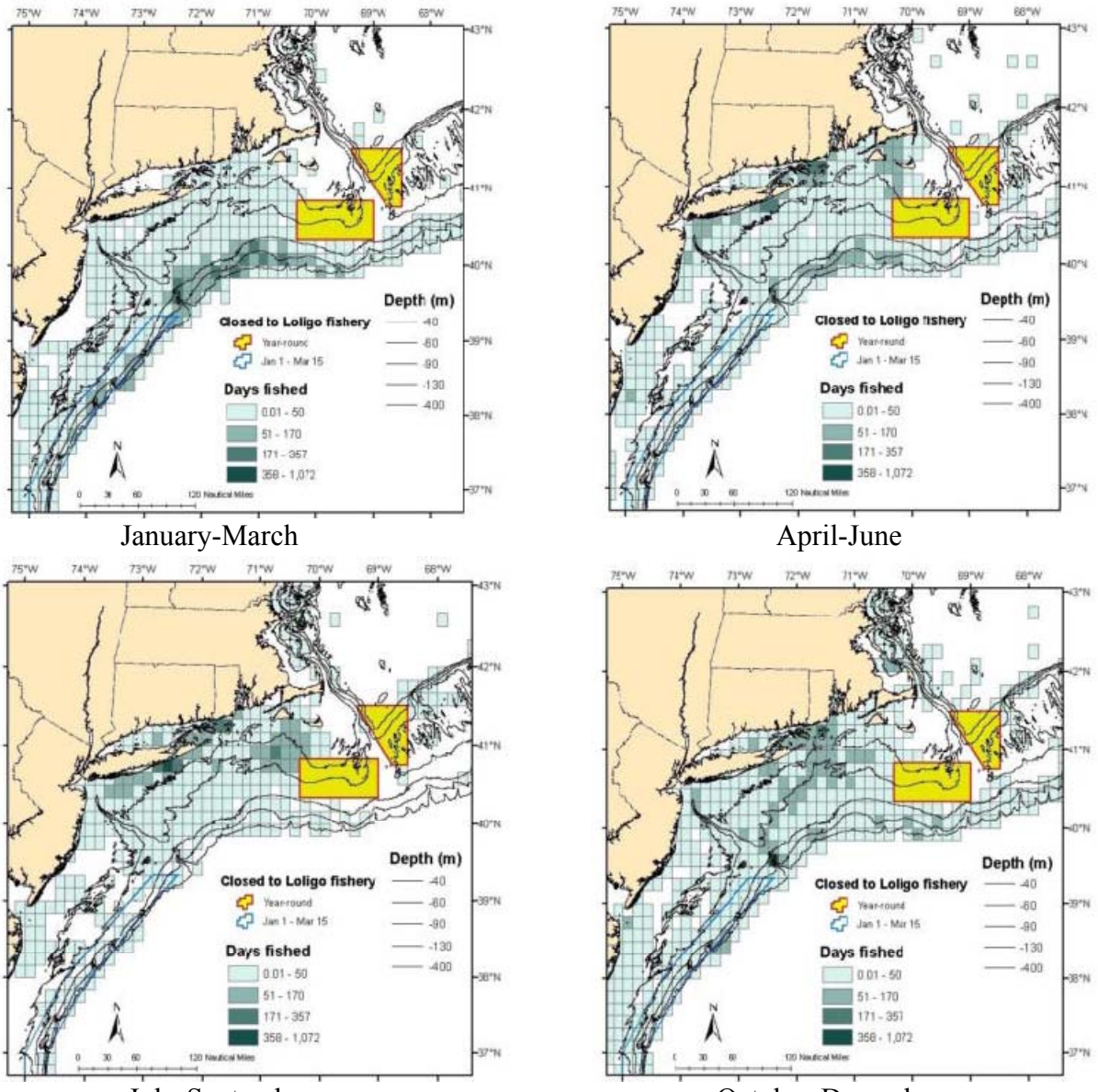


Figure B3. U.S. foreign, and total *Loligo pealeii* landings during 1963-2010 and TACs during1974-2010. The 2010 landings are preliminary and incomplete.



January-March April-June

July-September October-December

Figure B4. Spatial distribution of *Loligo* fishing effort (days fished) during the winter (Jan.-March and Oct.-Dec.) offshore fishery and the summer (April-Sept.) inshore fishery during 1997-2004.

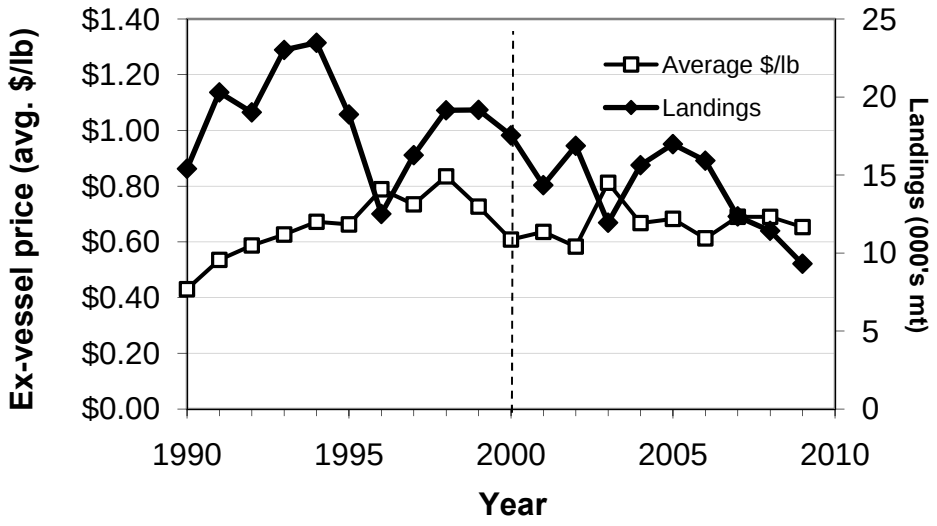


Figure B5. Annual ex-vessel price (avg. $ per lb in 1990 dollars) of *L. pealeii*, in relation to landings, during 1990-2009.

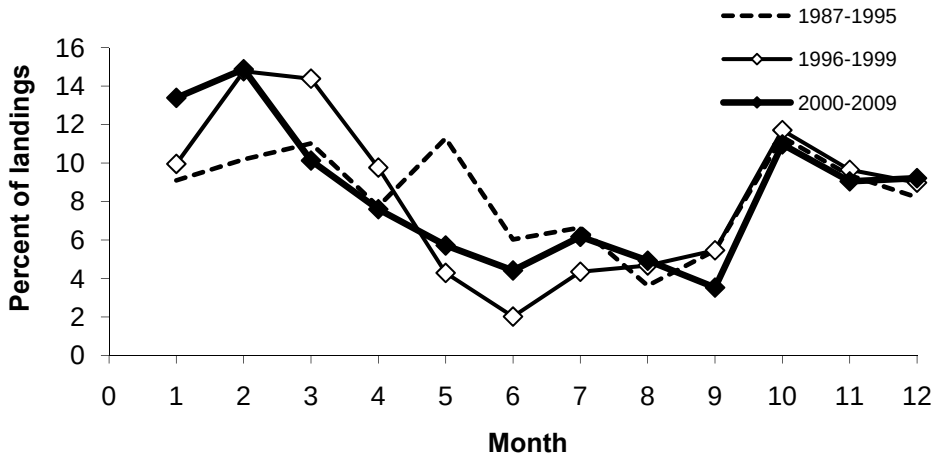


Figure B6. Trends in *Loligo* landings, percent by month, during 1987-1995, 1996-1999, and 2000-2009.

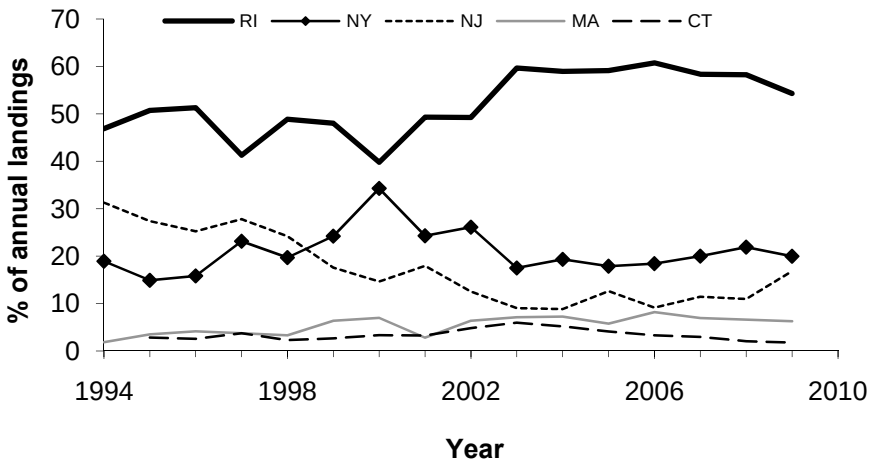


Figure B7. *Loligo* landings by state during 1994-2009.

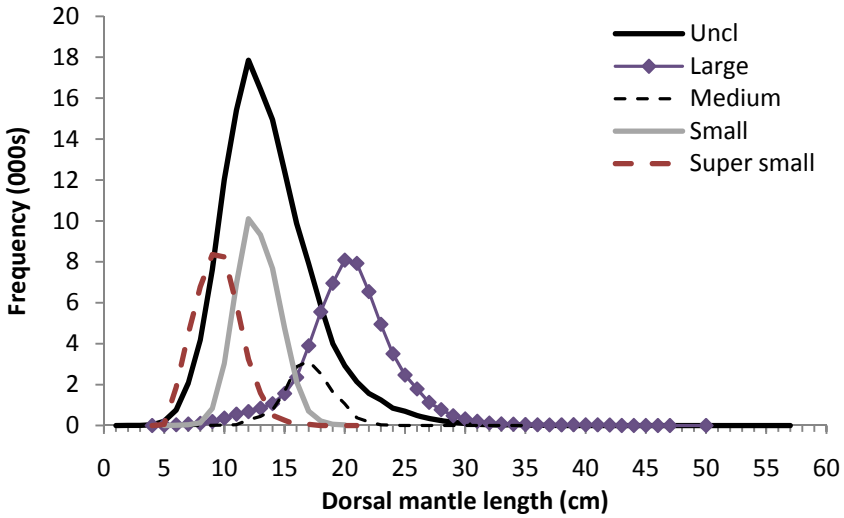


Figure B8. Length composition of the landings samples, during 1996-2009, by market category.

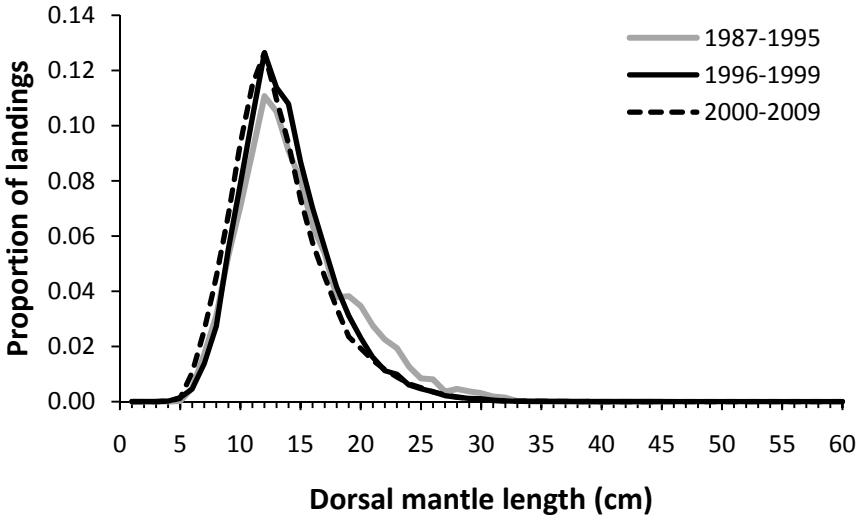


Figure B9. Length compositions of the *Loligo* landings during 1987-1995, 1996-1999, and 2000-2009.

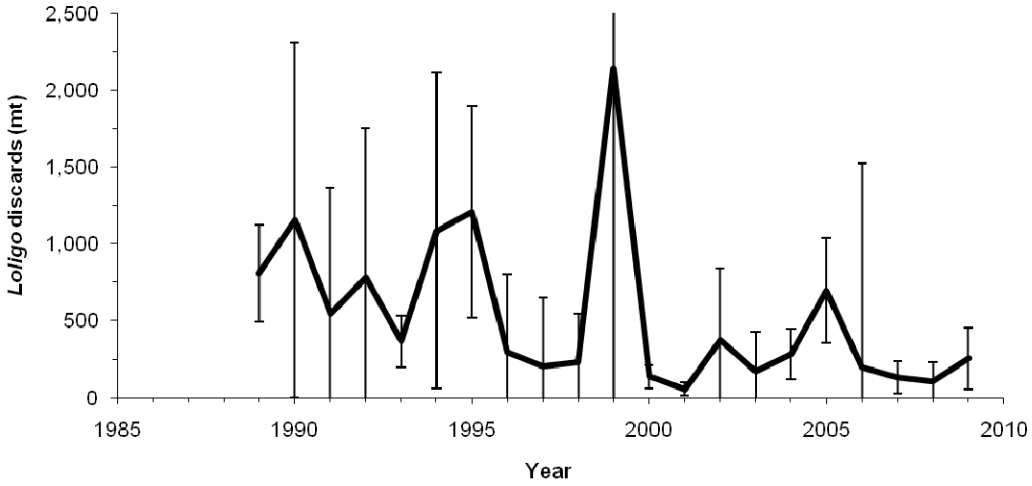


Figure B10. Discards of *Loligo pealeii* during 1989-2009 and 95% confidence intervals.

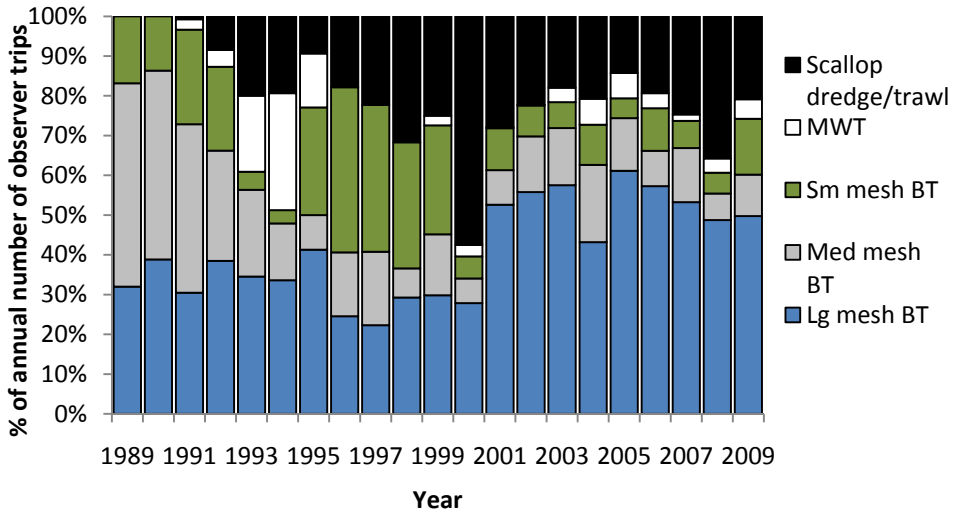


Figure B11. Percentage of annual numbers of fishery observer trips, by fleet, that were used to compute *Loligo* discards.

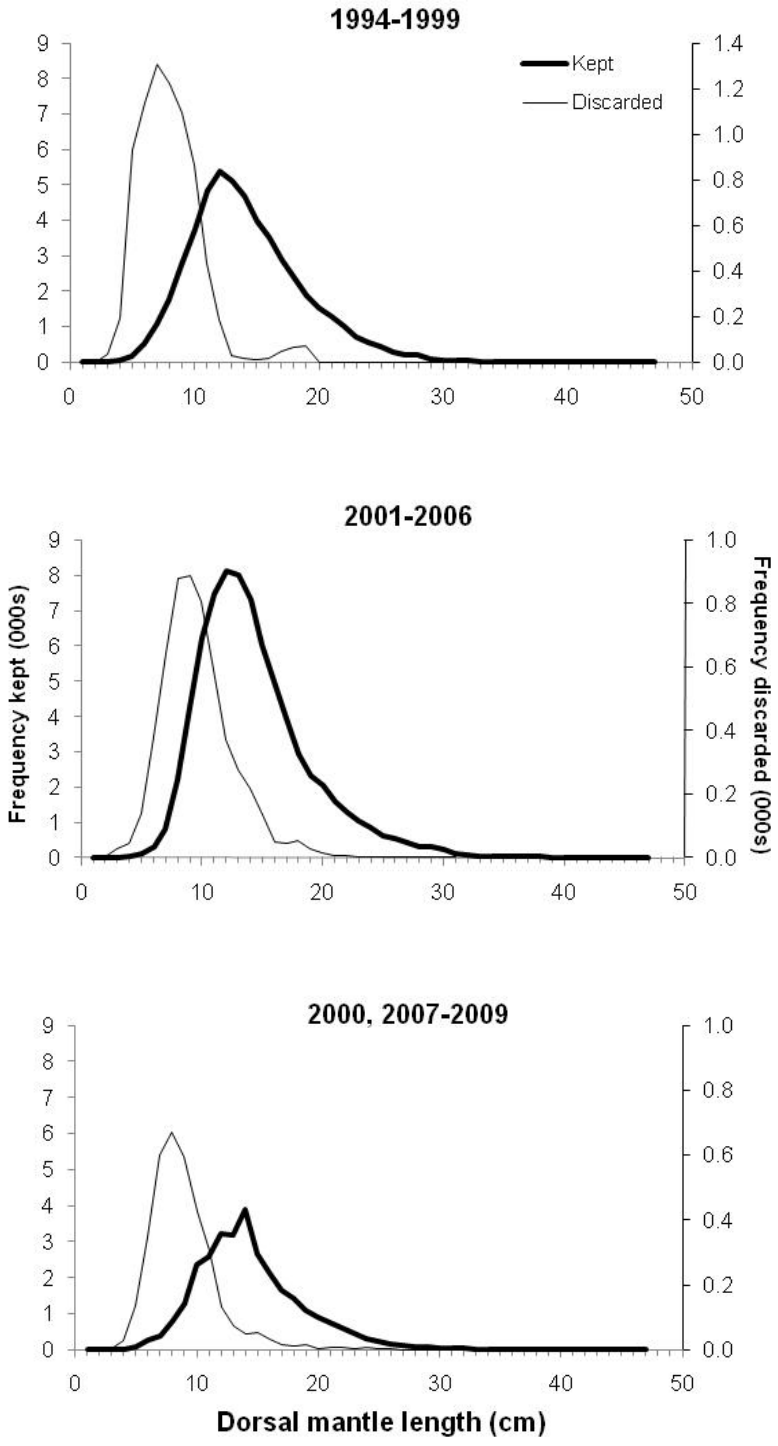


Figure B12. Length compositions of the kept and discarded portions of catches on trips where *Loligo* were discarded during 1994-1999, 2001-2006 and 2000 and 2007-2009. Since 2000, trip limits have been in effect during portions of each year.

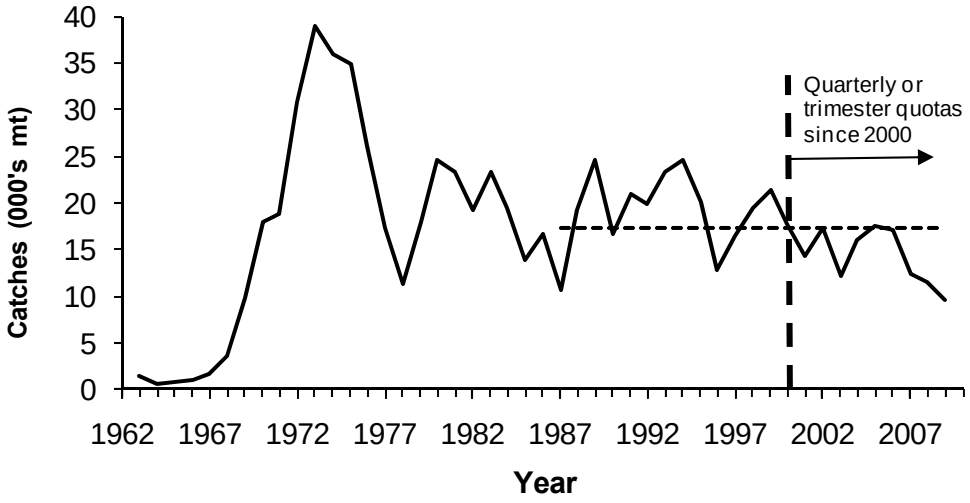


Figure B13. Catches (000s mt) of *Loligo pealeii* during 1963-2009 and the 1987-2008 median.

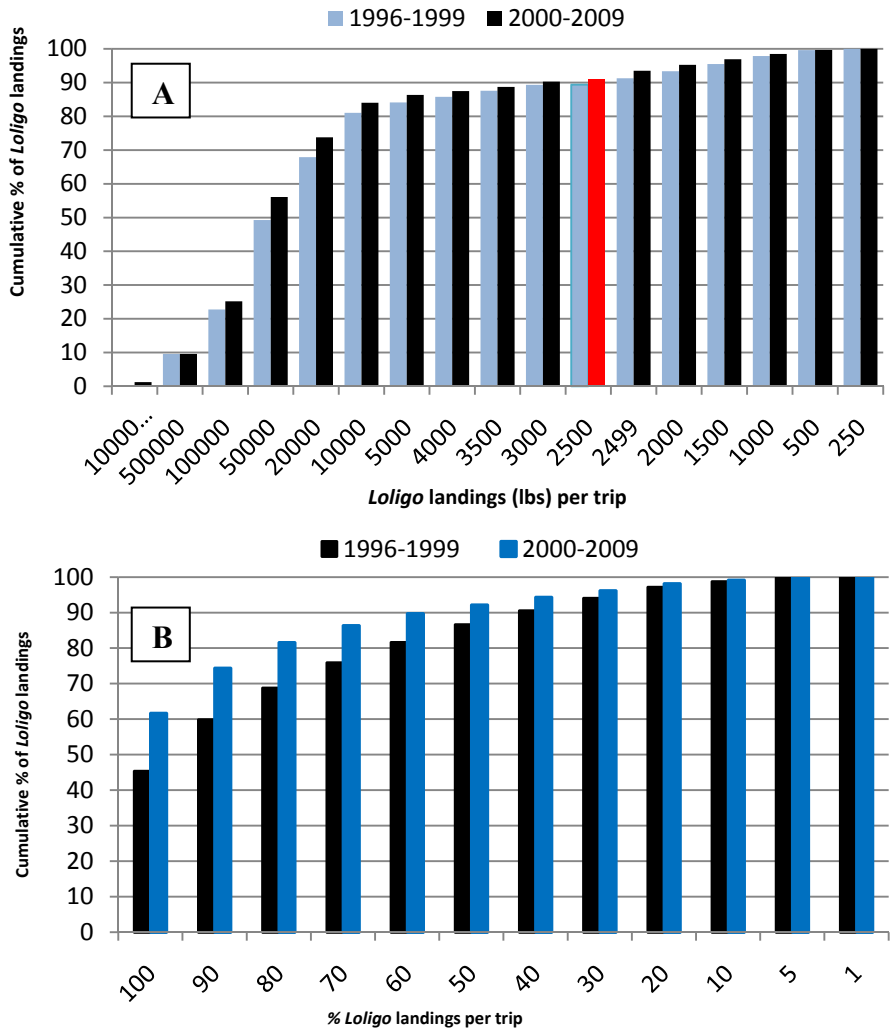


Figure B14. *Loligo* landings (lbs) per trip (A) and *Loligo* landings as a percentage of the total trip weight (B) as cumulative percentages of the *Loligo* landings during a period of annual quotas (1996-1999) versus a period of in-season quotas (2000-2009).

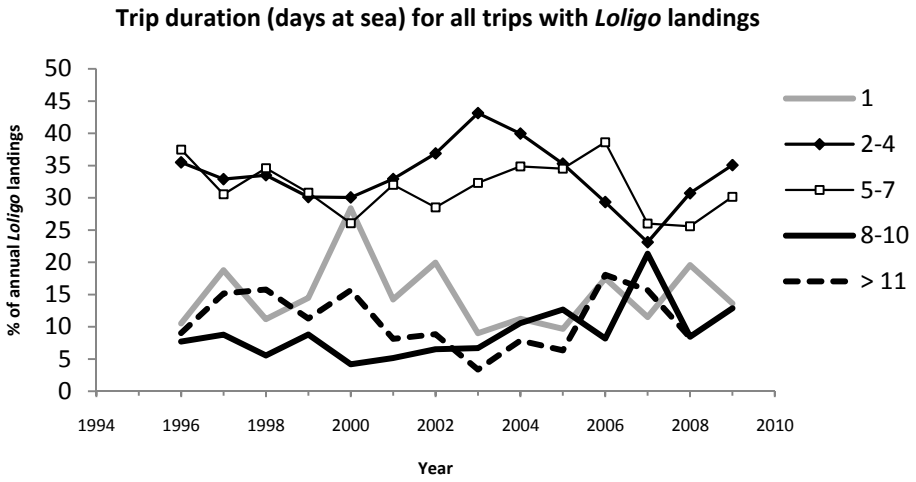


Figure B15. Percent of annual *Loligo* landings, during 1996-2009, by trip duration (days at sea).

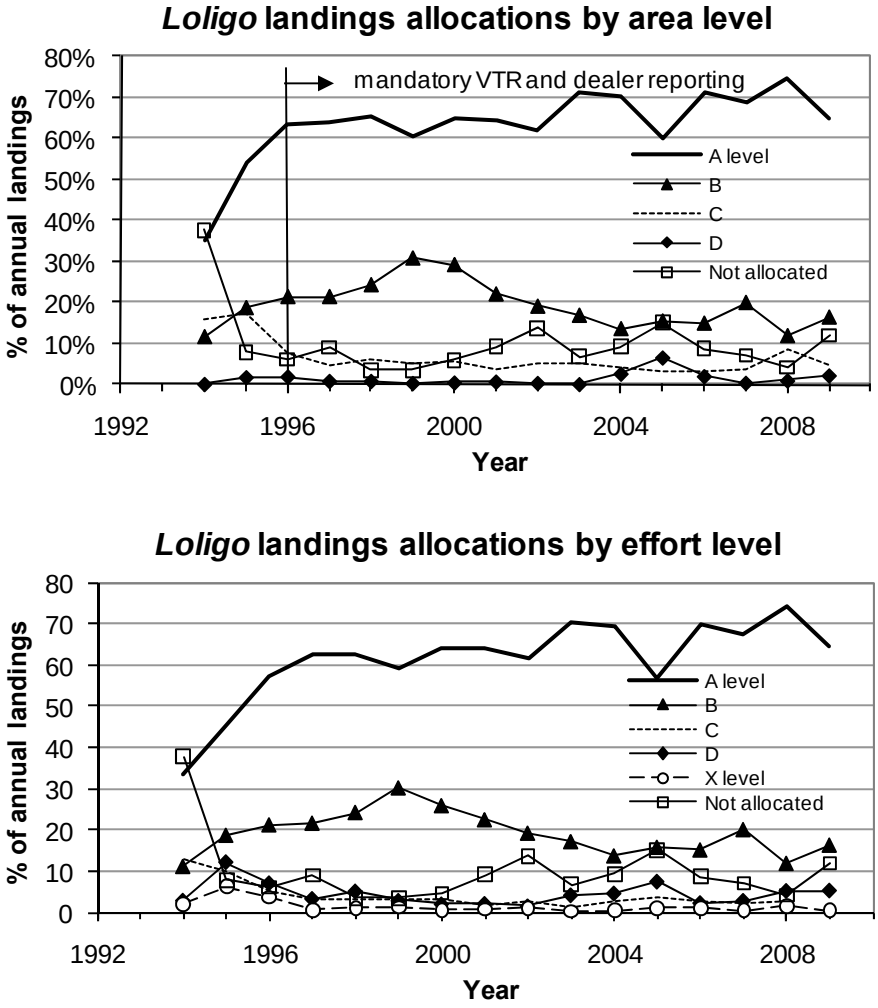


Figure B16. Percentage of annual *Loligo* landings allocated by fishing area level (A) and effort allocation level (B) during 1994-2009. The "A level" trips, which represent a one-to-one match between a trip in the Dealer Database and the Vessel Trip Report Database, were used to computed nominal LPUE for the directed fishery.

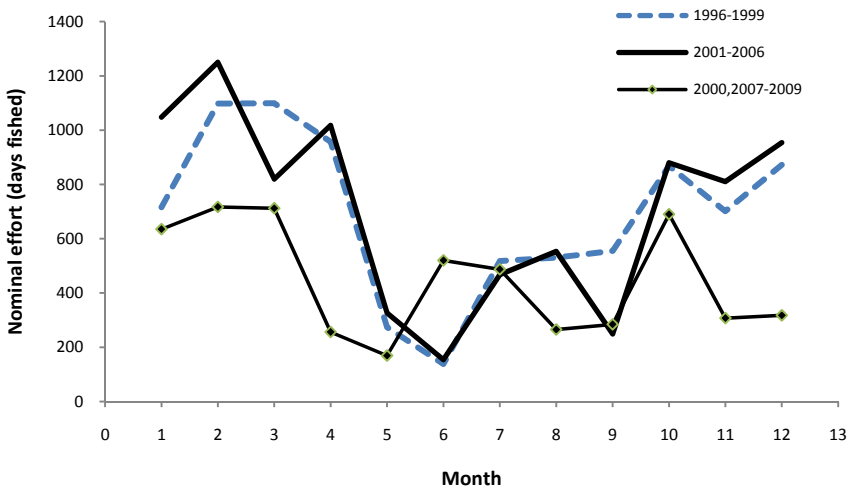


Figure B17. Monthly nominal effort (days fished) in the *Loligo* fishery during 1996-2009.

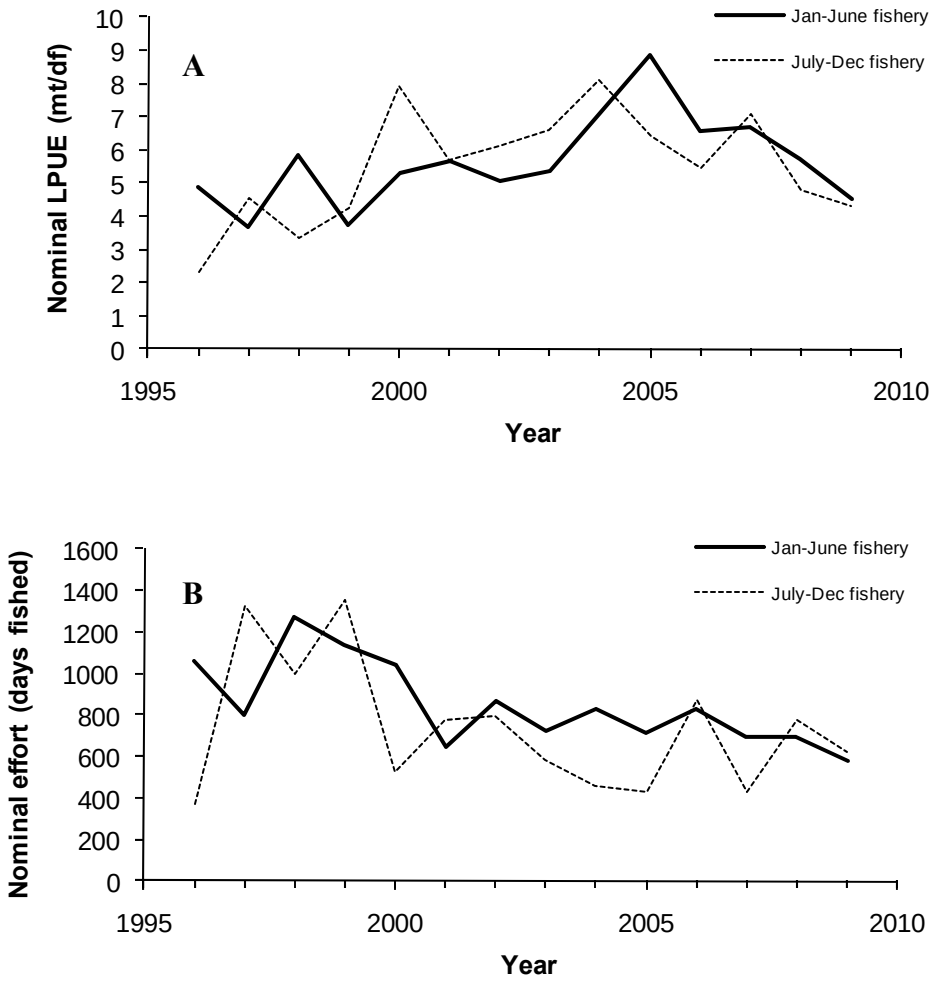


Figure B18. Nominal landings per unit of effort (mt/day fished) (A) and nominal effort (B) in the January-June fishery versus the July-December fishery.

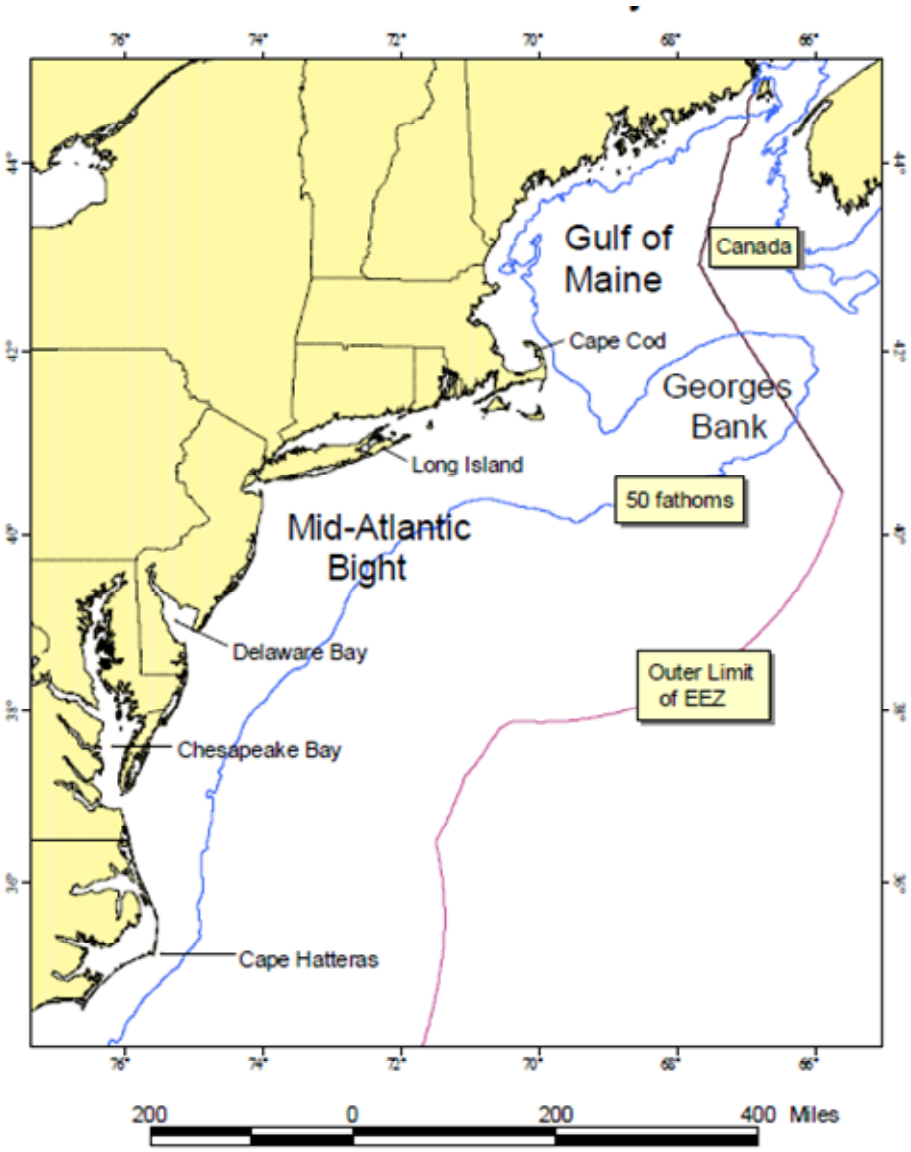


Figure B19. Map of the region covered by the Northeast Fisheries Science Center bottom trawl surveys; the Gulf of Maine to Cape Hatteras, North Carolina.

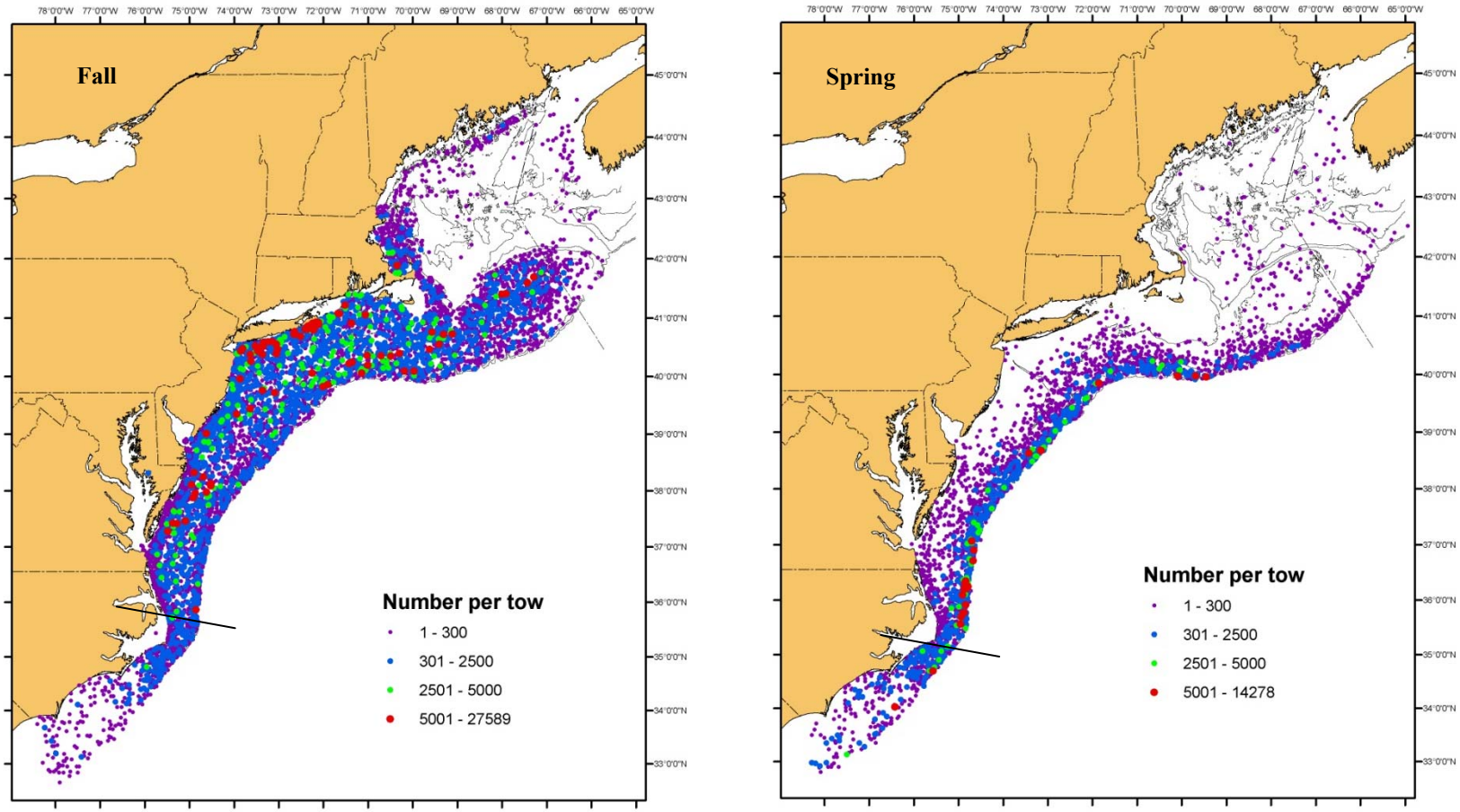


Figure B20. Distribution of *Loligo pealeii* during NEFSC fall (1975-2008) and spring (1976-2008) bottom trawl surveys. Survey strata located south of the solid black line (Cape Hatteras, NC) were not regularly sampled and these squid represent an unknown mix of *Loligo pealeii* and *Loligo pleii.* The 60, 100,200 and 400 m isobaths are also shown.

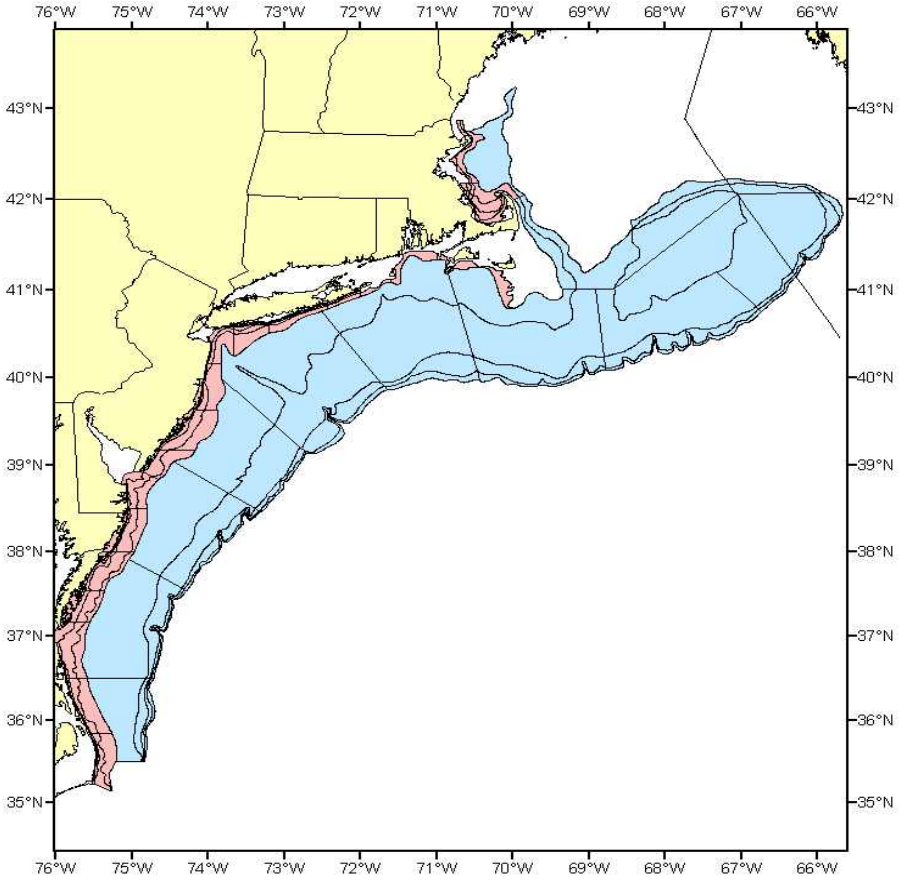


Figure B21. NEFSC survey depth strata used to derive relative abundance and biomass estimates. Inshore strata, including depths 8-27 m, are shaded pink and offshore strata, including depths 27-366 m, are shaded blue.

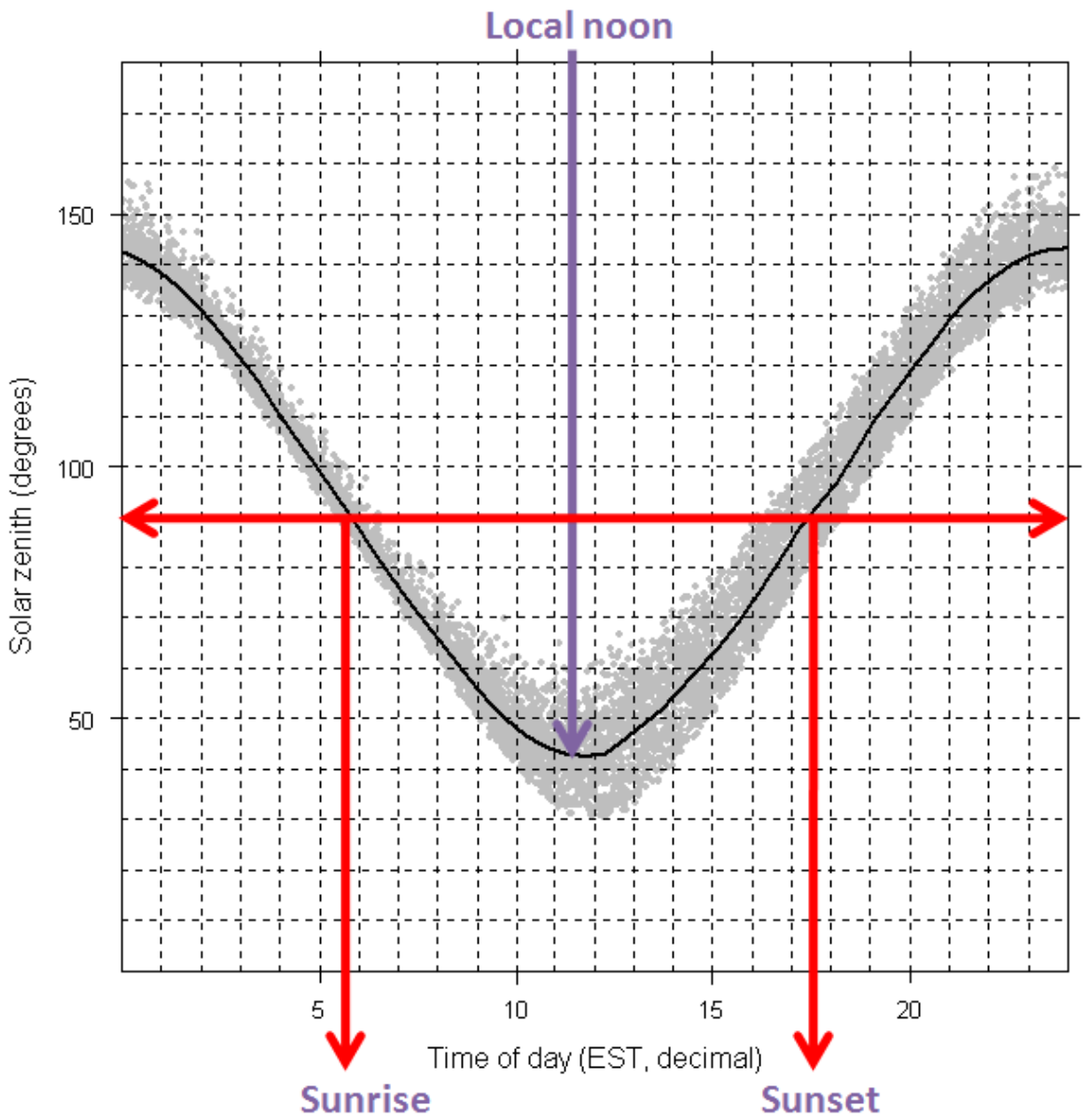


Figure B22. The relationship between solar zenith and time of day in NEFSC fall surveys, 1975-2008. The sun rises and sets at a solar zenith of 90.83° when the disk of the sun first appears or disappears along the horizon. At local noon, the sun is at its apogee and the solar zenith is at its minimum value.

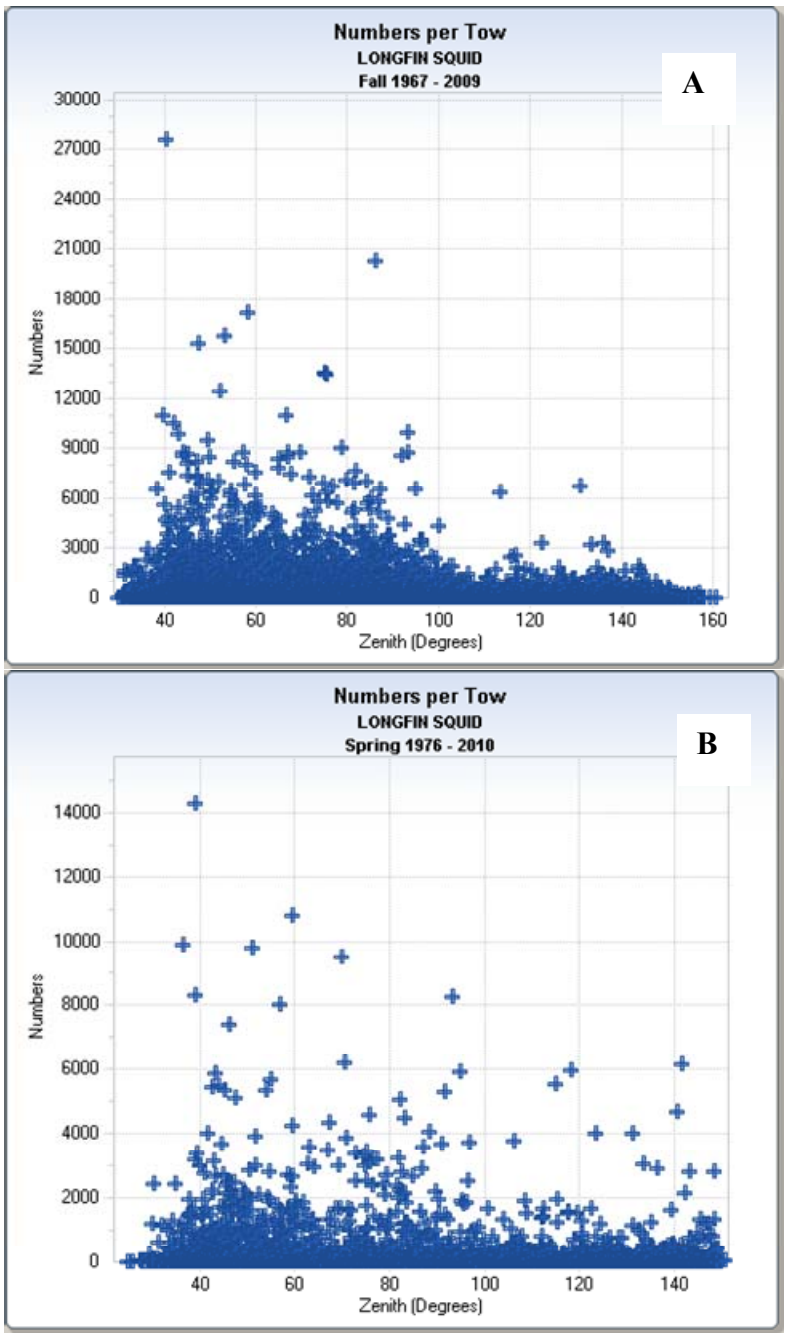


Figure B23. *Loligo* catch rates, number per tow, in relation to solar zenith angle (degrees) during NEFC bottom trawl surveys conducted during fall, 1975-2009 (A), and spring, 1976-2010 (B).

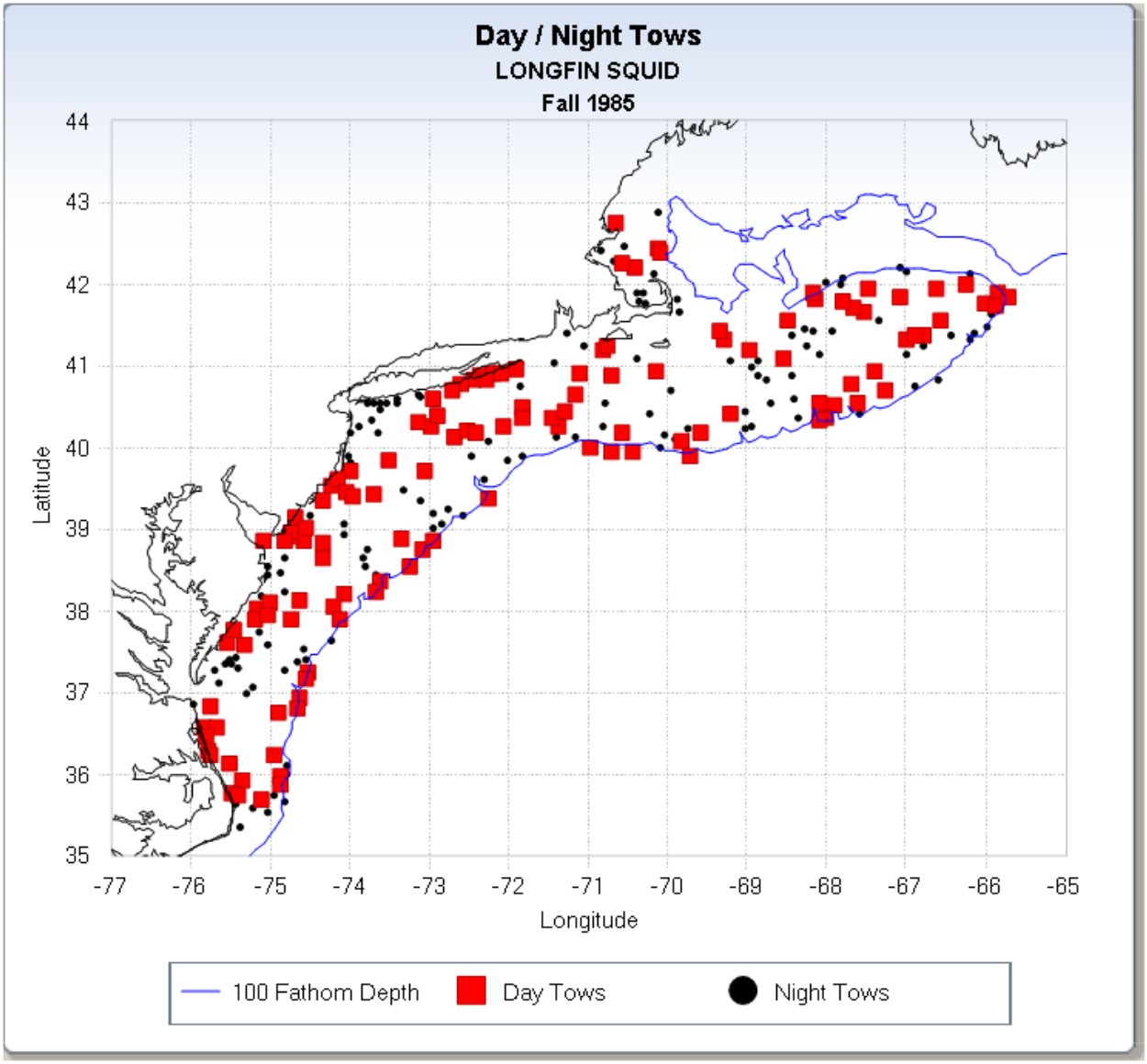


Figure B24. Location of day- and nighttime tows, for the *Loligo pealeii* strata set, during the fall 1985 survey. The year shown was chosen at random.

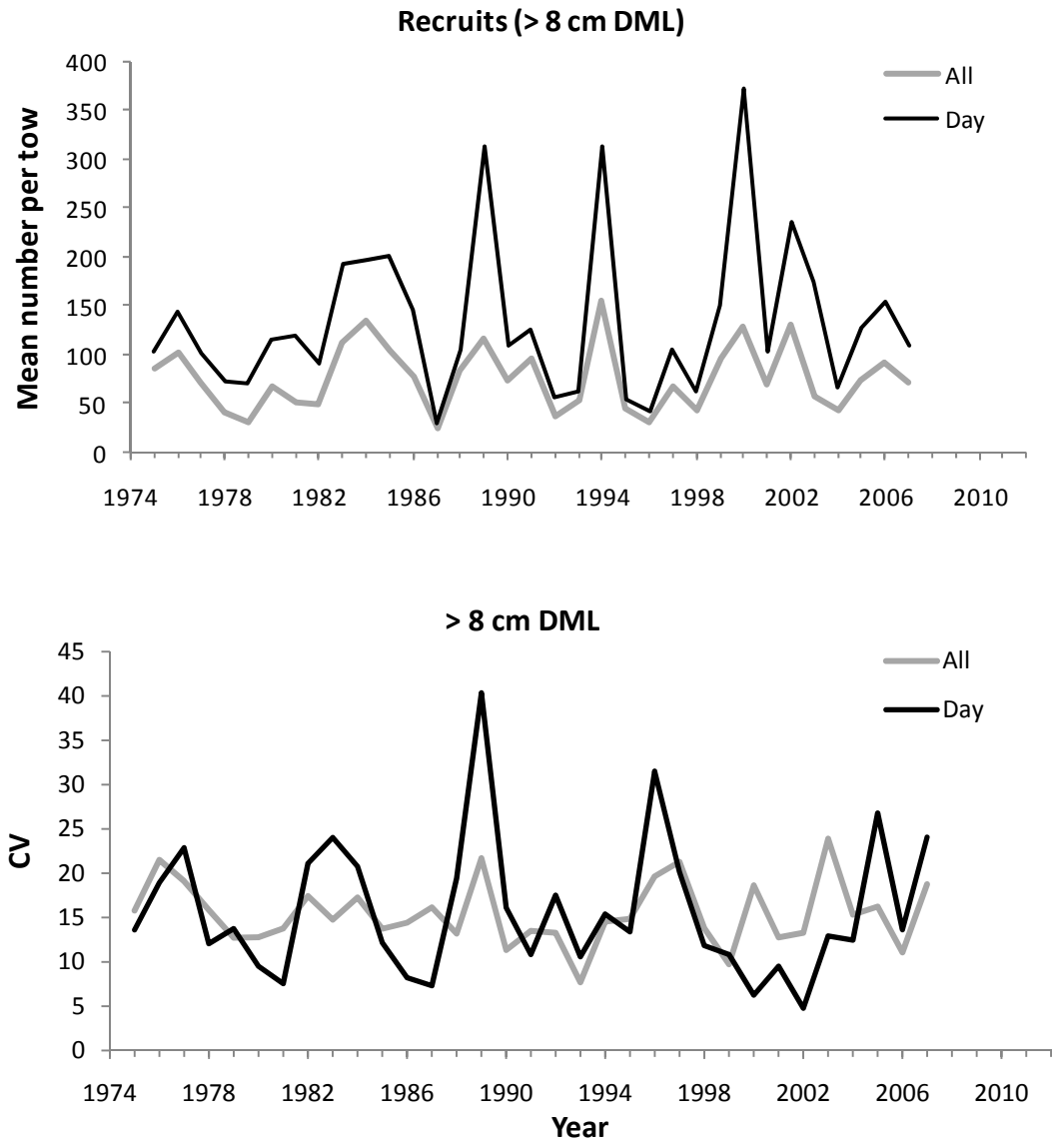


Figure B25. Comparison of *Loligo pealeii* relative abundance indices and CVs for recruits (> 8 cm DML) based on day tows (solar zenith 43-80□) versus all tows from NEFSC fall bottom trawl surveys, 1975-2008.

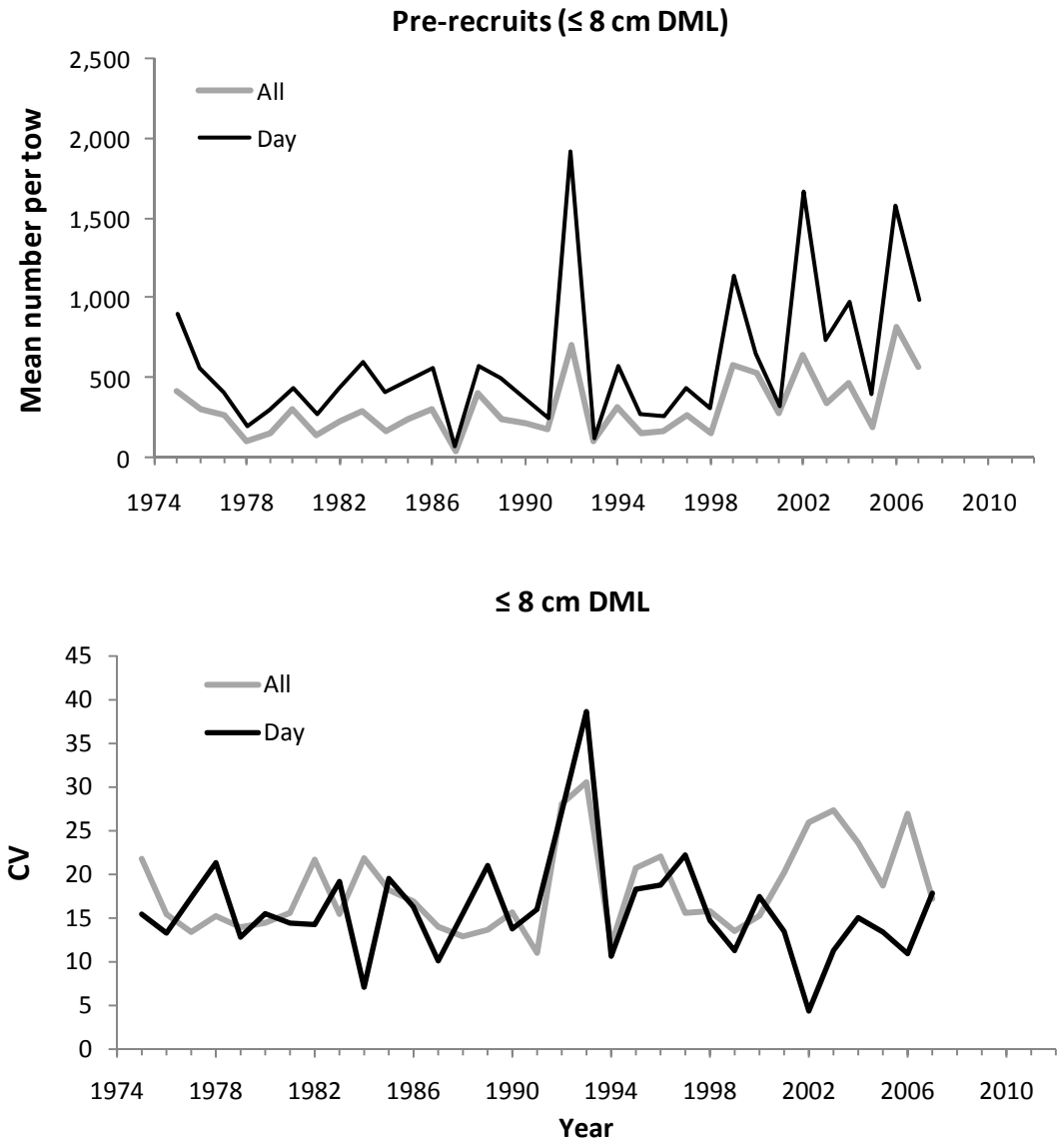


Figure B26. Comparison of *Loligo pealeii* relative abundance indices and CVs for pre-recruits (≤ 8 cm DML) based on day tows (solar zenith 43-80□) versus all tows from NEFSC fall bottom trawl surveys, 1975-2008.

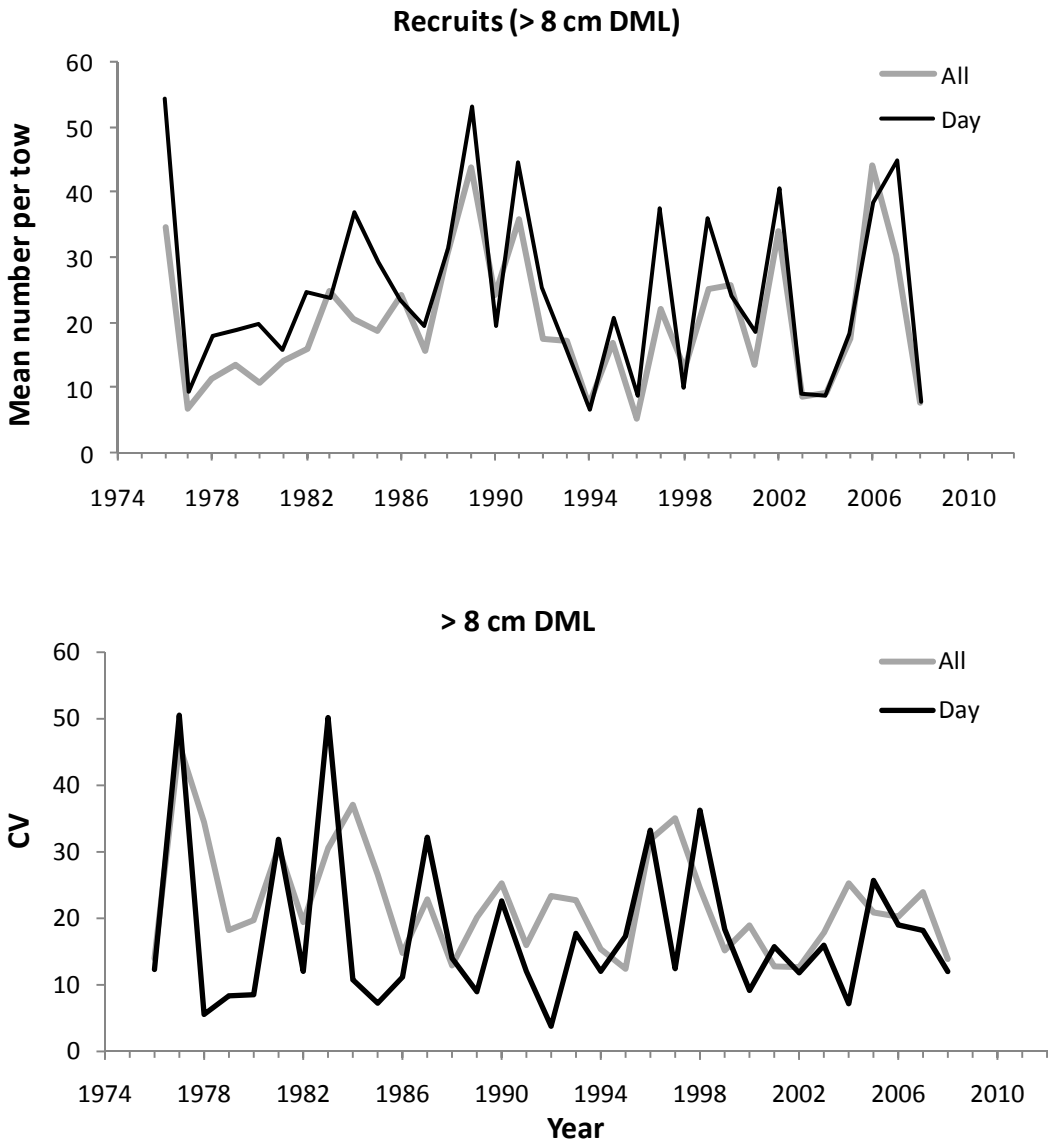


Figure B27. Comparison of *Loligo pealeii* relative abundance indices and CVs for recruits (> 8 cm DML) based on day tows (solar zenith 29-84□) versus all tows from NEFSC spring bottom trawl surveys, 1976-2008.

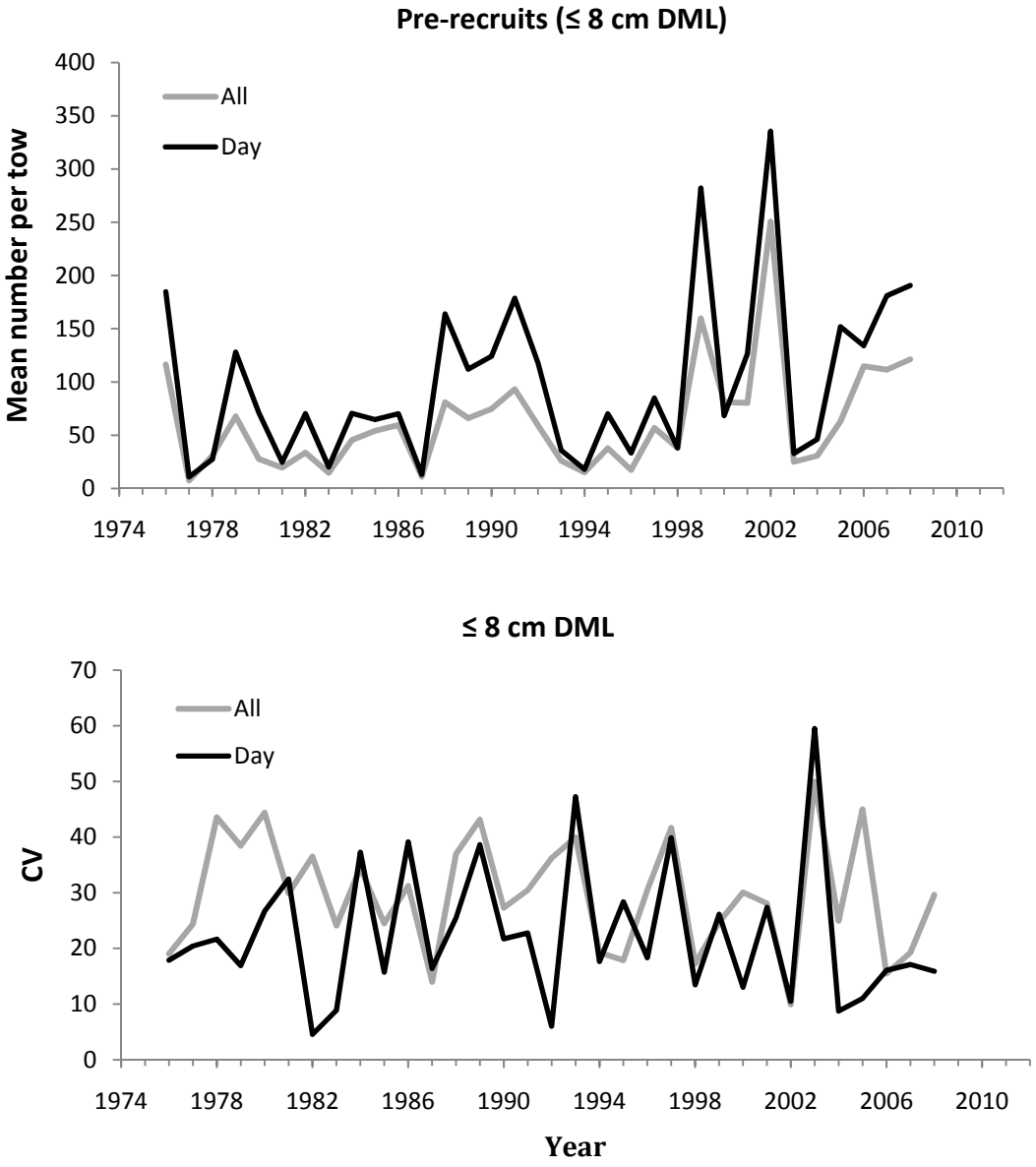


Figure B28. Comparison of *Loligo pealeii* relative abundance indices and CVs for pre-recruits (≤ 8 cm DML) based on day tows (solar zenith 29-84□) versus all tows from NEFSC spring bottom trawl surveys, 1976-2008.

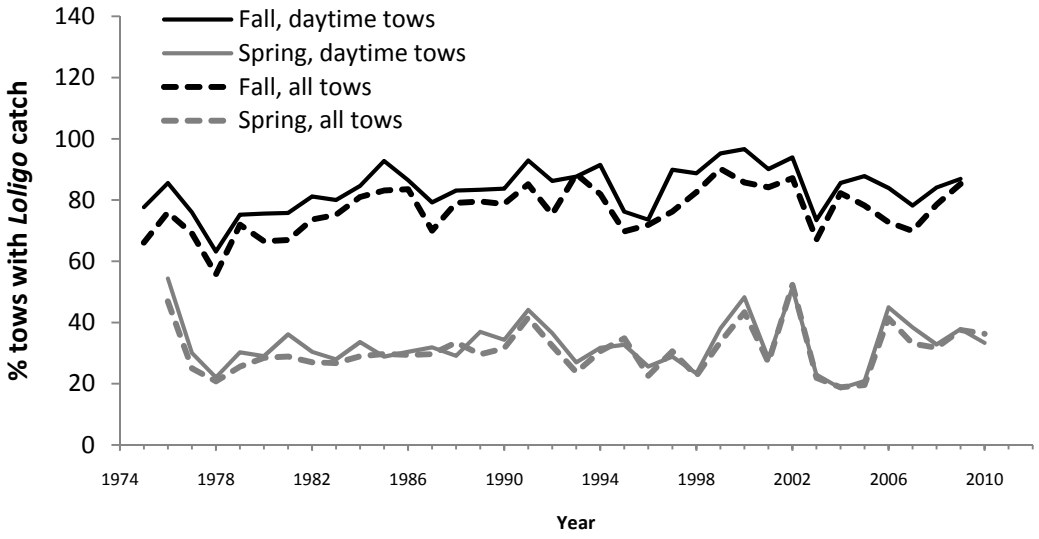


Figure B29. Percentages of "daytime" tows versus all tows with *Loligo pealeii* catch in NEFSC spring (1976-2010) and fall (1975-2009) bottom trawl surveys. Solar zenith angles of 29-84□ and 43-80□ were used to define daytime tows for the spring and fall surveys, respectively.

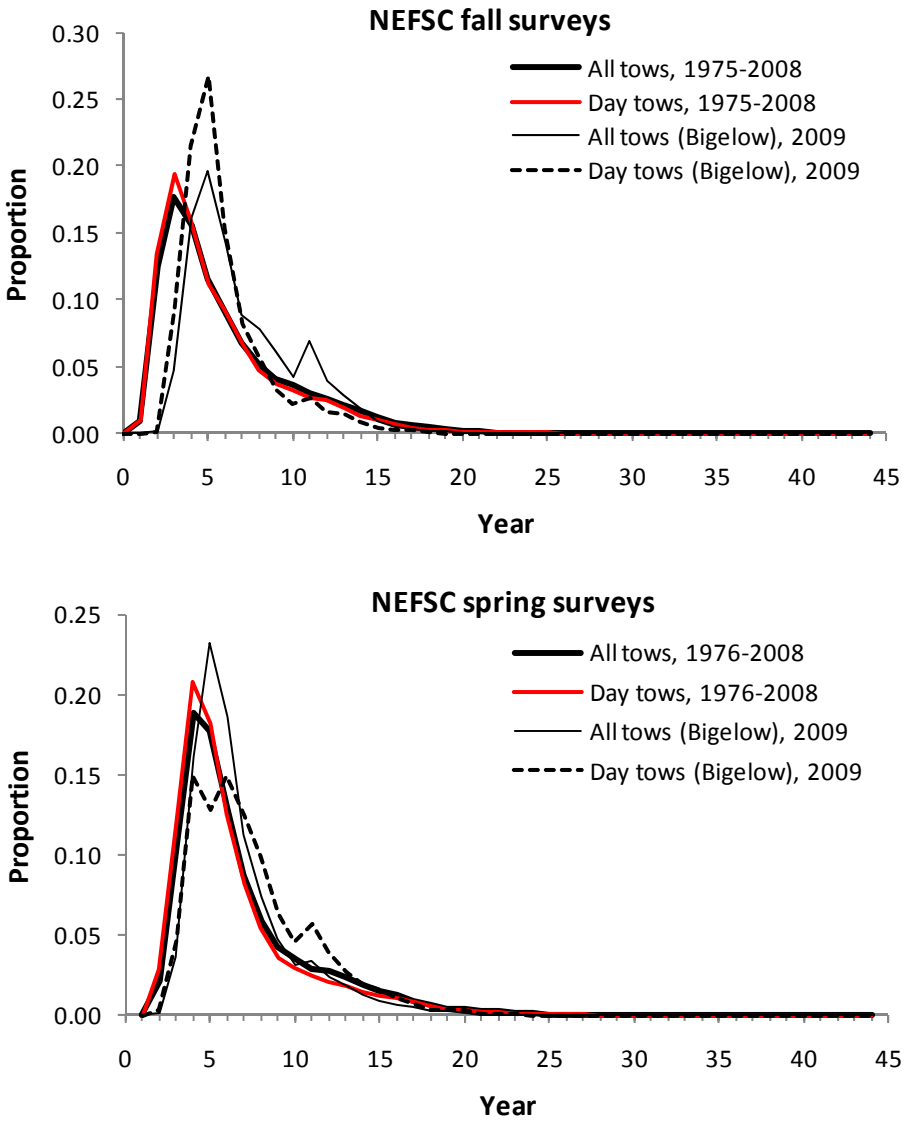


Figure B30. *Loligo* length compositions for NEFSC fall and spring surveys, based on all tows versus "daytime" tows (fall and spring "daytime" tows are for solar zenith angles of 43-80° and 29-84°, respectively).

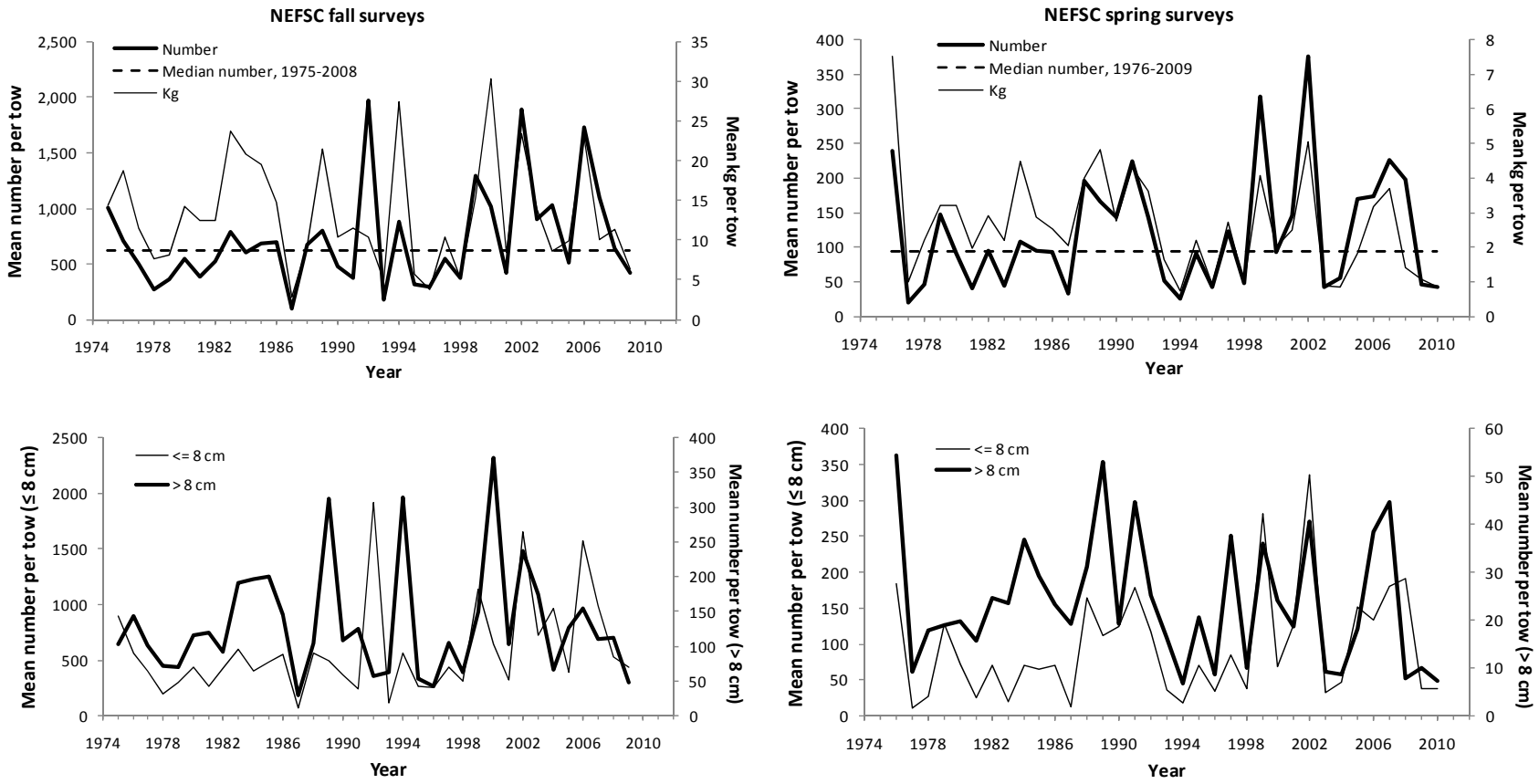


Figure B31. *Loligo pealeii* relative abundance and biomass indices (stratified mean number and kg per tow) and relative abundance indices for pre-recruits (≤ 8 cm DML) and recruits (> 8 cm DML) from NEFSC fall (1975-2009) and spring (1976-2010) bottom trawl surveys.

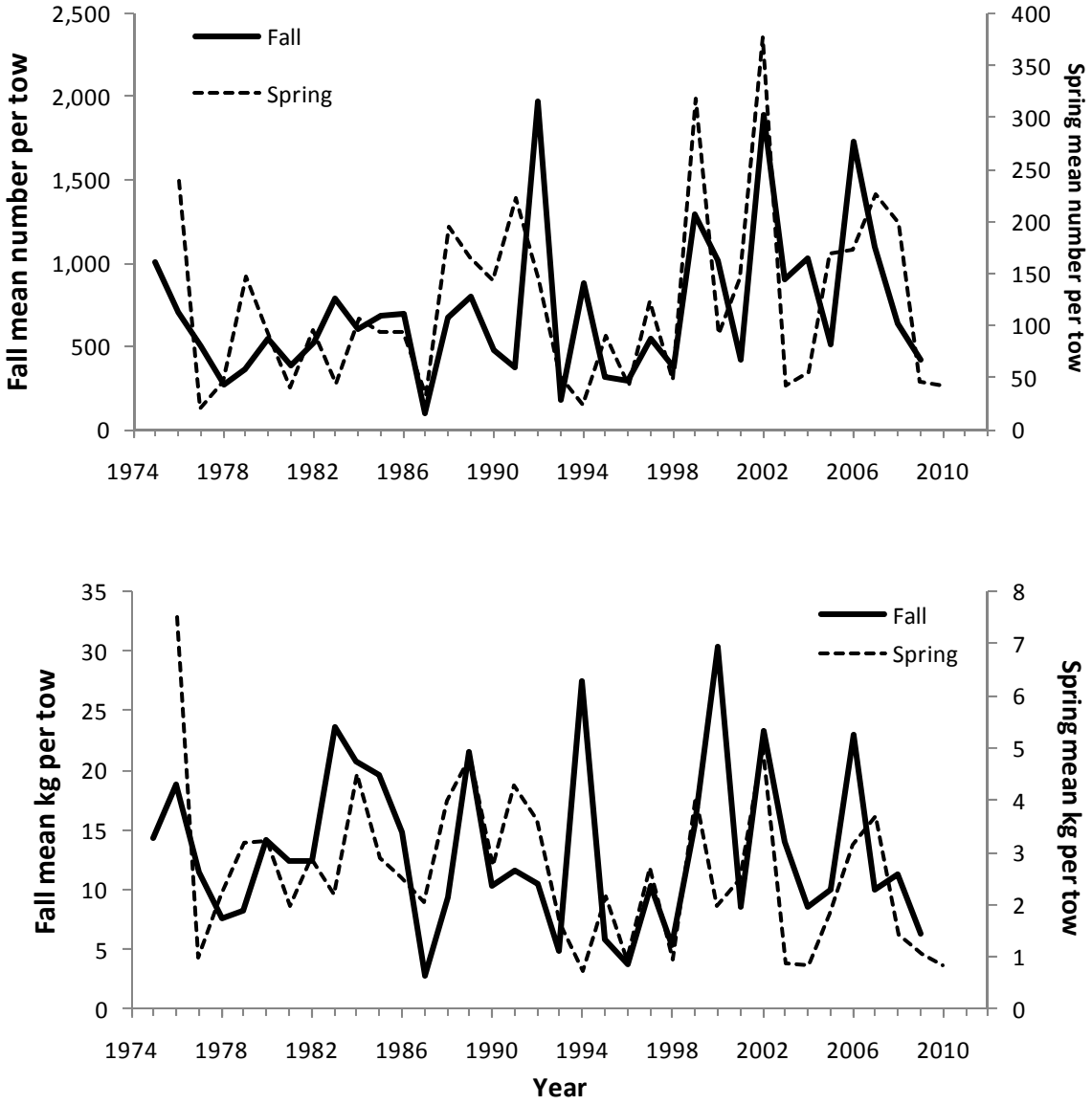


Figure B32. Trends in *Loligo* relative abundance and biomass indices for NEFSC spring (1976-2010) and fall (1975-2009) bottom trawl surveys.

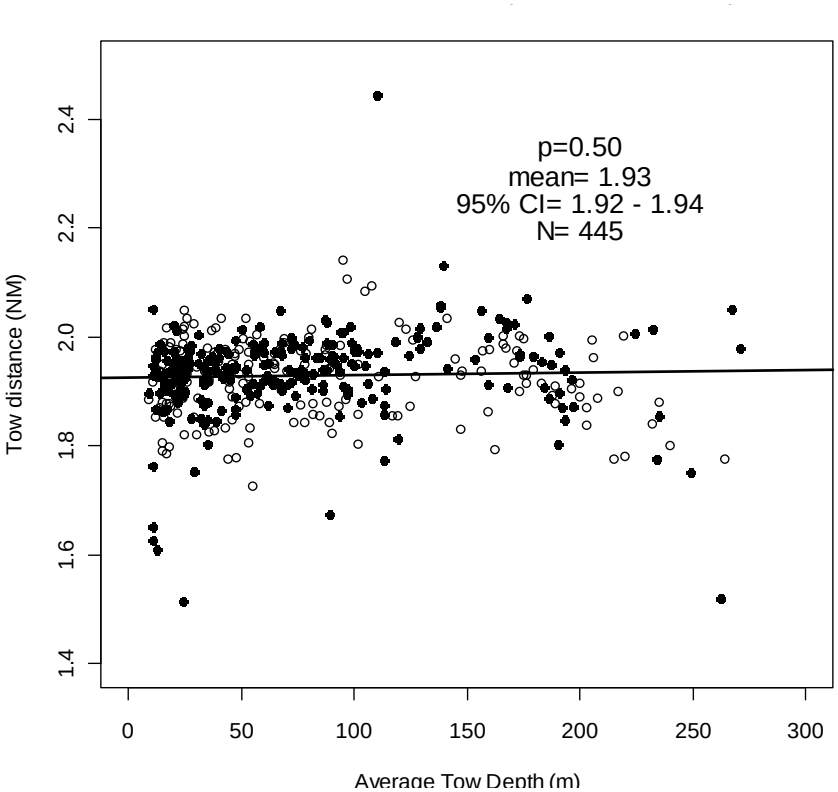


Figure B33. Tow distance (nautical miles) in relation to average station depth based on data from the 2008 spring (open circles) and 2007 fall bottom trawl surveys (solid circles).

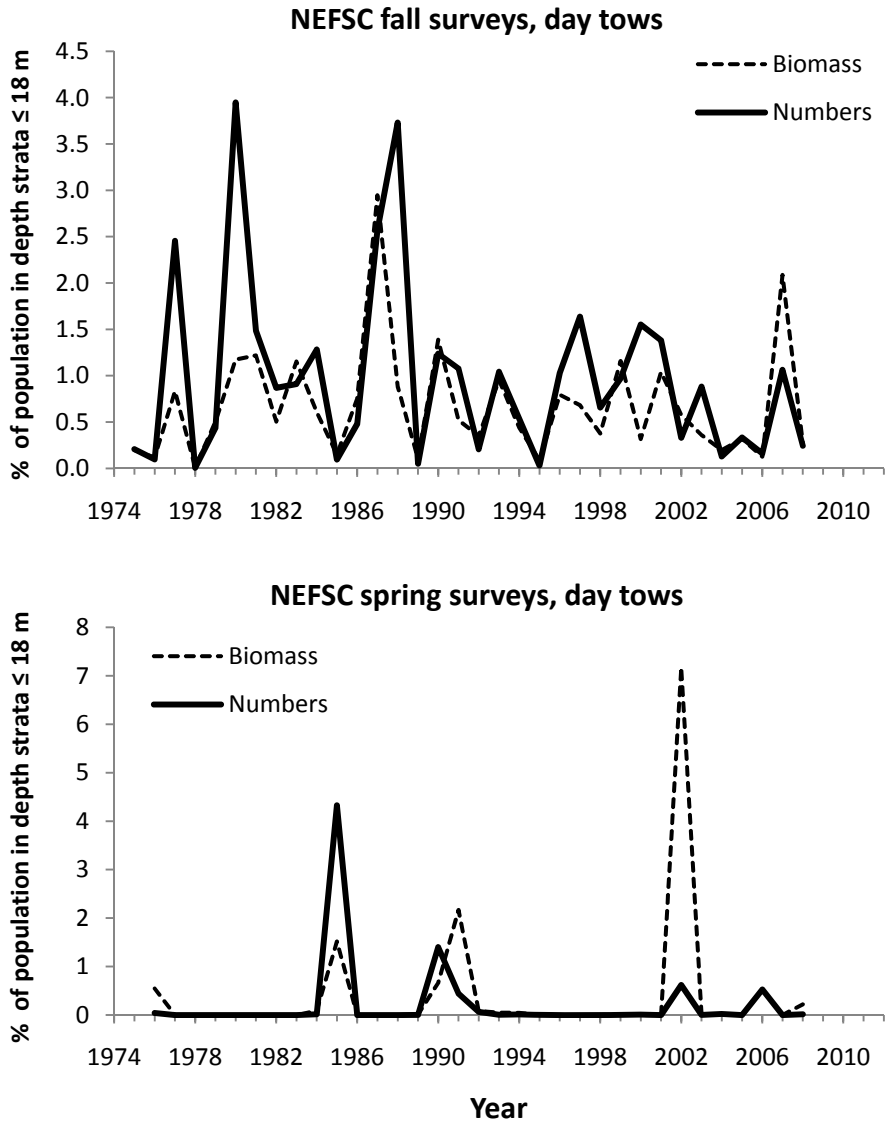


Figure B34. Percentages of the *Loligo pealeii* stratified mean number and kg per tow indices, based on "day" tows conducted during NEFSC spring and fall bottom trawl surveys, in NEFSC survey strata that can no longer be sampled as of 2009.

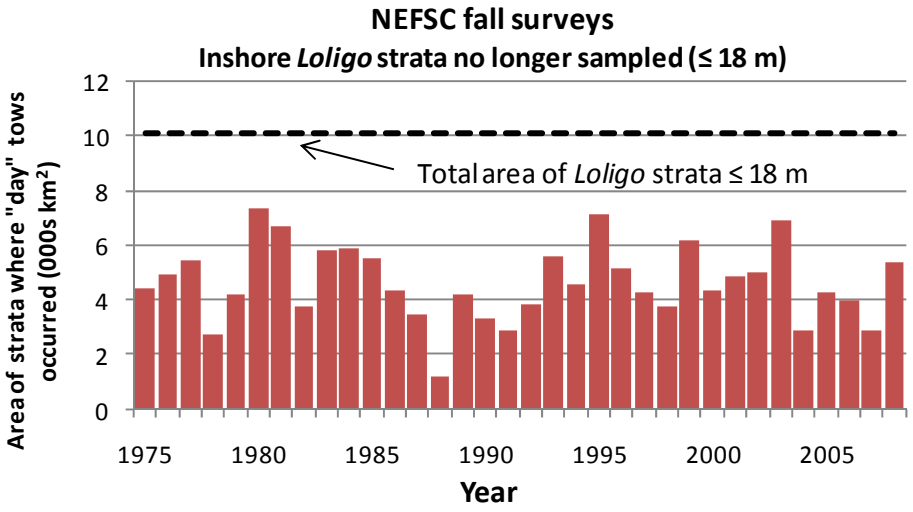


Figure B35. Areas (000s km^2) where daytime tows occurred during NEFSC fall surveys (1975-2008), in the inshore *Loligo* strata (≤ 18 m) which are no longer sampled. The dashed line indicates the total area (10,111 km^2) of these inshore strata.

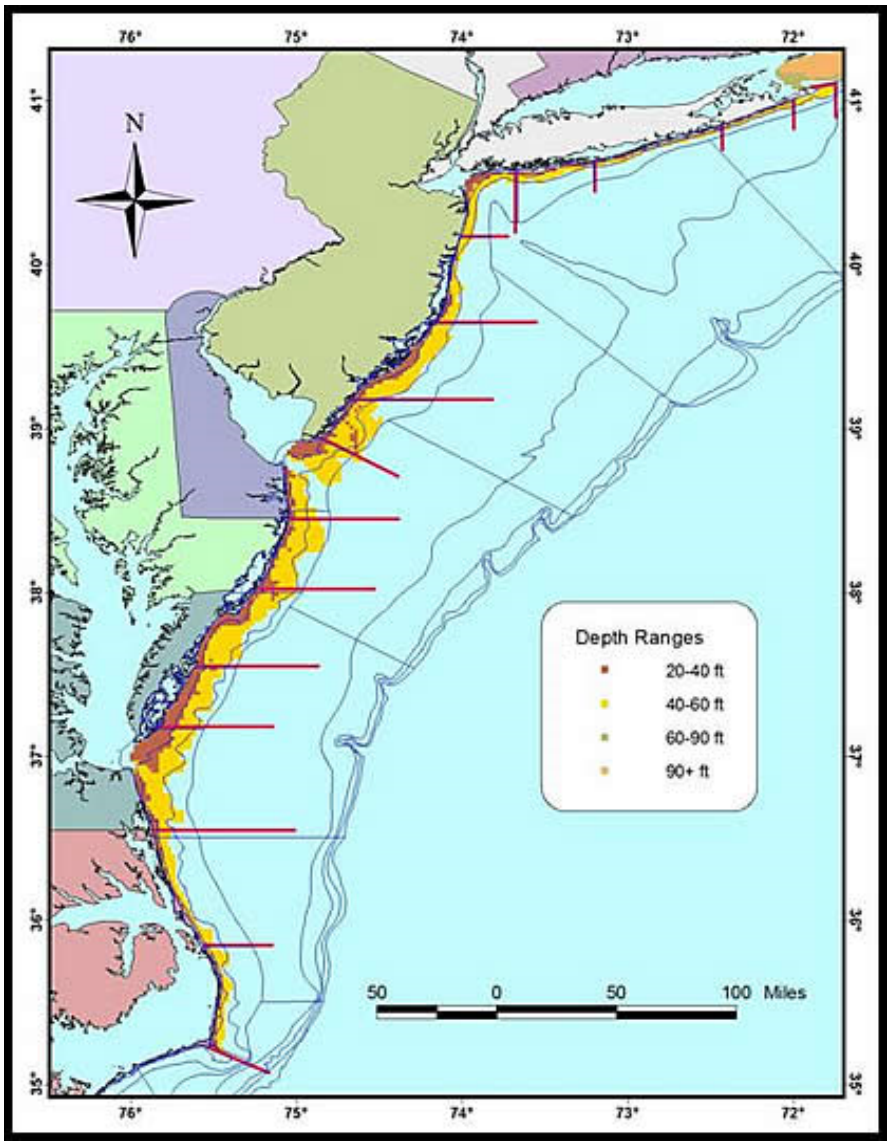


Figure B36. Locations of the NEAMAP bottom trawl survey strata (the two shallowest strata sets shaded red and yellow and ranging in depth from 6.1-18.3 m), between Long Island, NY and Cape Hatteras, NC, in relation to the NEFSC bottom trawl survey strata (polygons outlined in blue).

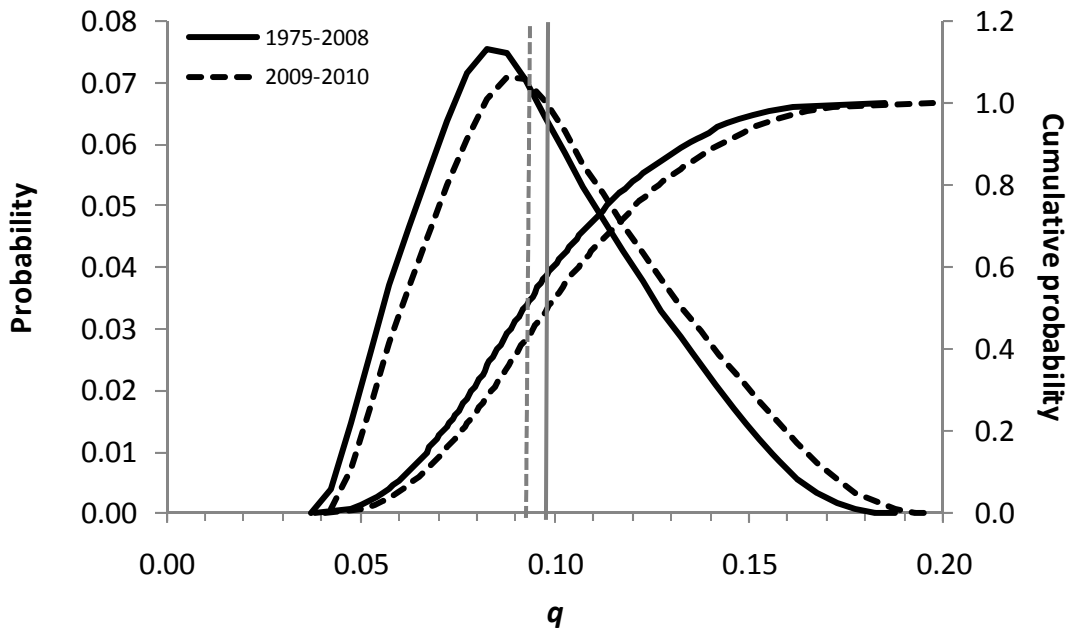


Figure B37. Uncertainty in catchability (q) priors for *Loligo pealeii* in NEFSC spring and fall surveys and median q-priors (0.092 for 1975-2009 and 0.098 for 2009-2010) used to compute biomass estimates.

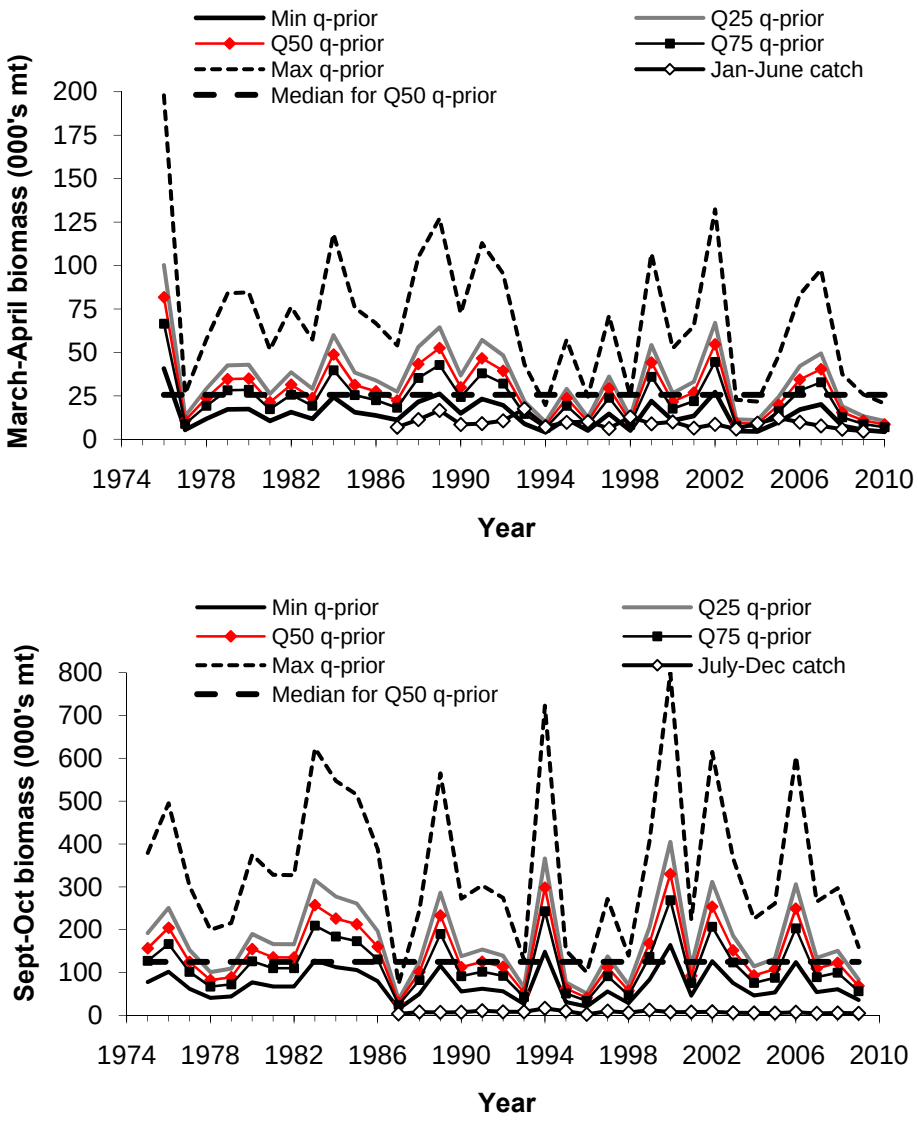


Figure B38. *Loligo* biomass estimates, derived using the minimum, maximum, 25th, 50th and 75th percentiles of the *q*-prior distributions (Q25,50 and 75), for cohorts caught in the NEFSC spring (1976-2010, top) and fall (1975-2009, bottom) bottom trawl surveys.

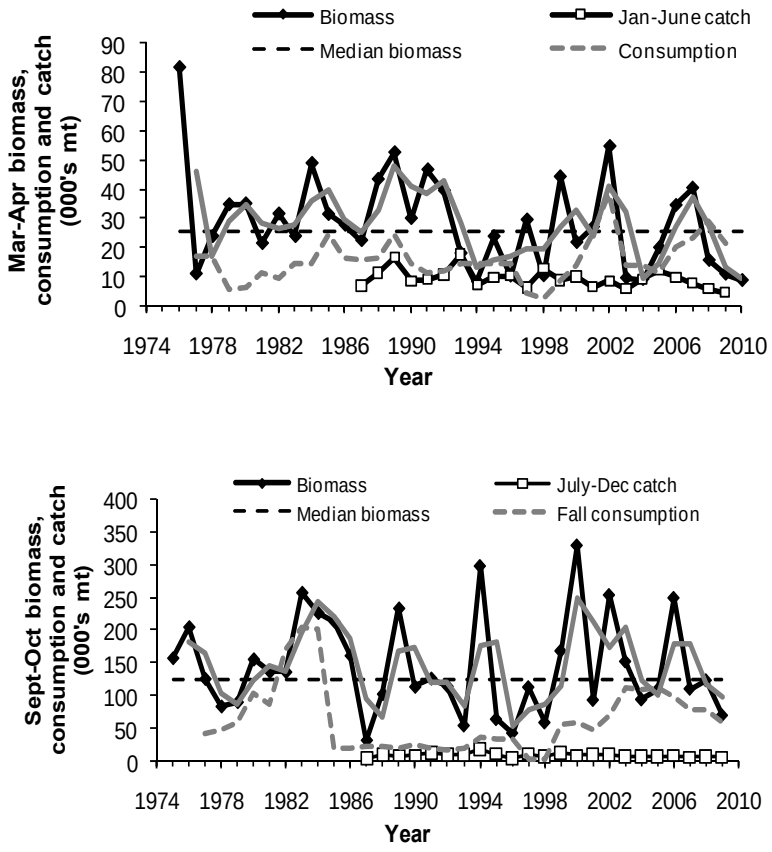


Figure B39. Estimates of *Loligo pealeii* biomass (derived using the median q-priors) for seasonal cohorts caught in the NEFSC spring (top) and fall surveys (bottom) in relation to their respective seasonal consumption estimates and fishery catches. The grey lines represent the two-year moving averages of the biomass estimates.

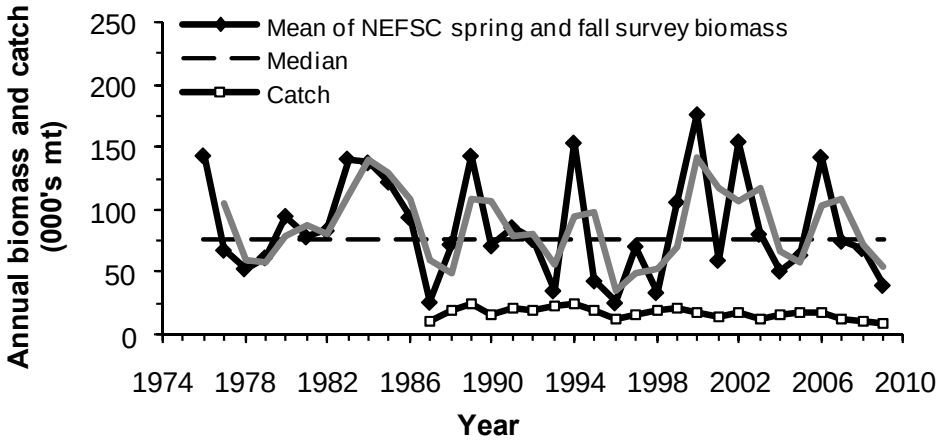


Figure B40. Annualized estimates (annual averages of NEFSC spring and fall survey biomass) of *Loligo* biomass in relation to annual catches. The grey line is the two-year moving average of the biomass estimates.

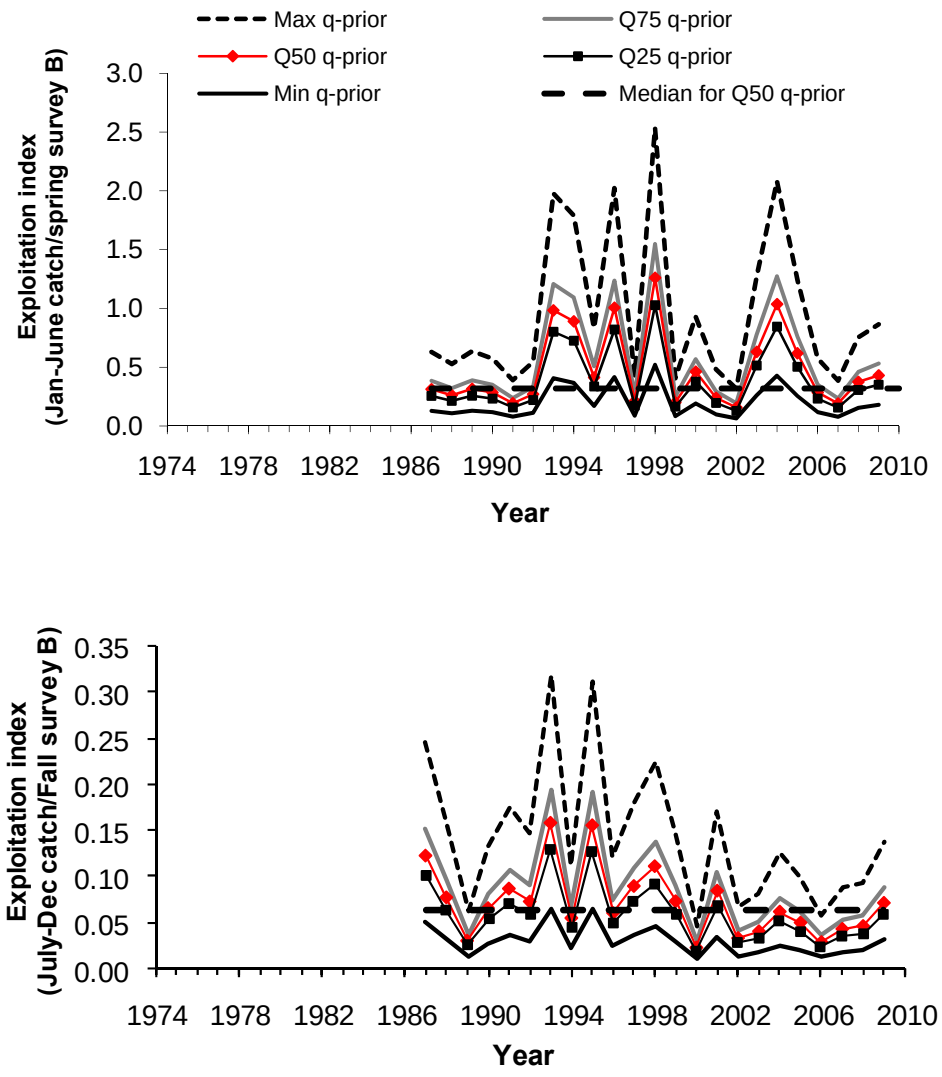


Figure B41. *Loligo* exploitation indices, derived using the minimum, maximum, 25th, 50th and 75th percentiles of the *q*-prior distributions (Q25,50 and 75), for the January-June fishery (January-June catch/March survey biomass, top) and the July-December fishery (July-December catch/September survey biomass, bottom), 1987-2009.

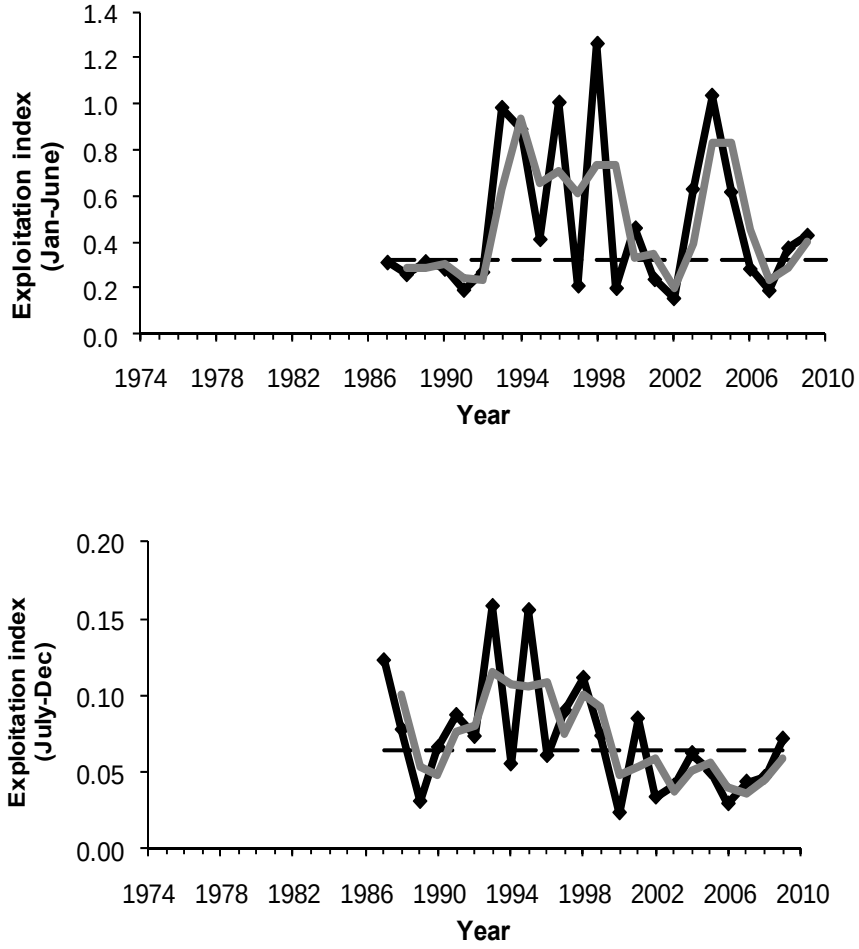


Figure B42. Exploitation indices for the January-June fishery (top) and the July-December fishery (bottom) in relation their medians during 1987-2008. The grey lines represent the two-year moving averages.

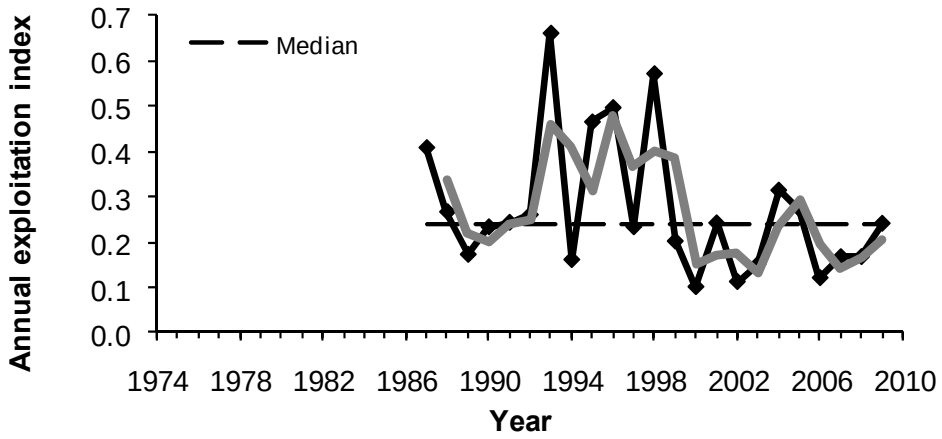


Figure B43. Annual exploitation indices for *Loligo* (annual catch/ annual mean of NEFSC spring and fall survey biomass). The grey lines represent the two-year moving averages.

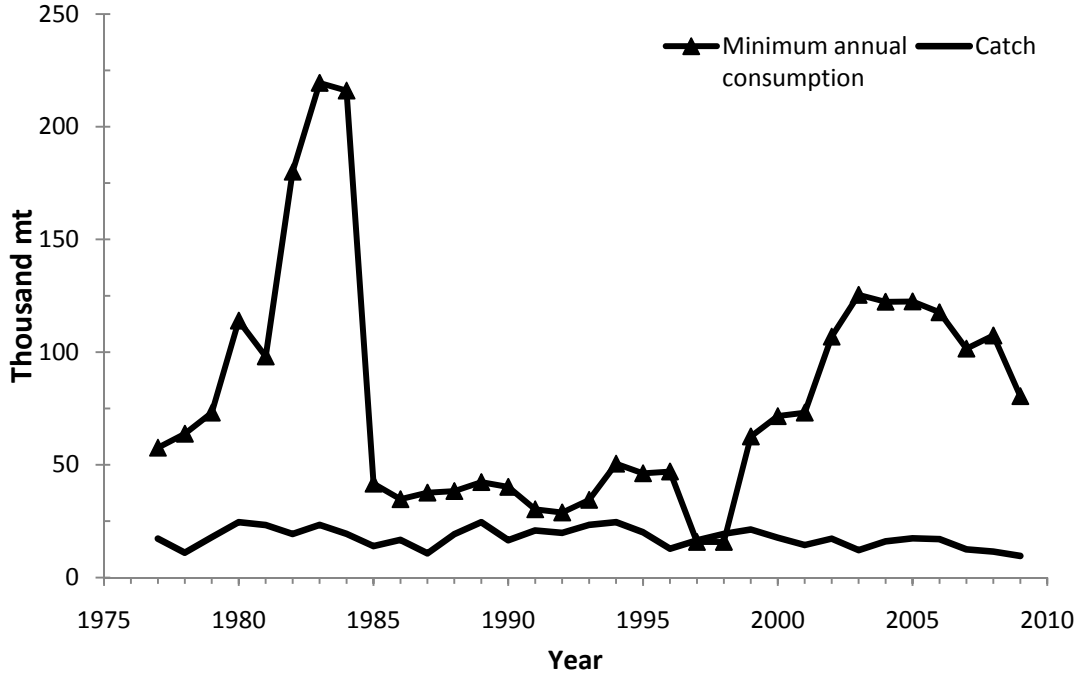


Figure B44. Annual estimates of minimum consumption and catches of Loligo pealeii during 1977-2009.

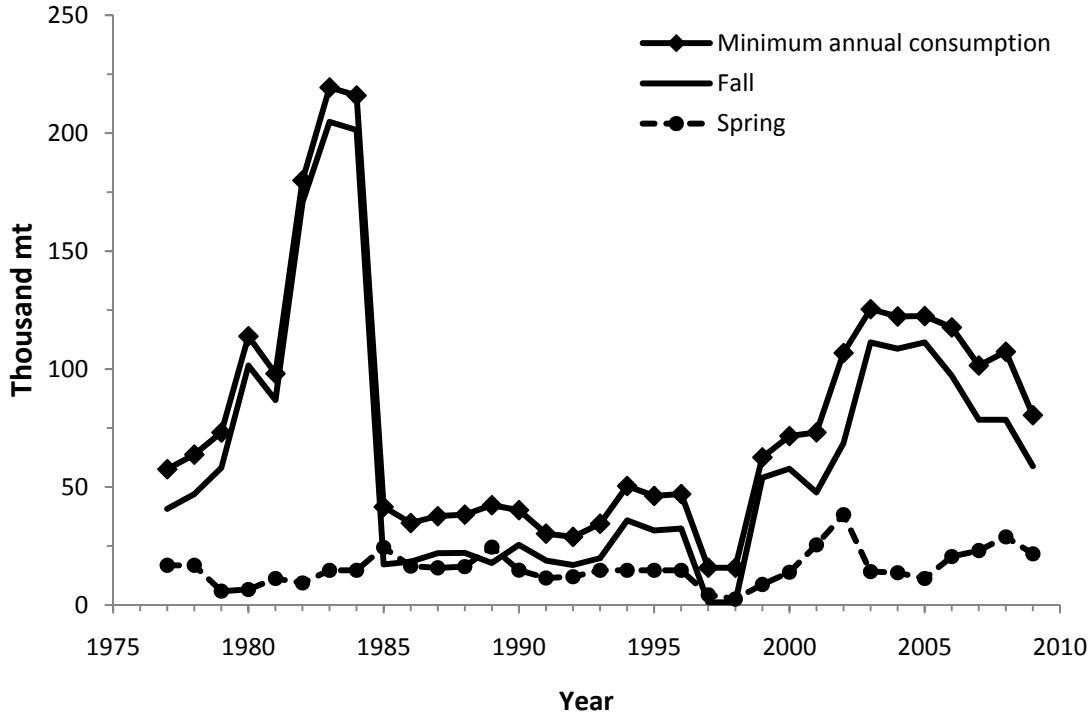


Figure B45. Minimum seasonal and annual estimates of *Loligo* consumption.

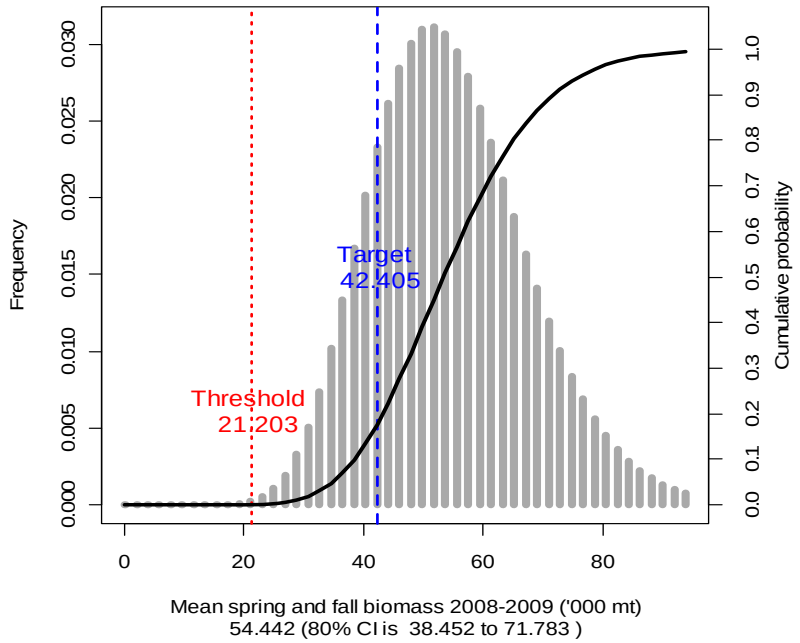


Figure B46. *Loligo* biomass estimate (000s mt), spring and fall survey average for 2008-2009, shown as a probability distribution. Also shown are proposed biomass reference points.

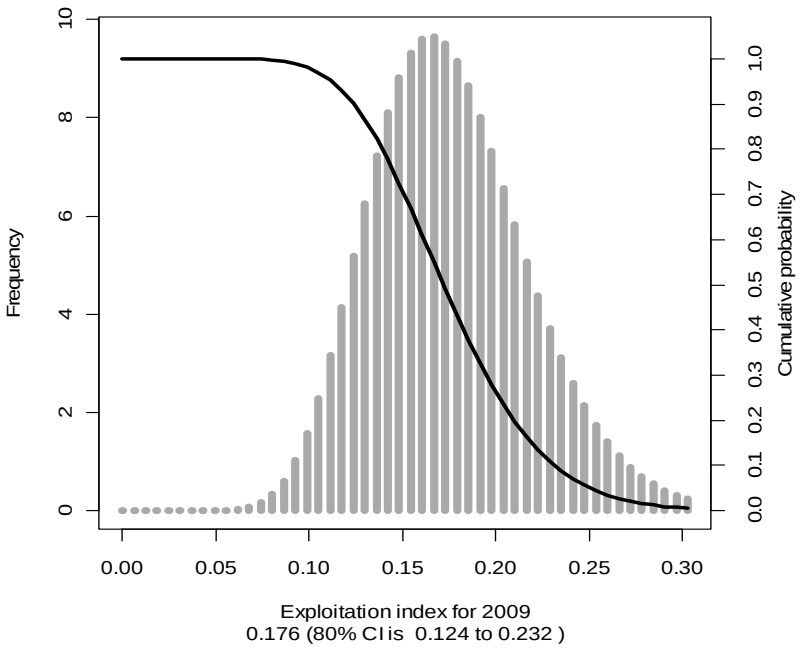


Figure B47. *Loligo* exploitation index for 2009 (2009 catch / mean of 2008-2009 spring and fall survey biomass) shown as a probability distribution.