D.Offshore Hake-Figures

Figure D1. NEFSC survey strata map.

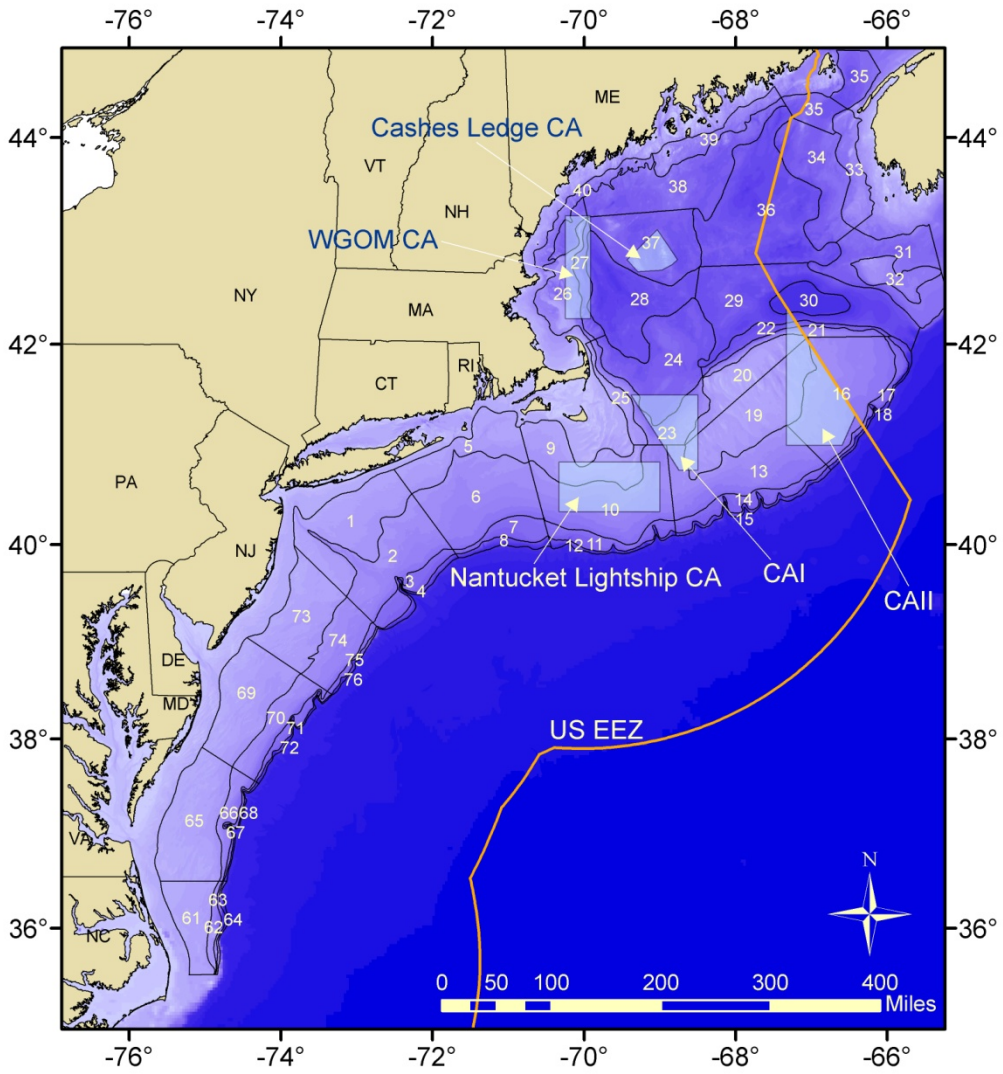


Figure D2. Distribution of offshore hake from the NEFSC fall survey (catch weight per tow, kg), 1967-2009.

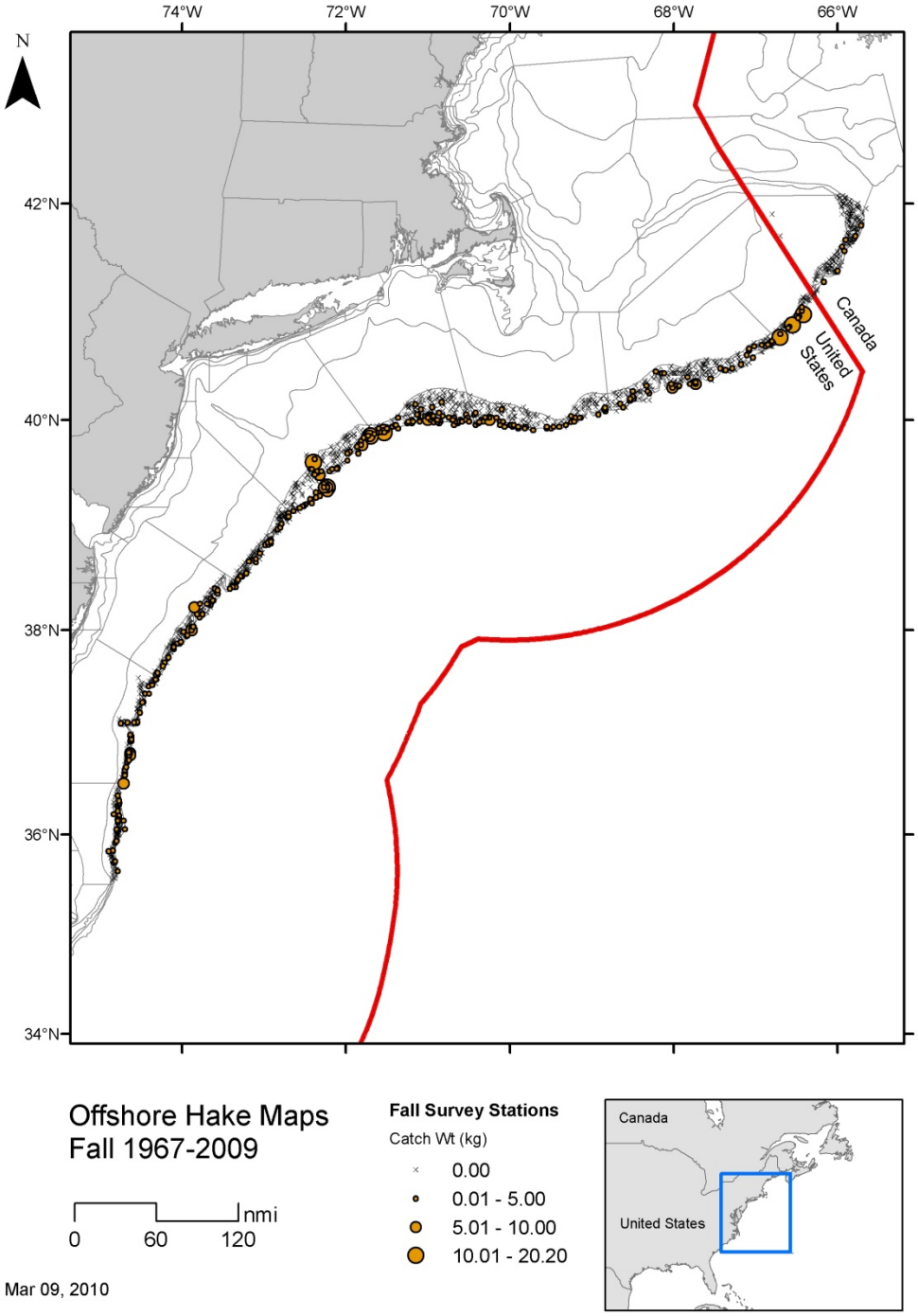


Figure D2a. NEFSC fall survey distribution (catch weight per tow, kg) of offshore hake, 1967-2009, broken up by stratum areas for easier viewing.

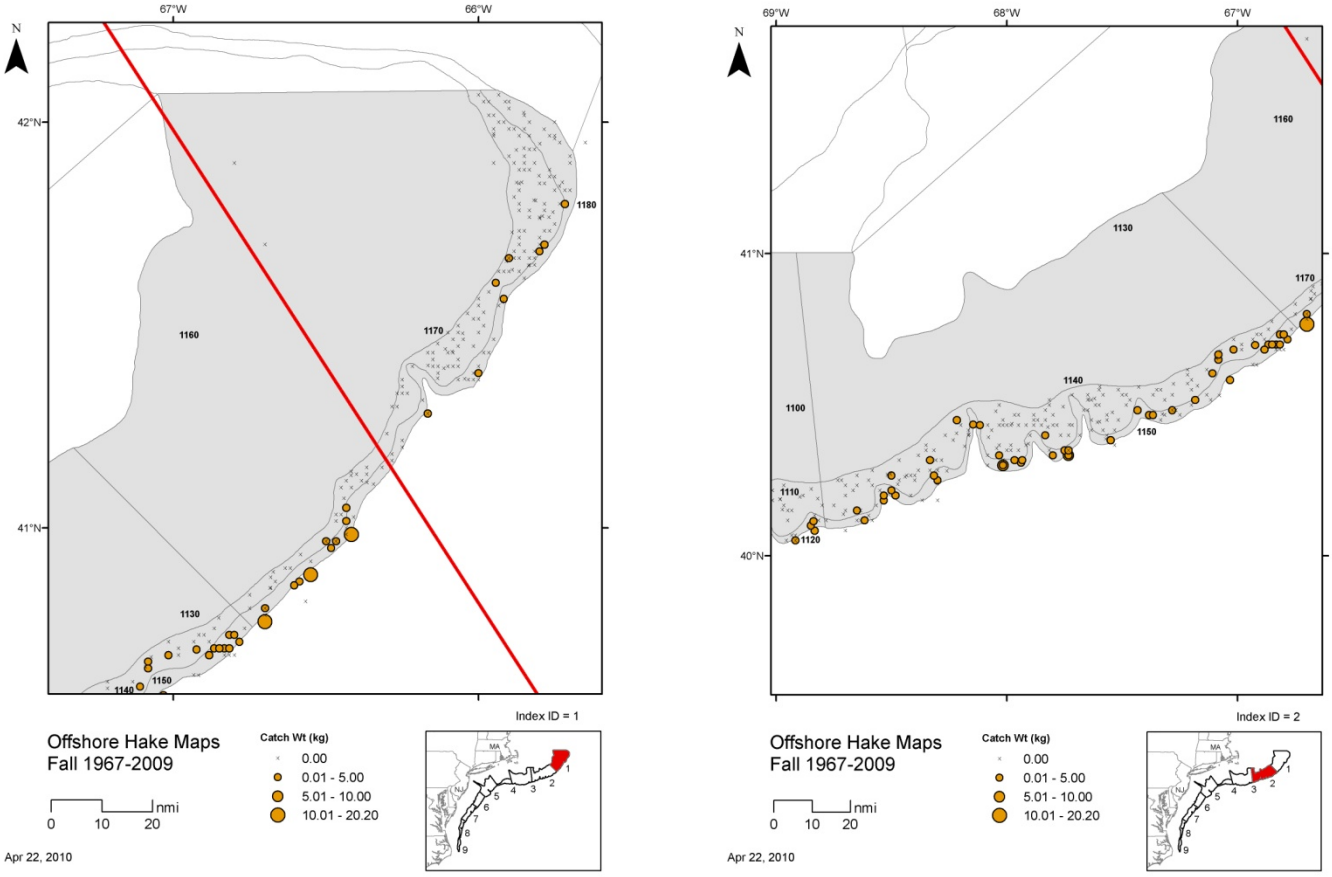
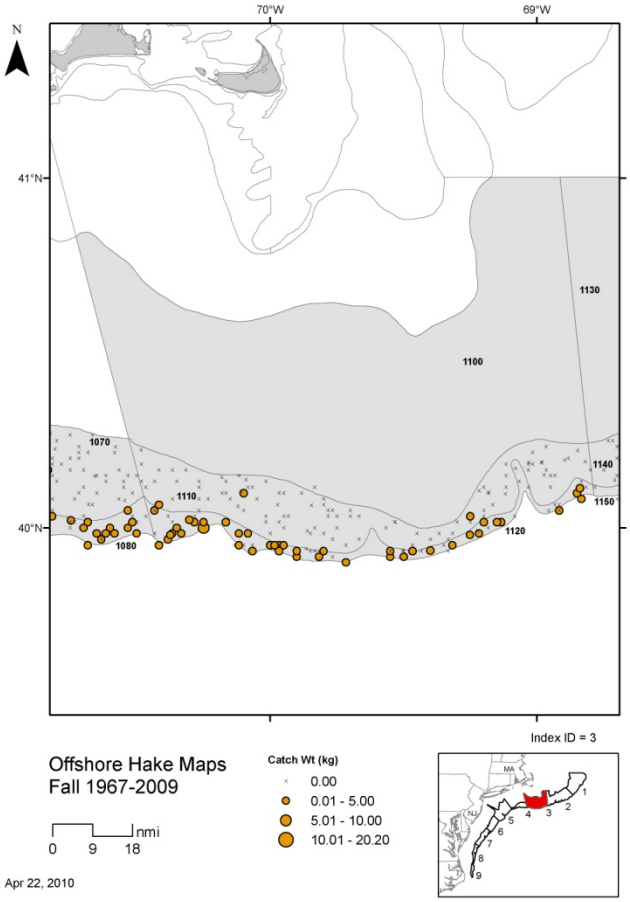


Figure D2b. NEFSC fall survey distribution (catch weight per tow, kg) of offshore hake, 1967-2009, broken up by stratum areas for easier viewing.



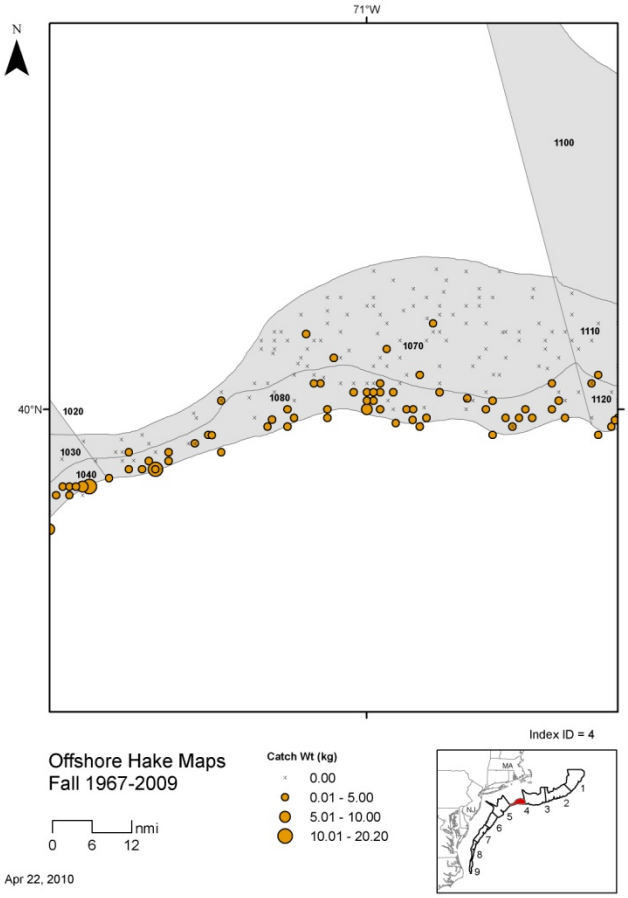


Figure D2c. NEFSC fall survey distribution (catch weight per tow, kg) of offshore hake, 1967-2009, broken up by stratum areas for easier viewing.

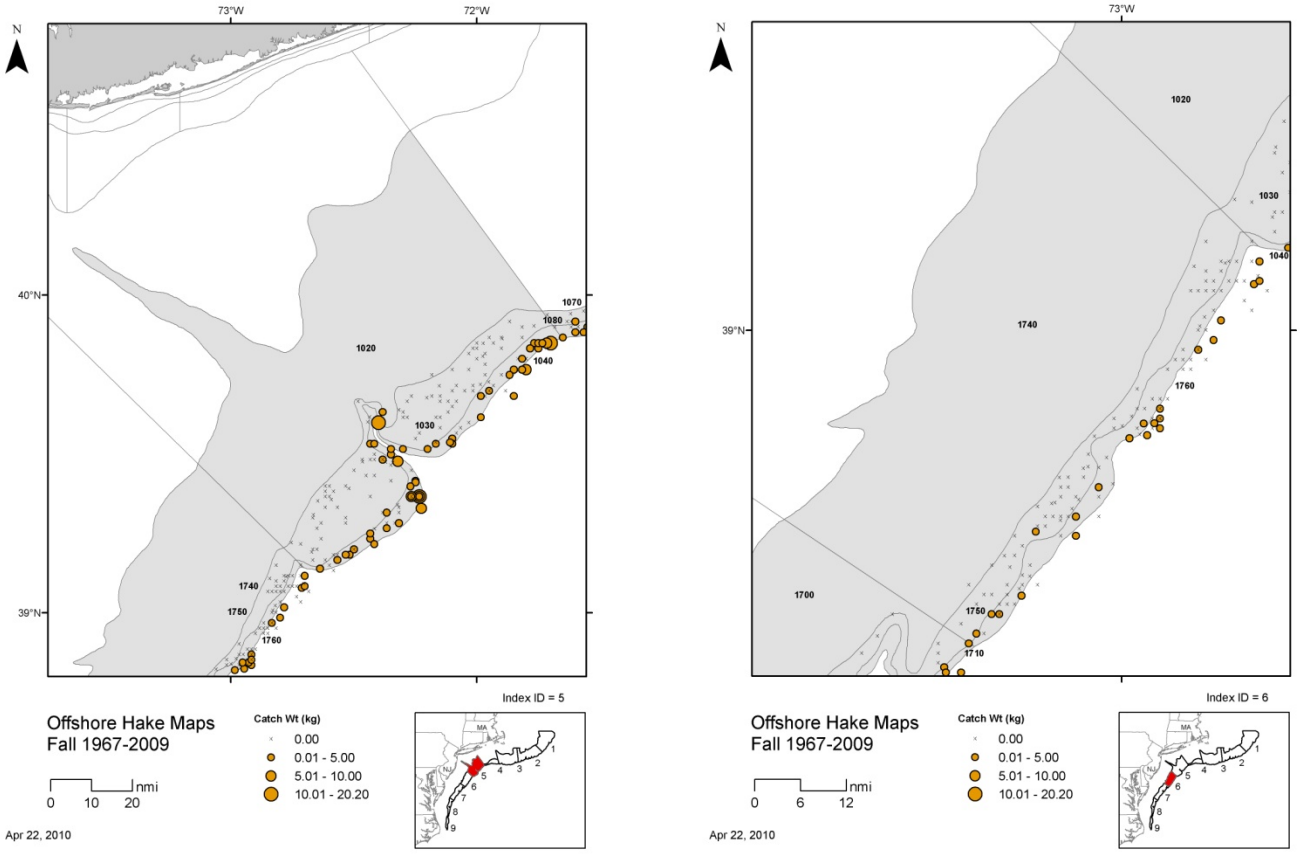


Figure D2d. NEFSC fall survey distribution (catch weight per tow, kg) of offshore hake, 1967-2009, broken up by stratum areas for easier viewing.

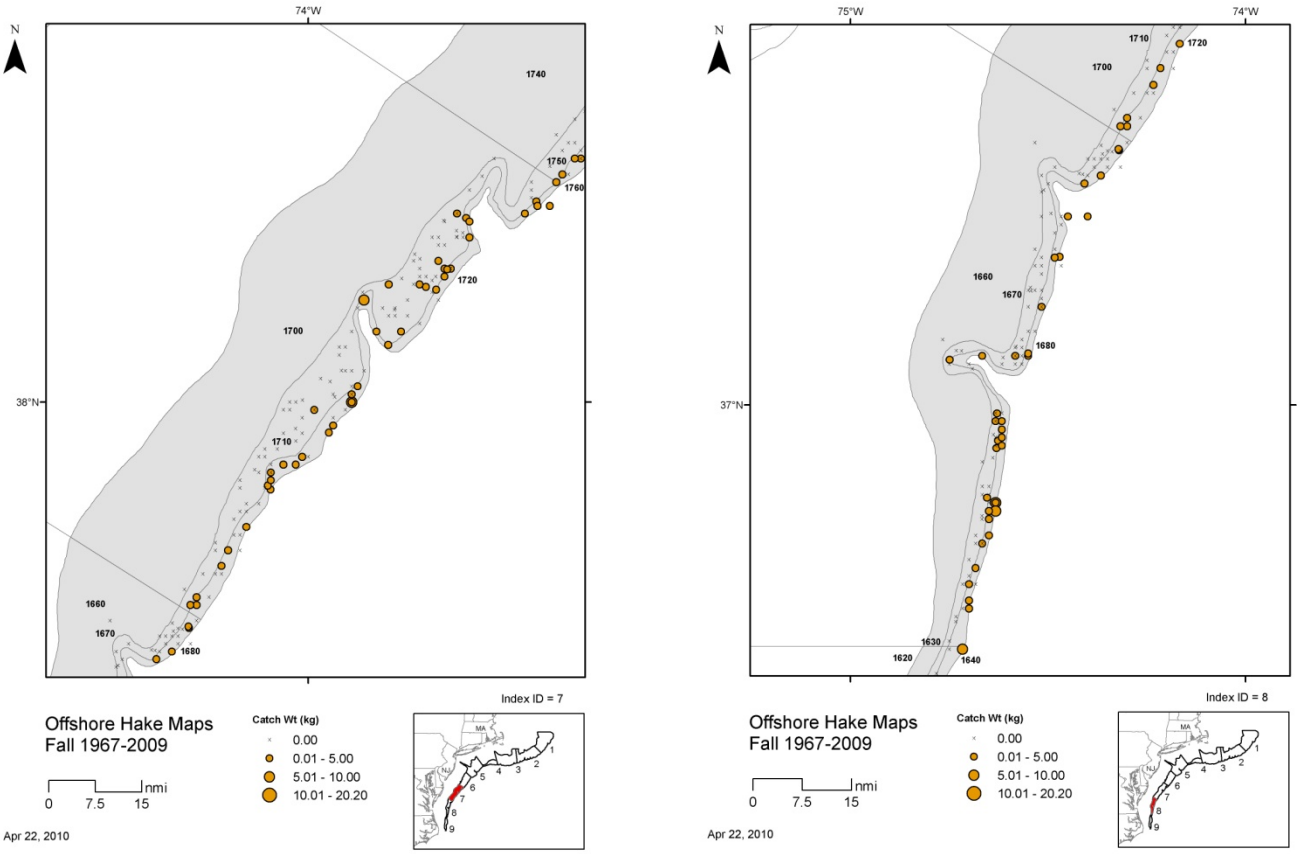


Figure D2e. NEFSC fall survey distribution (catch weight per tow, kg) of offshore hake, 1967-2009, broken up by stratum areas for easier viewing.

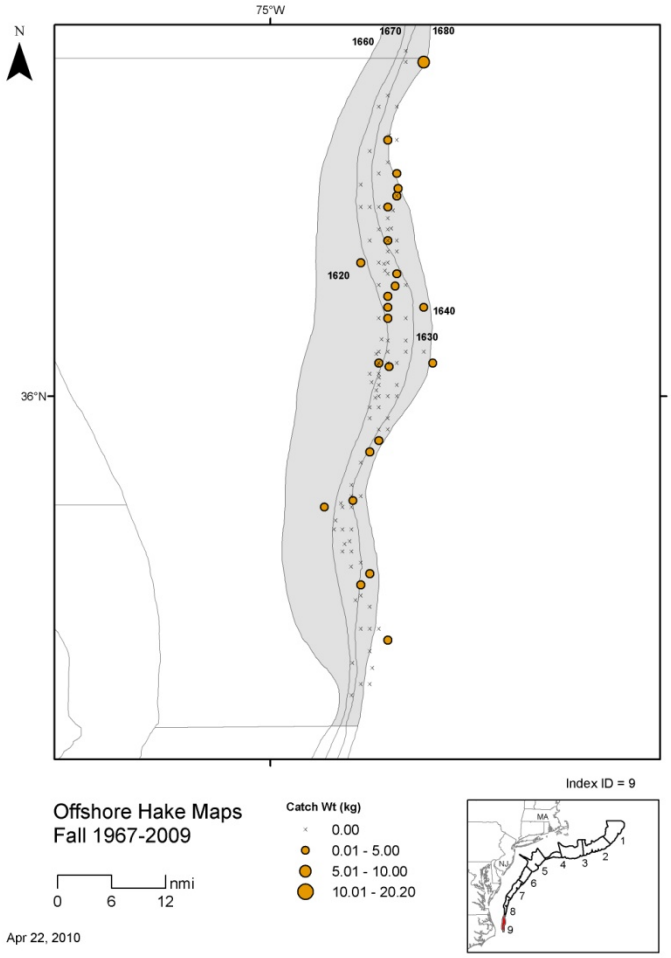


Figure D3. Distribution of offshore hake from the NEFSC spring survey (catch weight per tow, kg), 1968-2009.

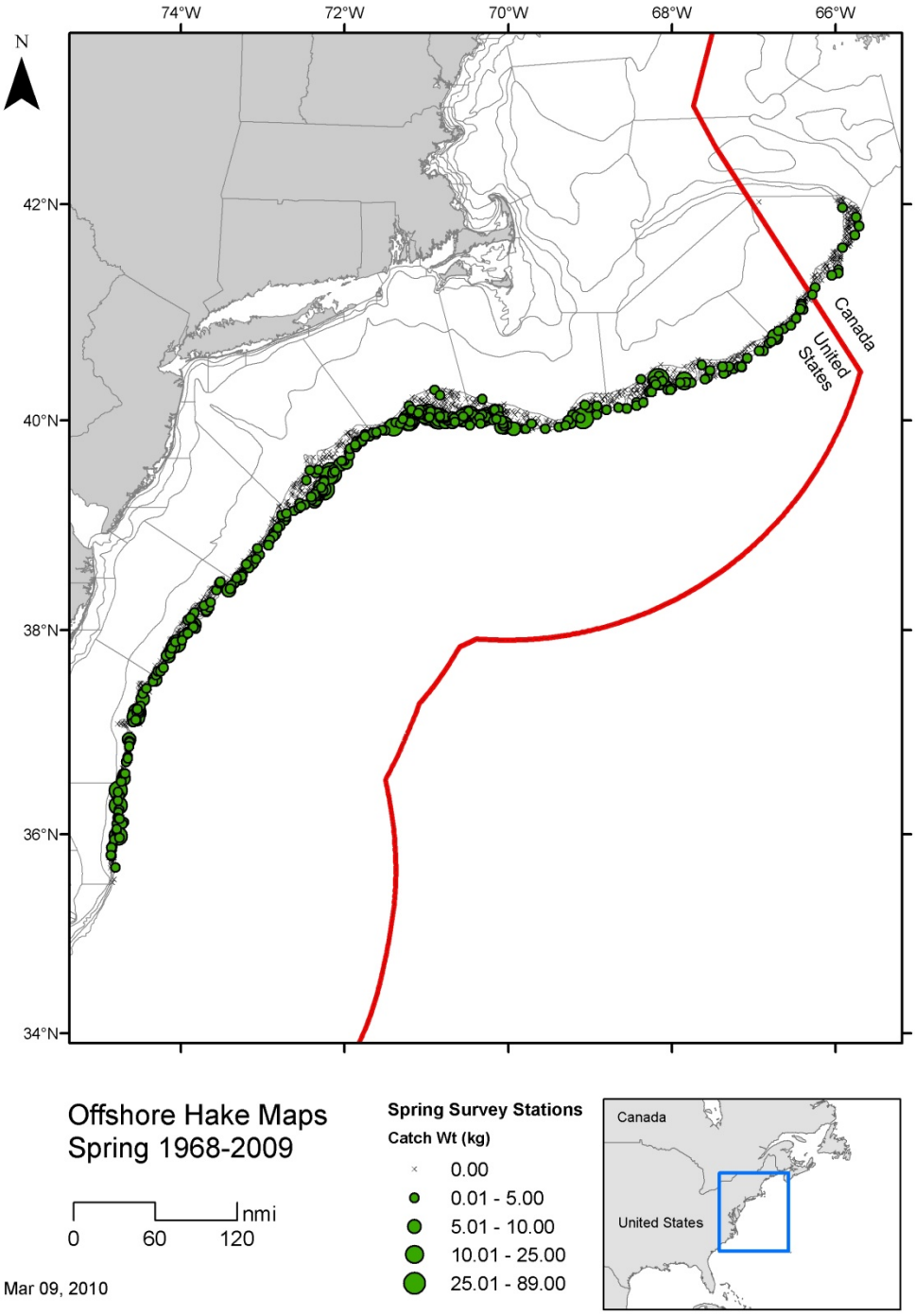
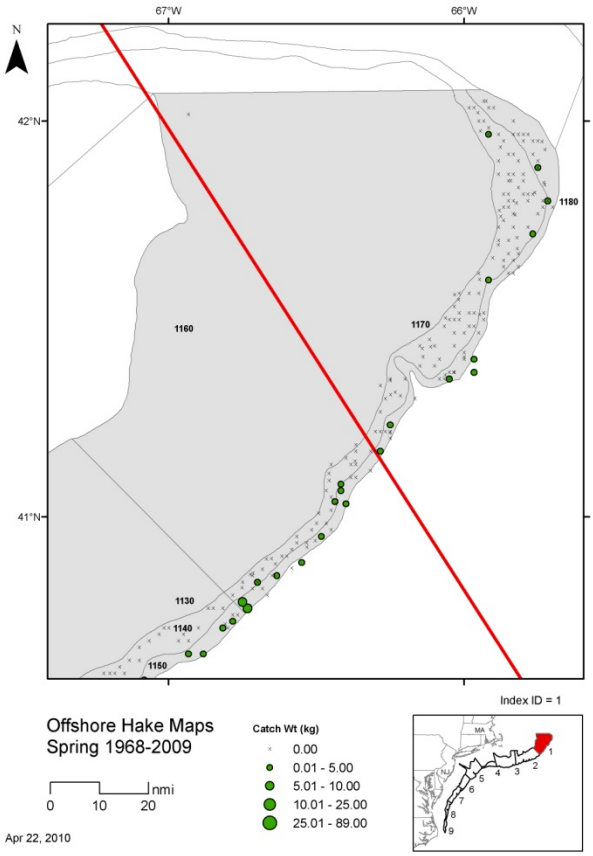


Figure D3a. NEFSC spring survey distribution (catch weight per tow, kg) of offshore hake, 1968-2009, broken up by stratum areas for easier viewing.



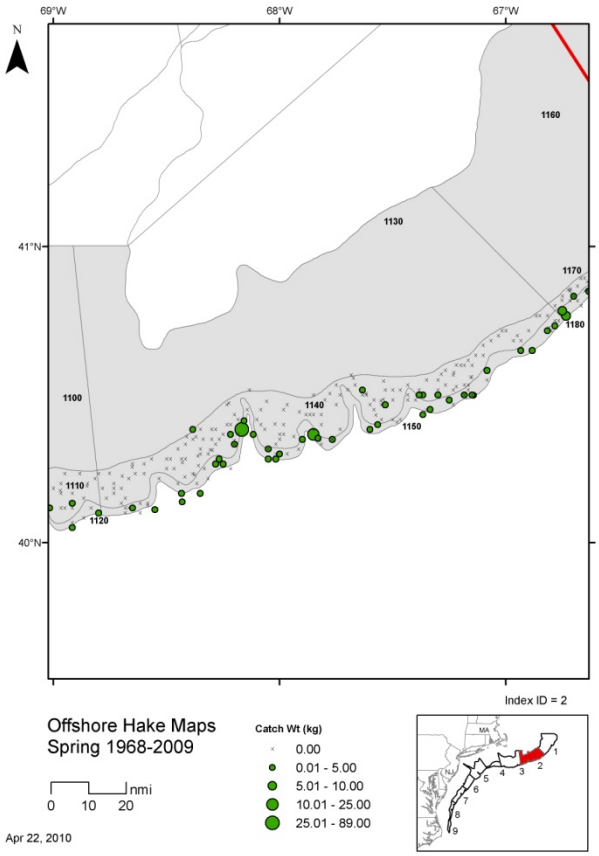
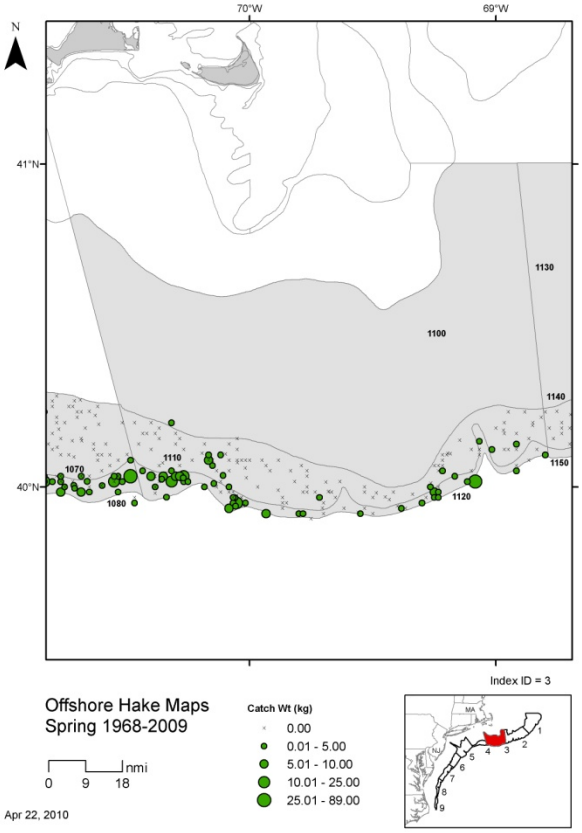


Figure D3b. NEFSC spring survey distribution (catch weight per tow, kg) of offshore hake, 1968-2009, broken up by stratum areas for easier viewing.



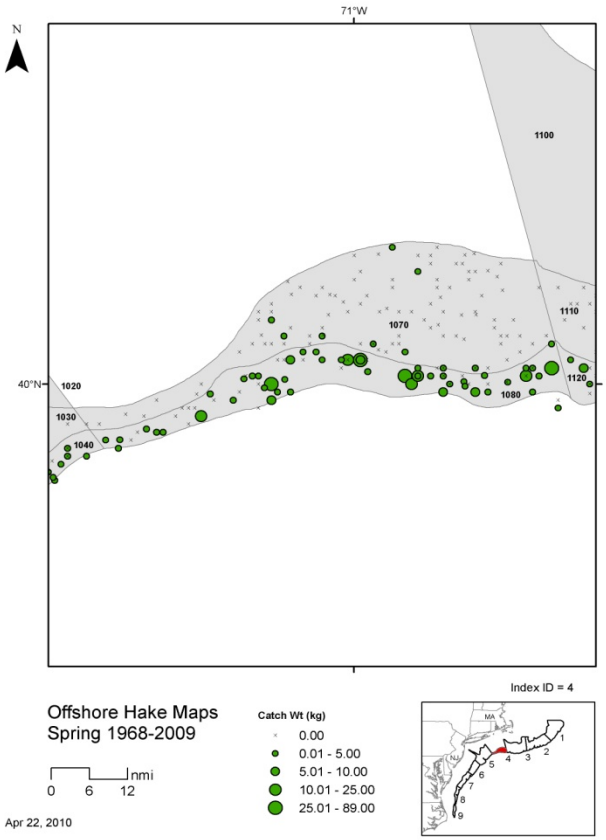
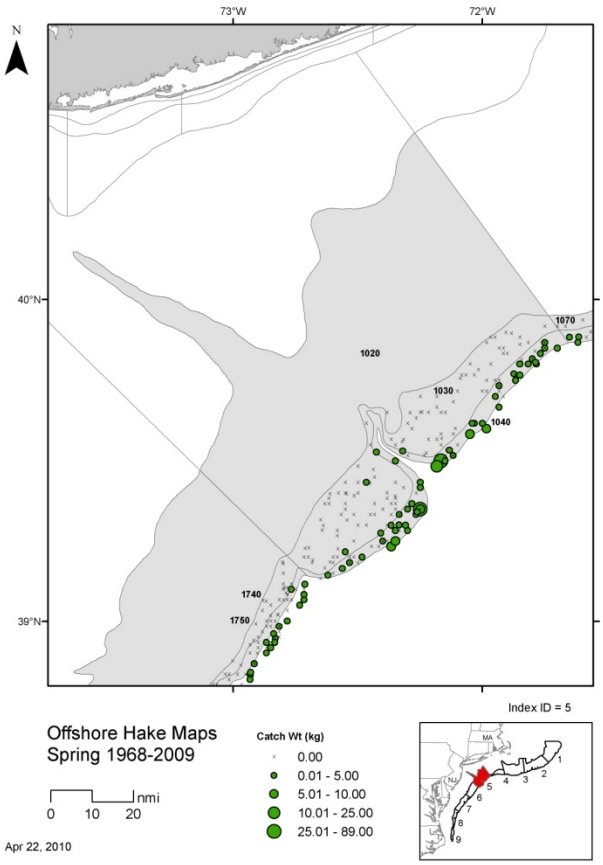


Figure D3c. NEFSC spring survey distribution (catch weight per tow, kg) of offshore hake, 1968-2009, broken up by stratum areas for easier viewing.



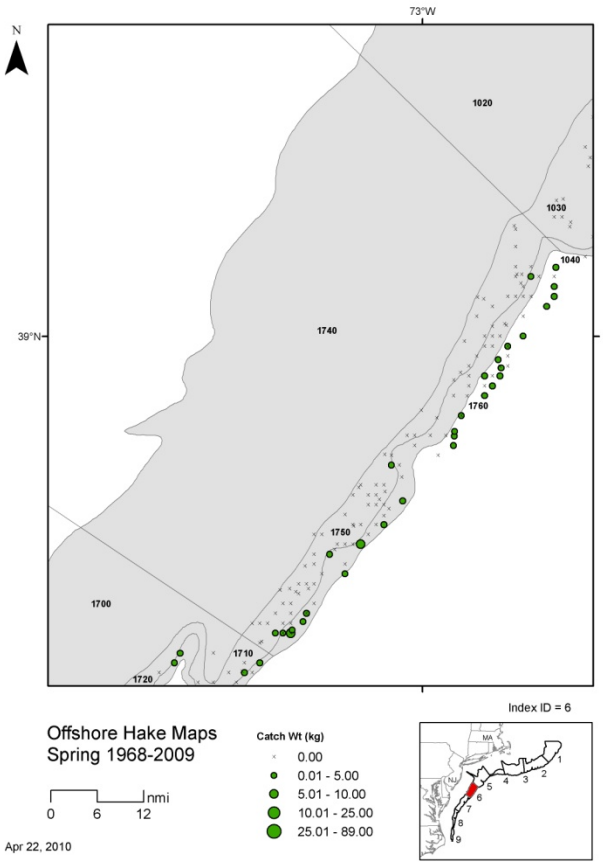


Figure D3d. NEFSC spring survey distribution (catch weight per tow, kg) of offshore hake, 1968-2009, broken up by stratum areas for easier viewing.

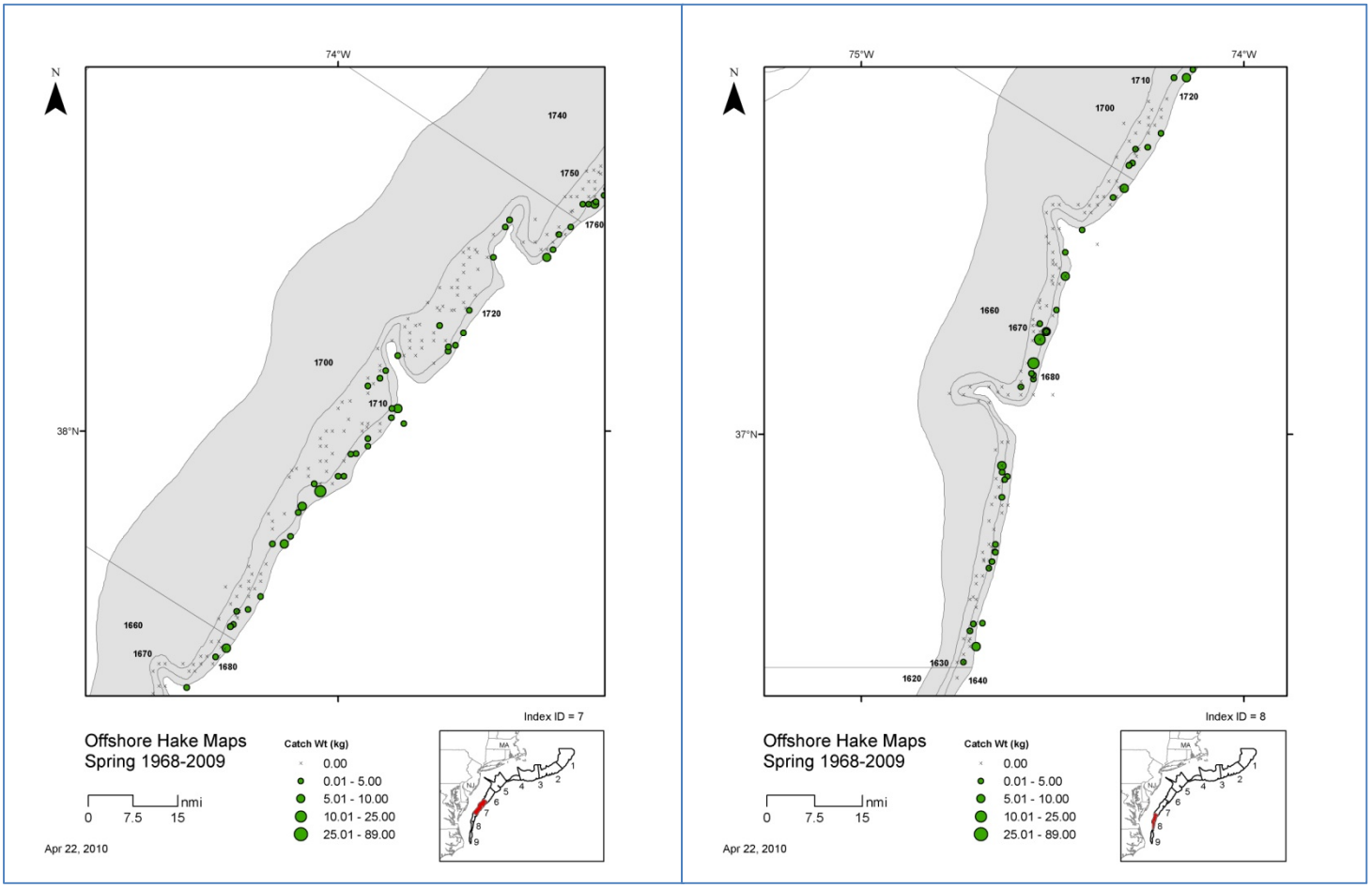


Figure D3e. NEFSC spring survey distribution (catch weight per tow, kg) of offshore hake, 1968-2009, broken up by stratum areas for easier viewing.

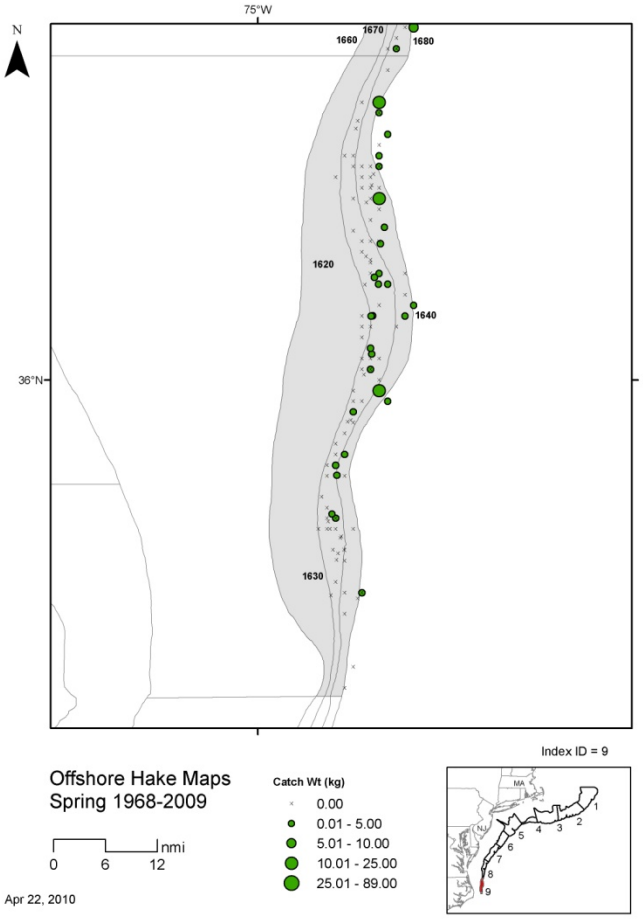


Figure D4. Distribution of offshore hake from the NEFSC winter survey (catch weight per tow, kg), 1998-2007.

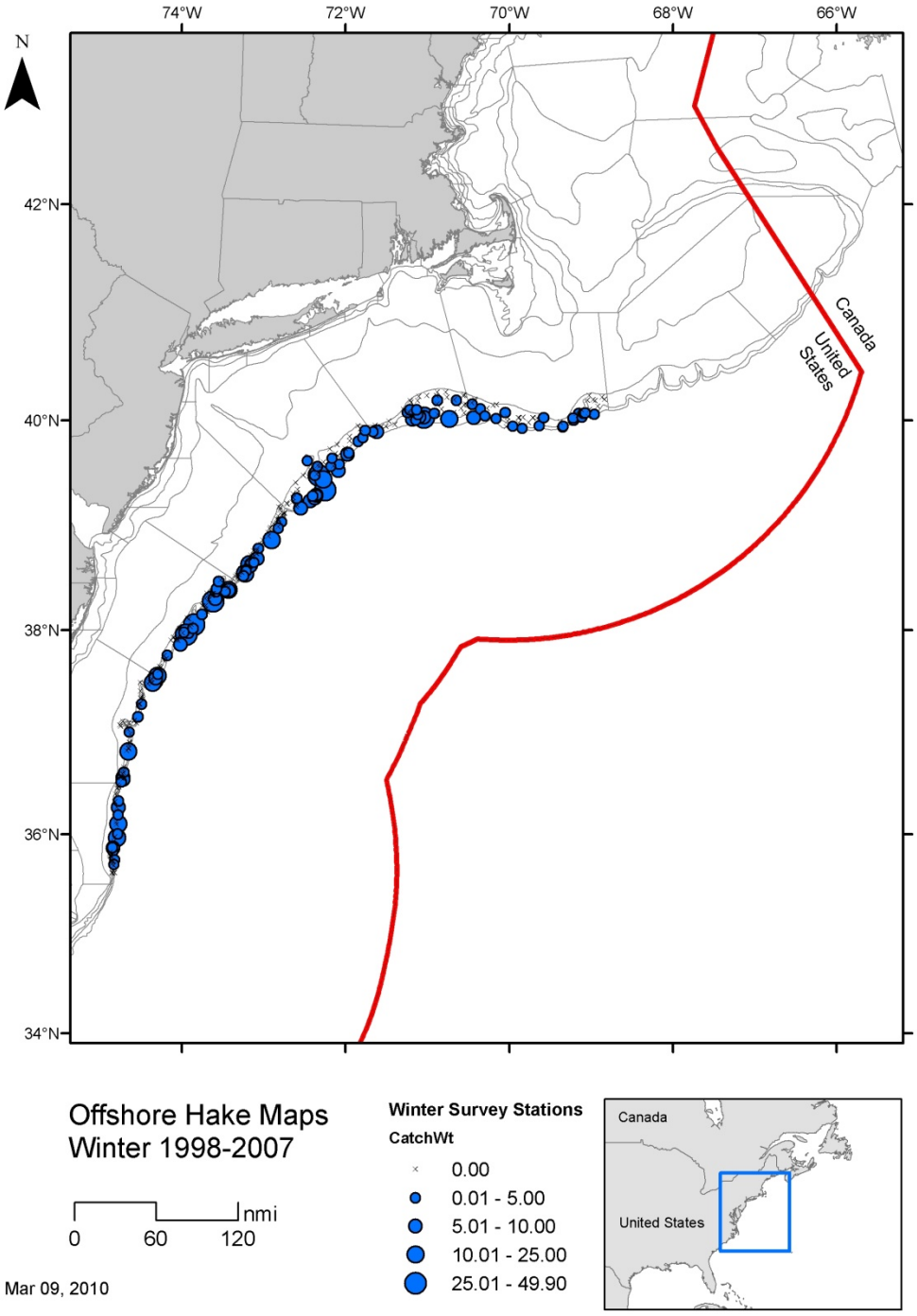
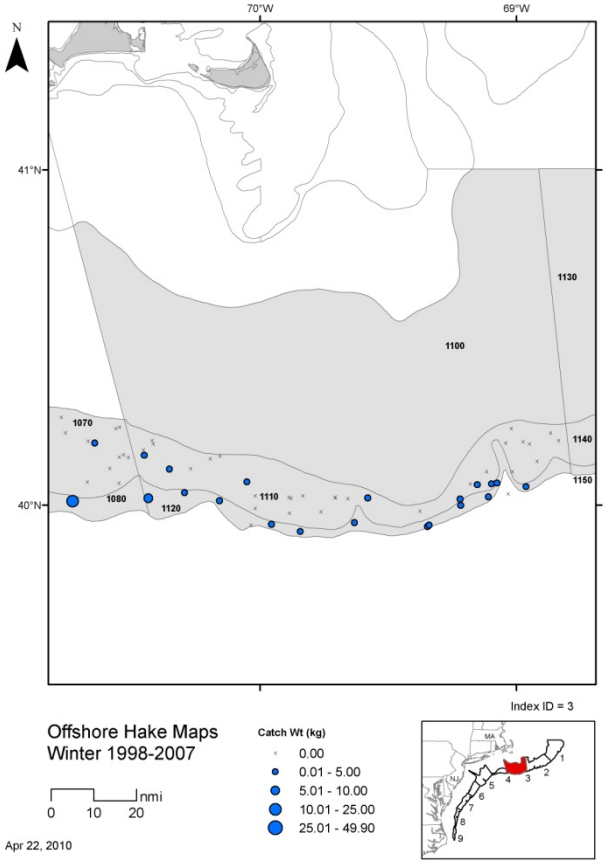


Figure D4a. NEFSC winter survey distribution (catch weight per tow, kg) of offshore hake, 1998-2007, broken up by stratum areas for easier viewing.



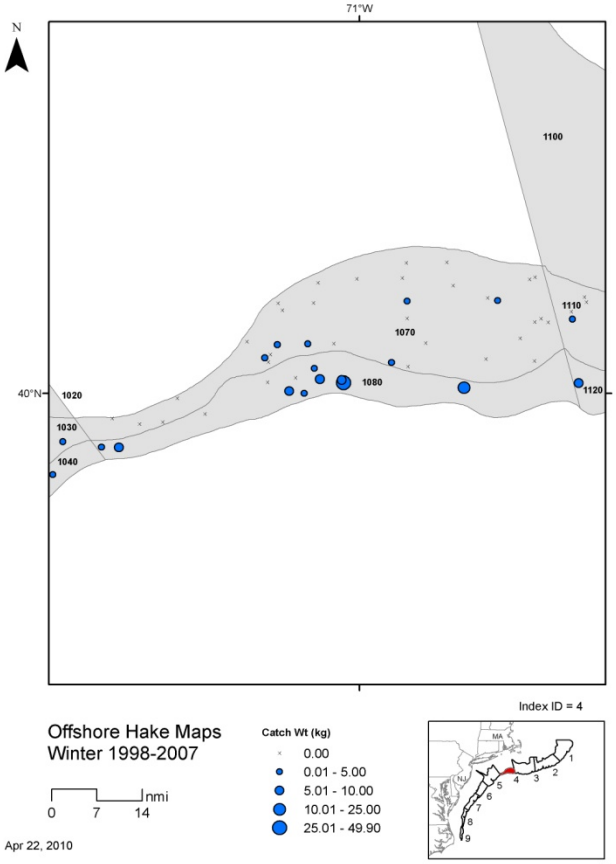


Figure D4b. NEFSC winter survey distribution (catch weight per tow, kg) of offshore hake, 1998-2007, broken up by stratum areas for easier viewing.

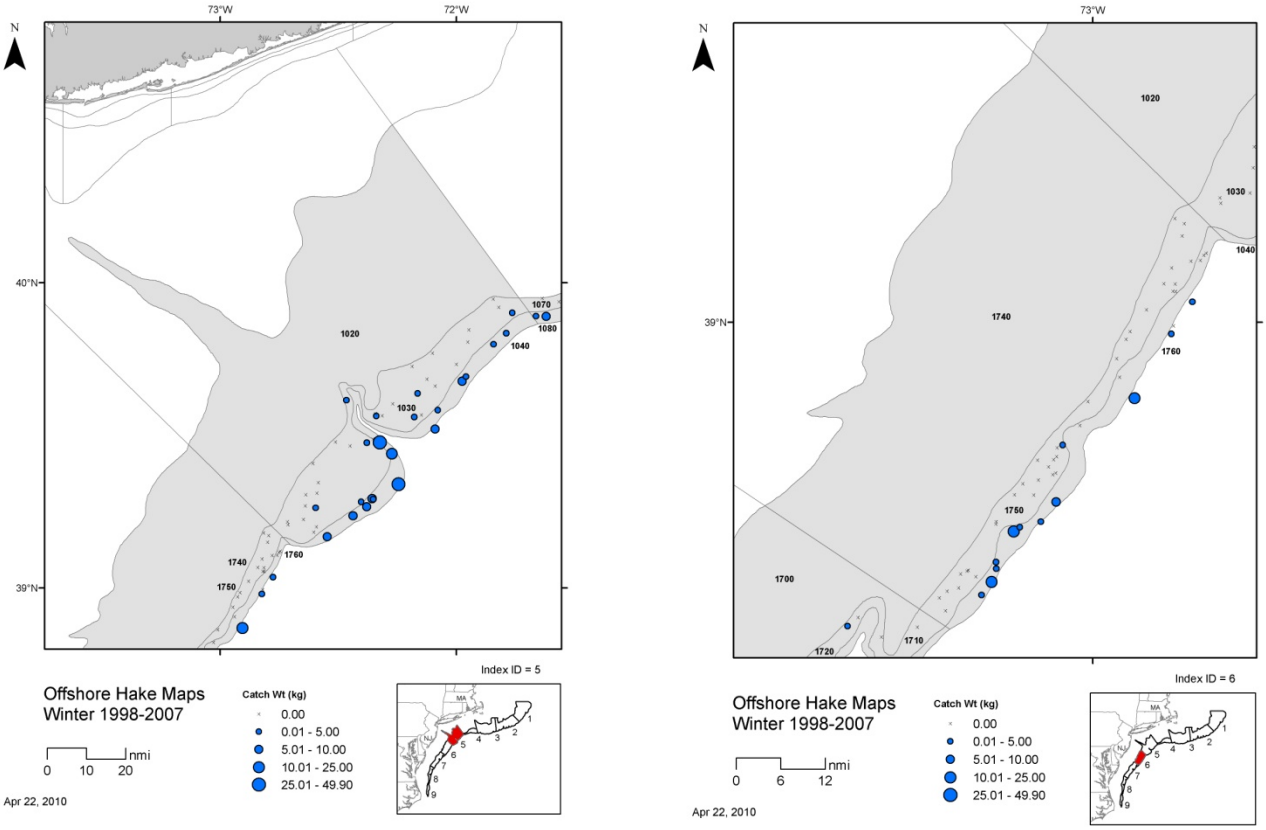


Figure D4c. NEFSC winter survey distribution (catch weight per tow, kg) of offshore hake, 1998-2007, broken up by stratum areas for easier viewing.

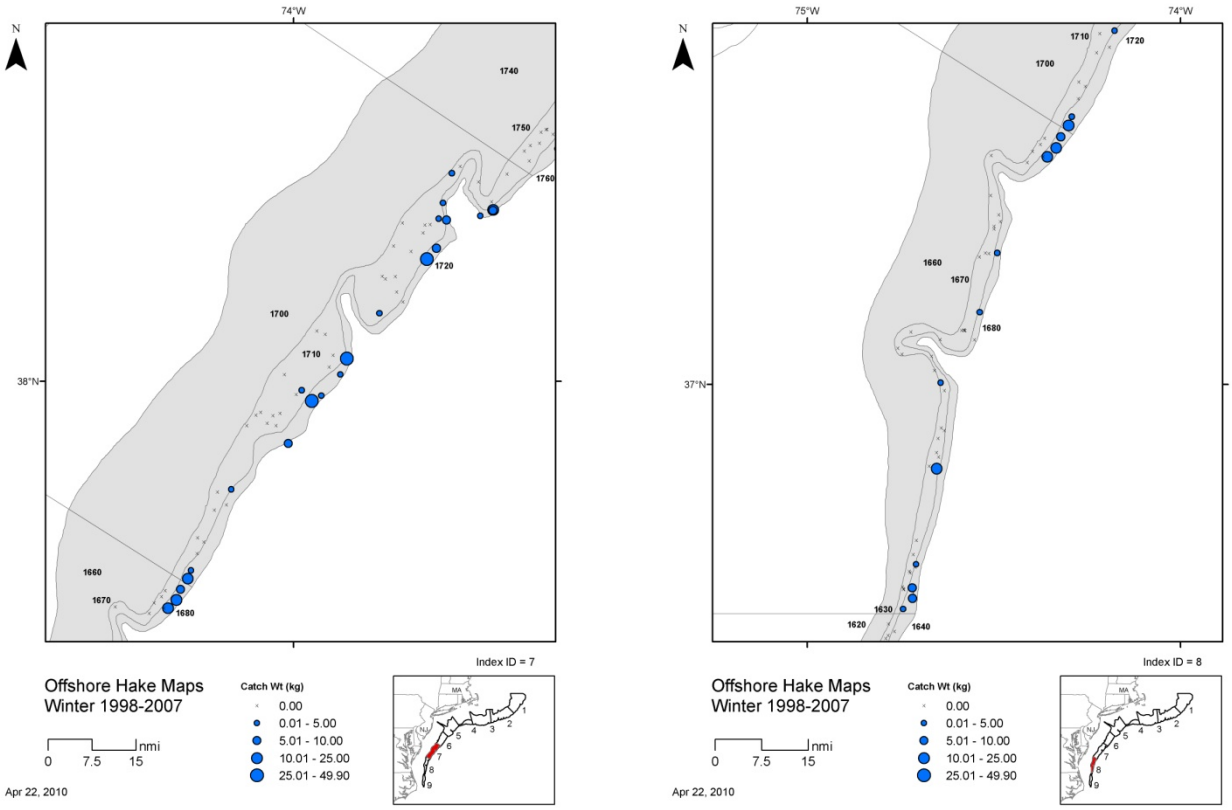
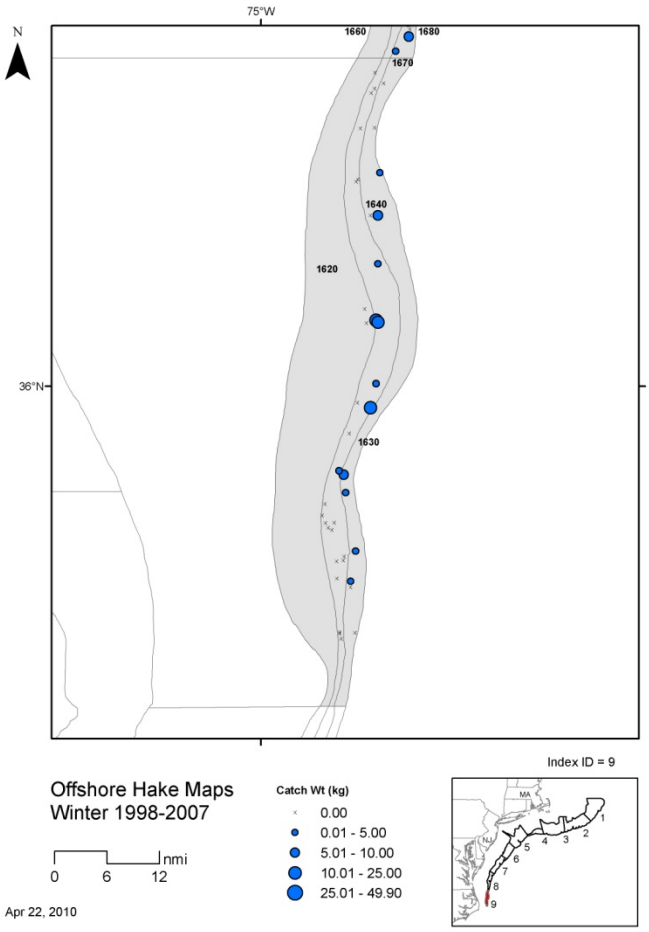


Figure D4d. NEFSC winter survey distribution (catch weight per tow, kg) of offshore hake, 1998-2007, broken up by stratum areas for easier viewing.



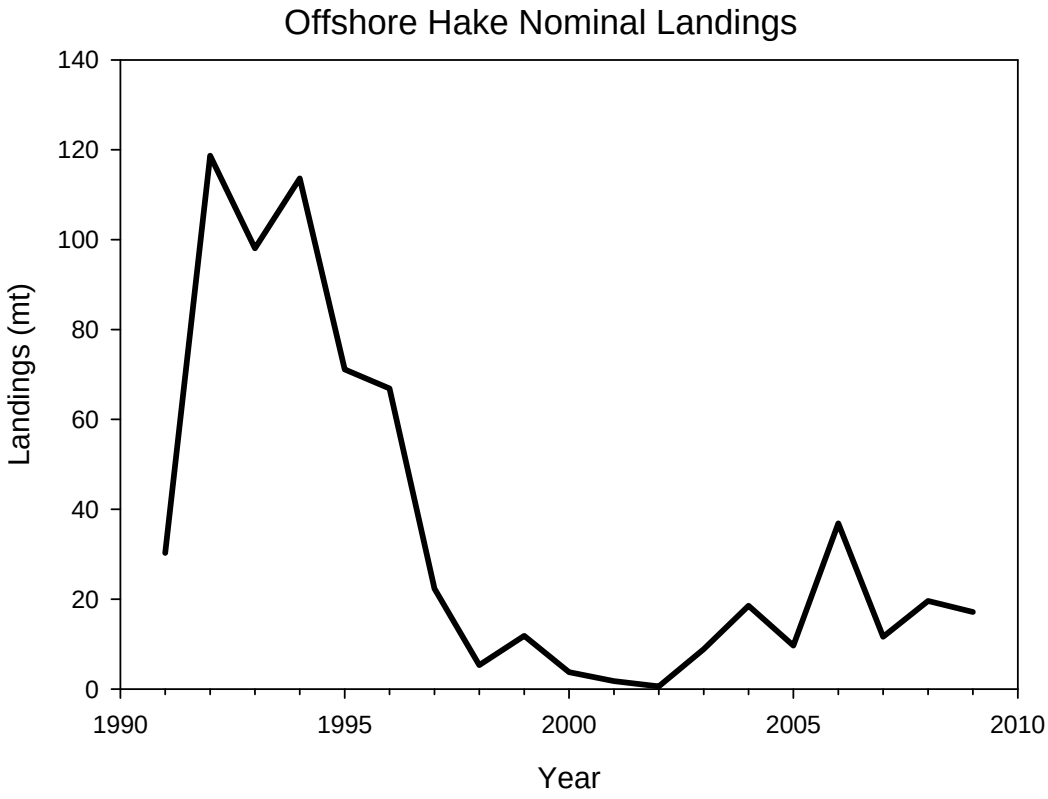


Figure D5. Nominal landings (mt) of offshore hake.

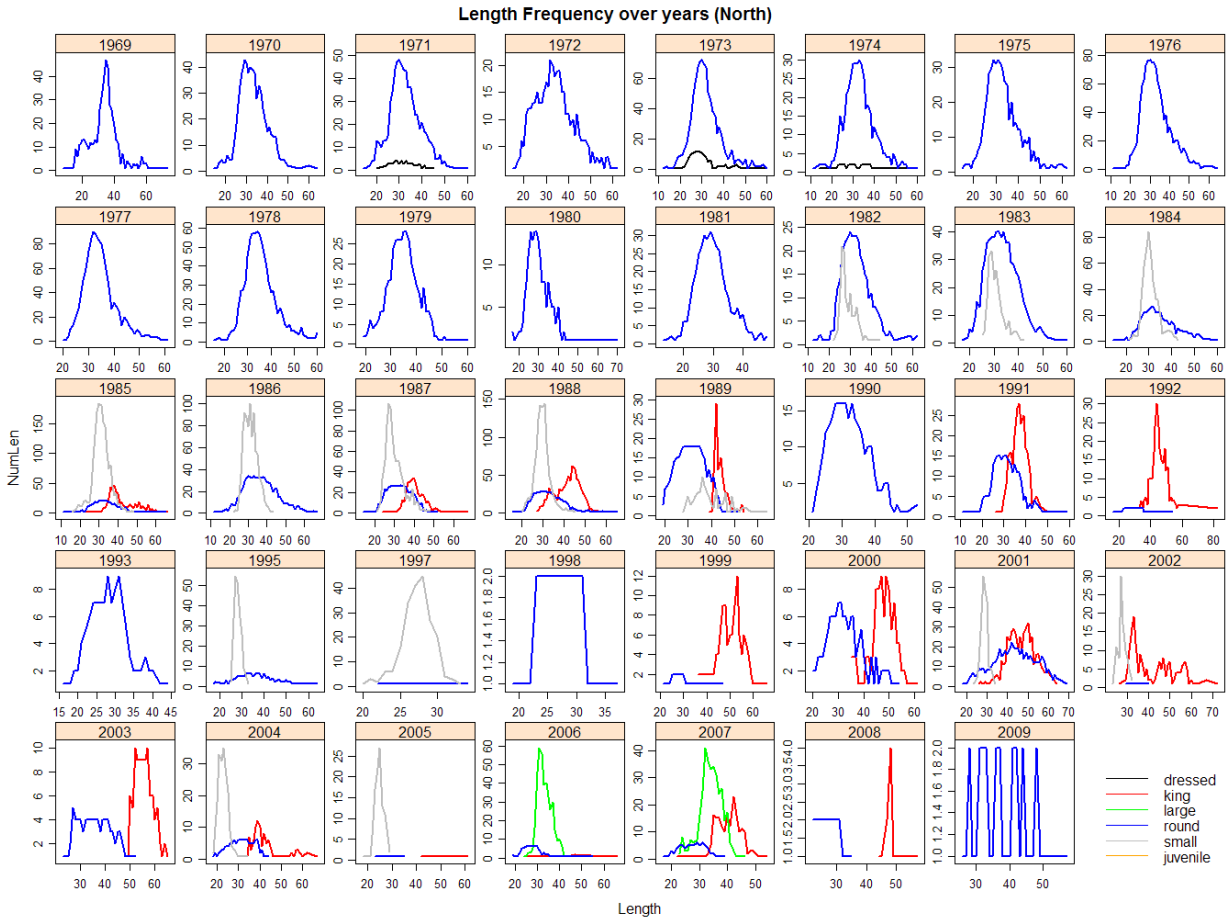


Figure D6. Length frequencies for silver hake for the northern region, before pooling, by all market categories.

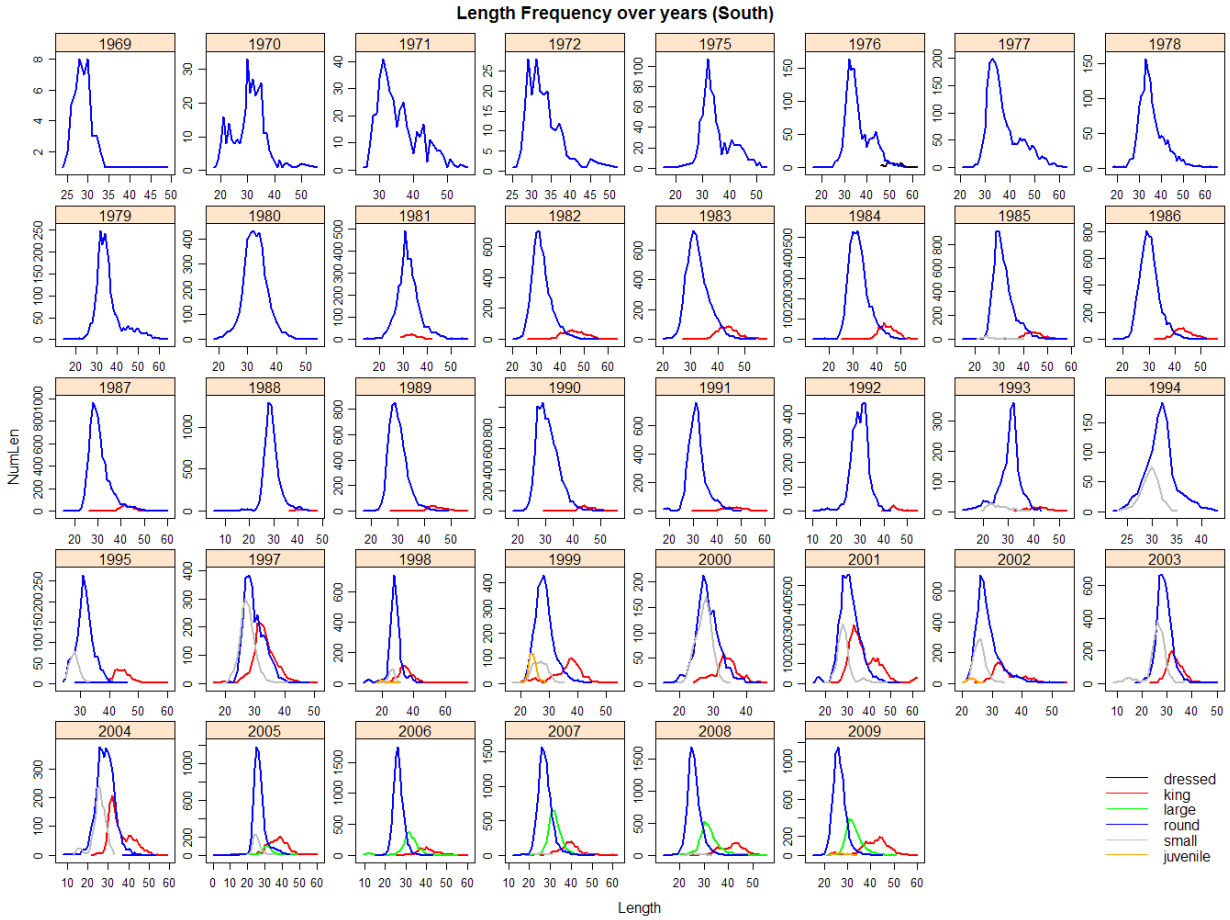


Figure D7. Length frequencies for silver hake for the southern region, before pooling, by all market categories.

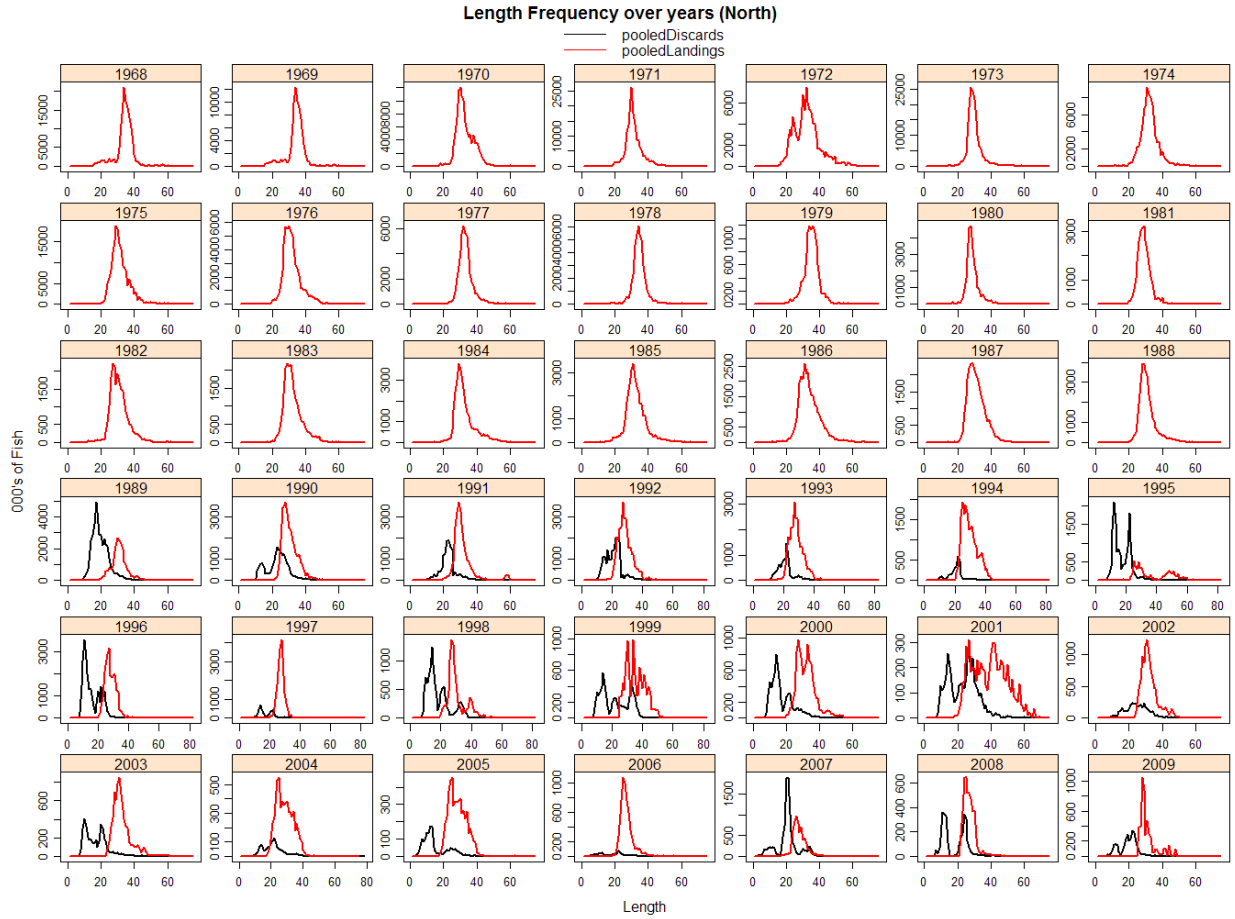


Figure D8. Length frequencies for silver hake for the northern region, landings and discards.

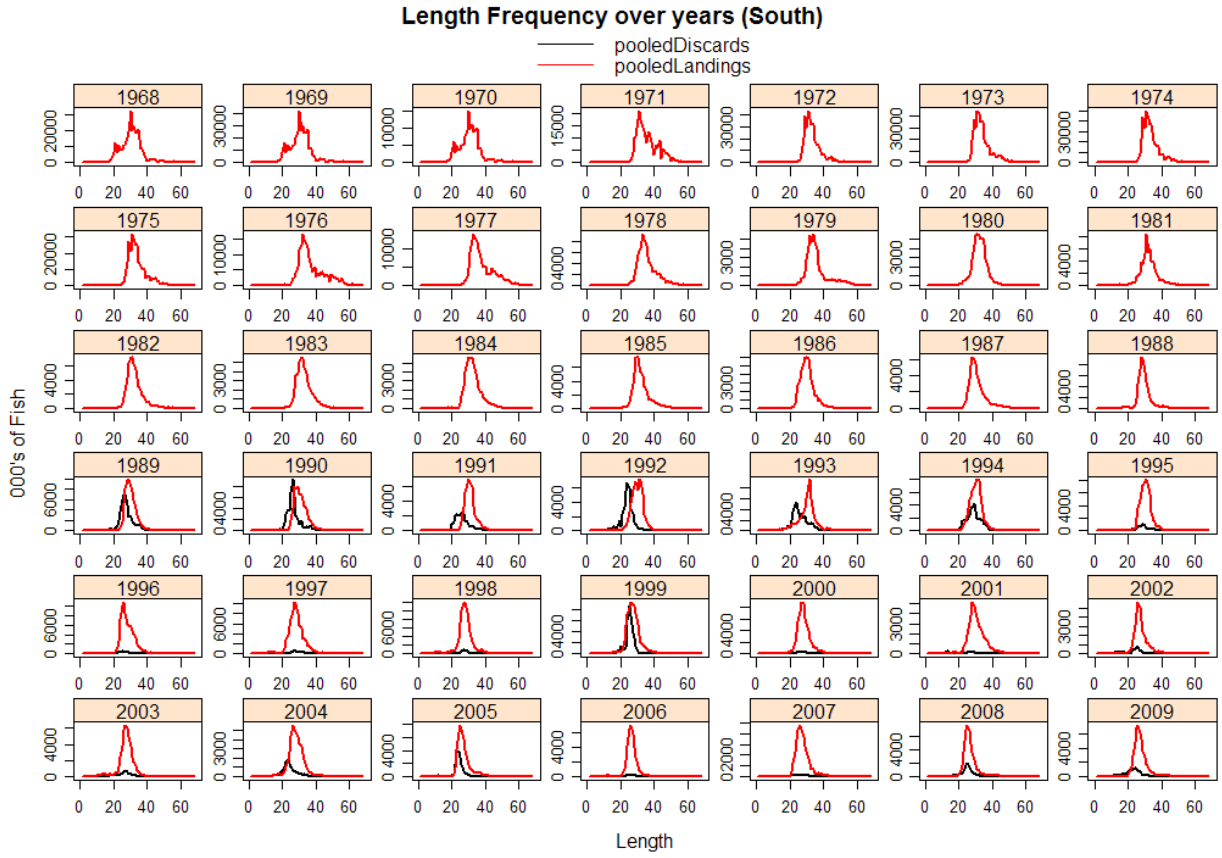


Figure D9. Length frequencies for silver hake for the southern region, landings and discards.

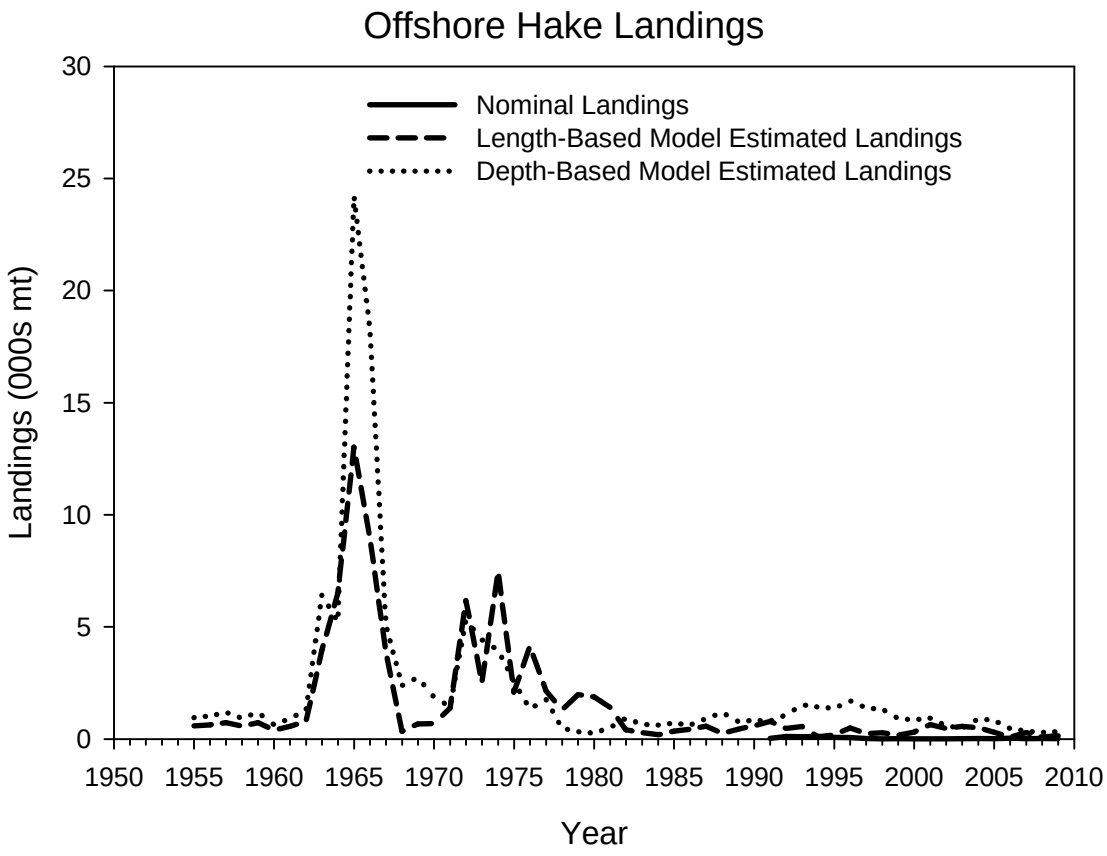
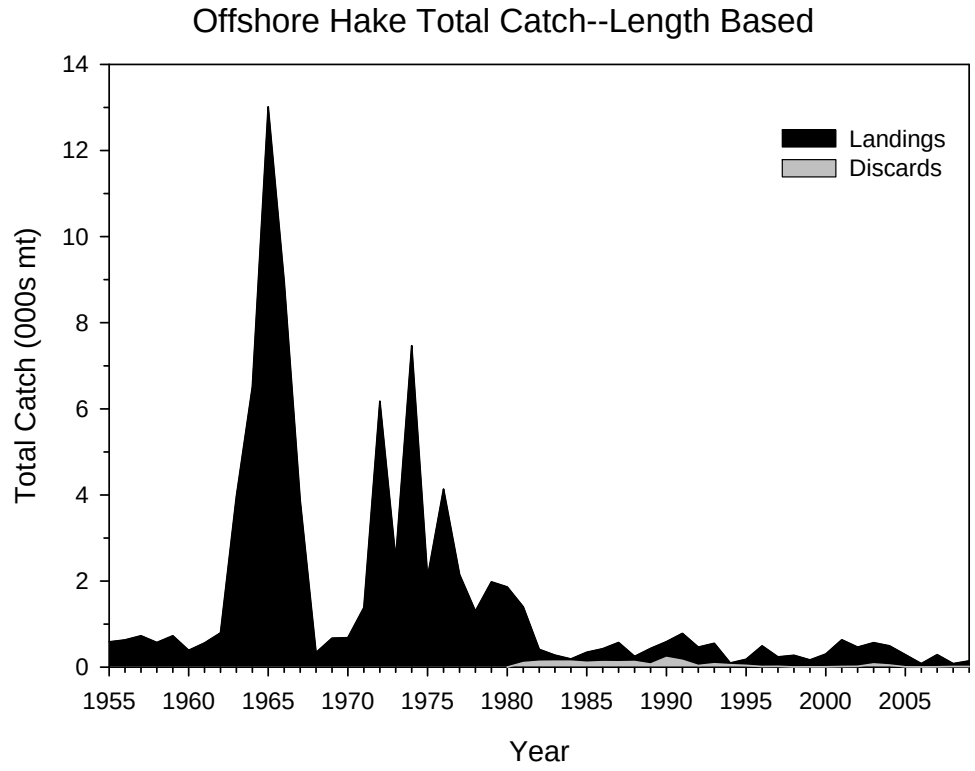


Figure D10. Comparison of nominal landings with the two model-based estimates for offshore hake from the southern stock.

Figure D11. Length-based total catch landings and discards for offshore hake, 1955-2009.



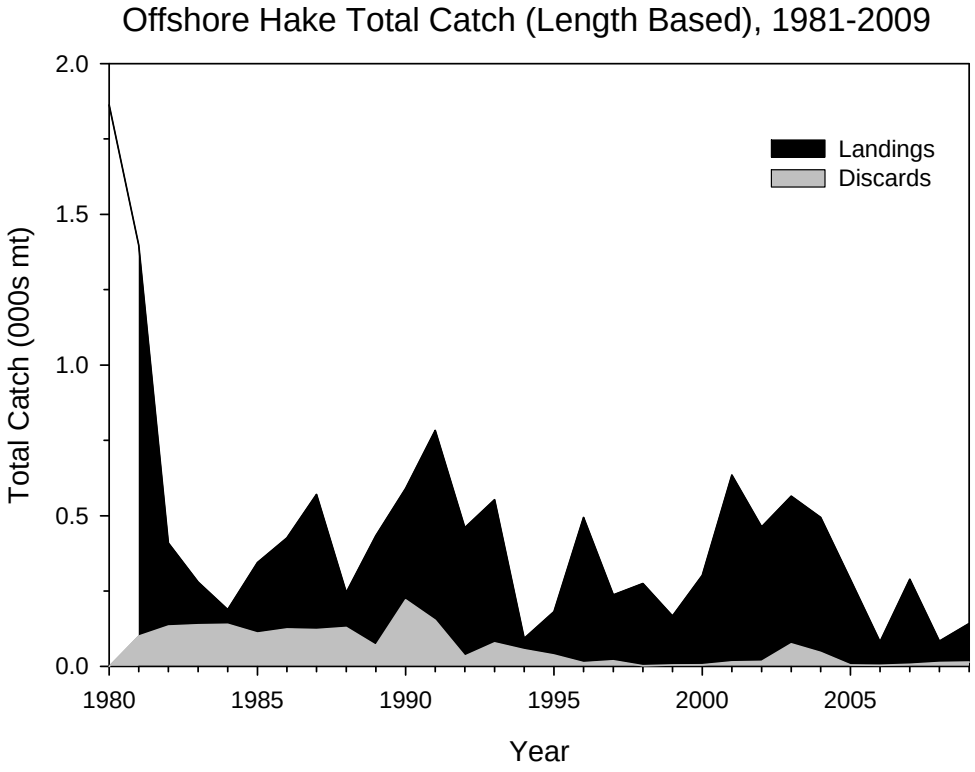
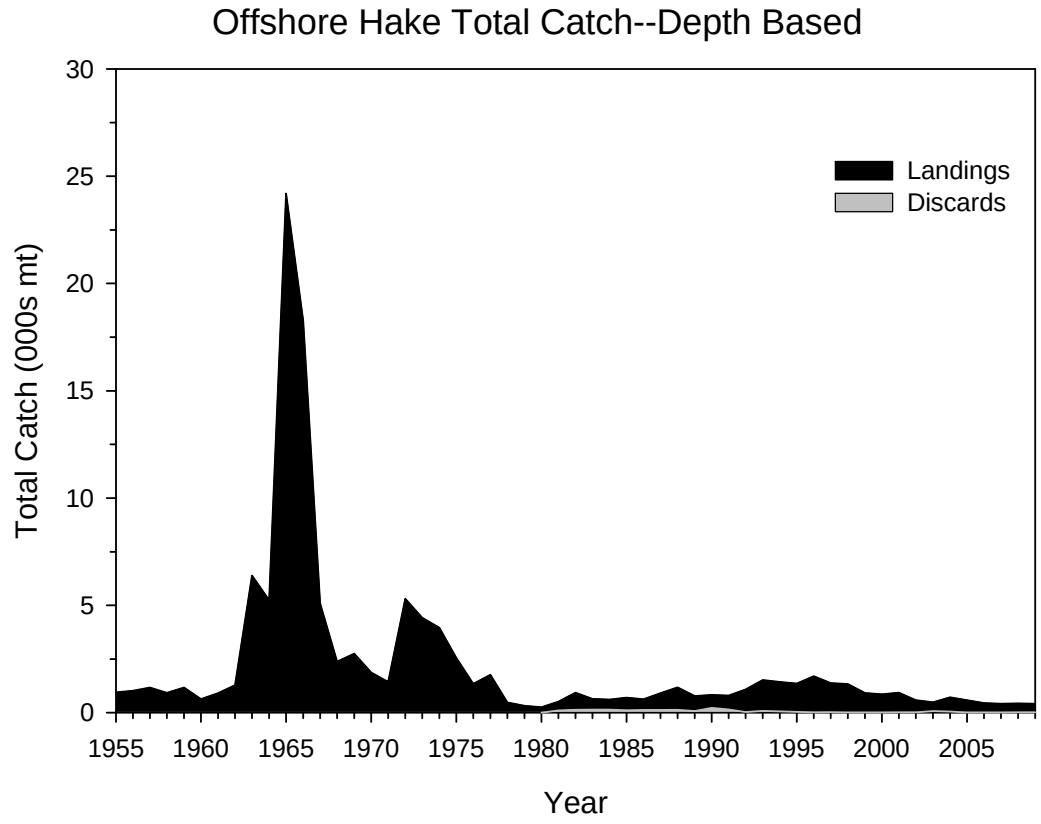


Figure D12. Depth-based total catch landings and discards for offshore hake, 1955-2009.



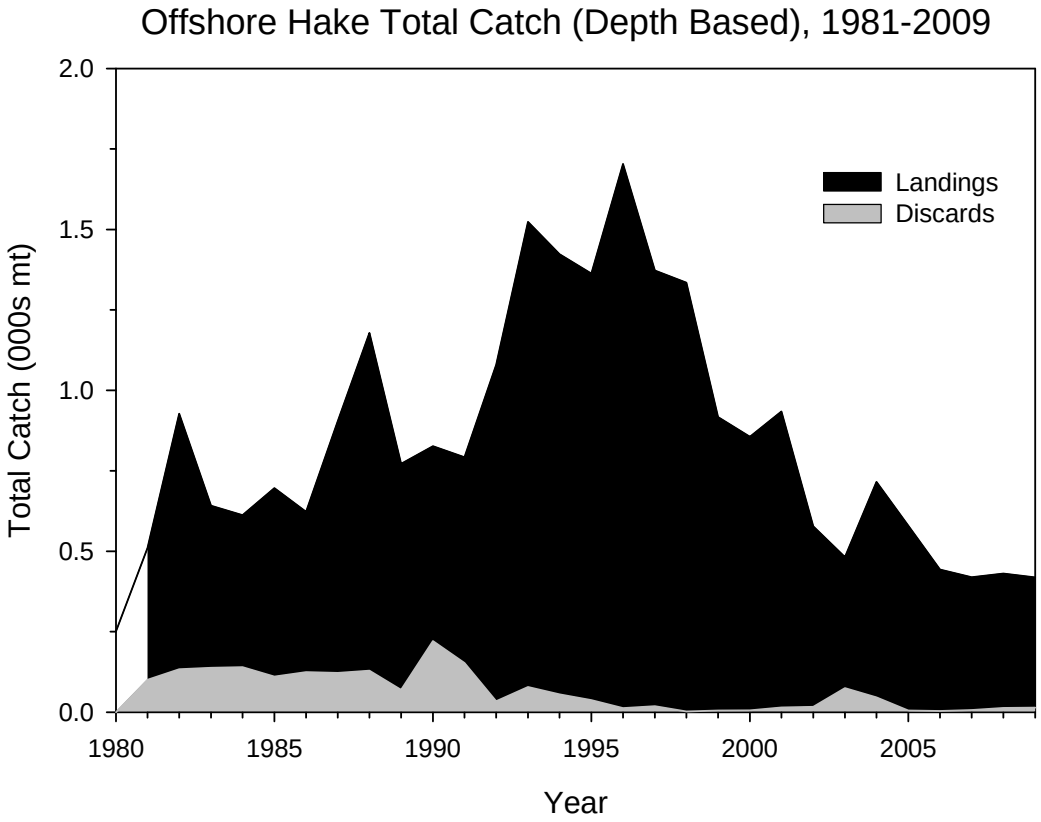


Figure D13.Comparison of the arithmetic and delta transformed mean weight per tow from the fall survey.

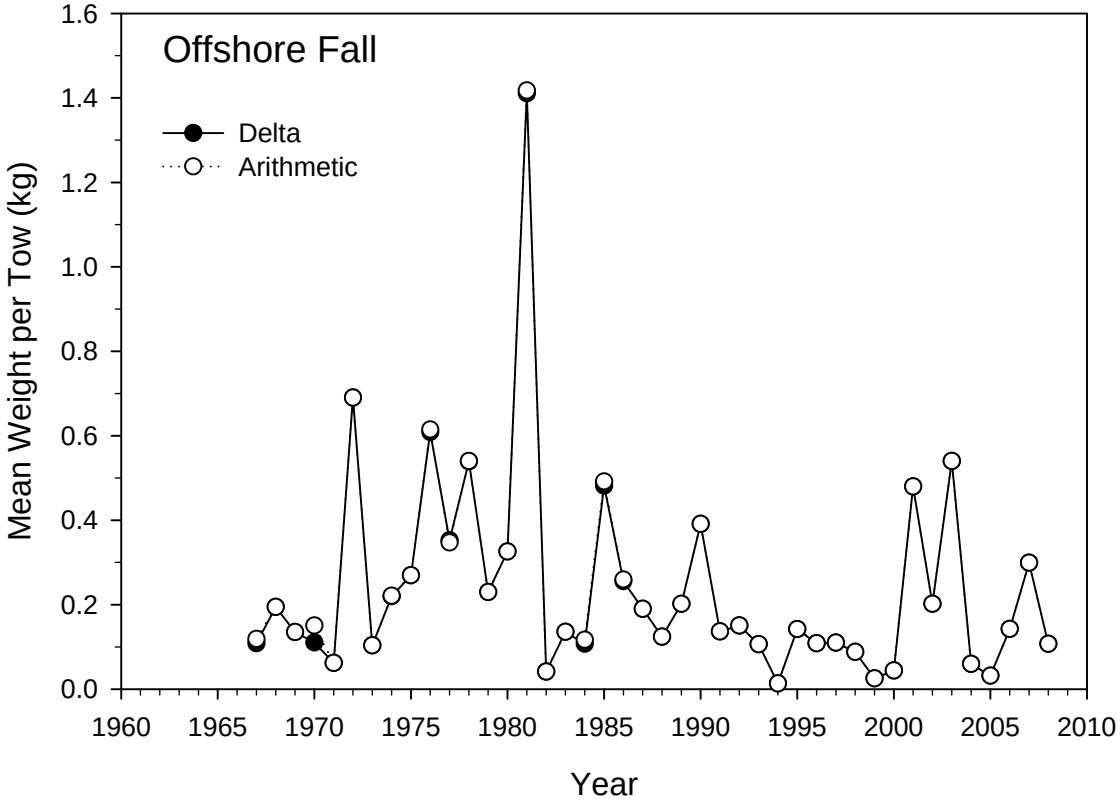
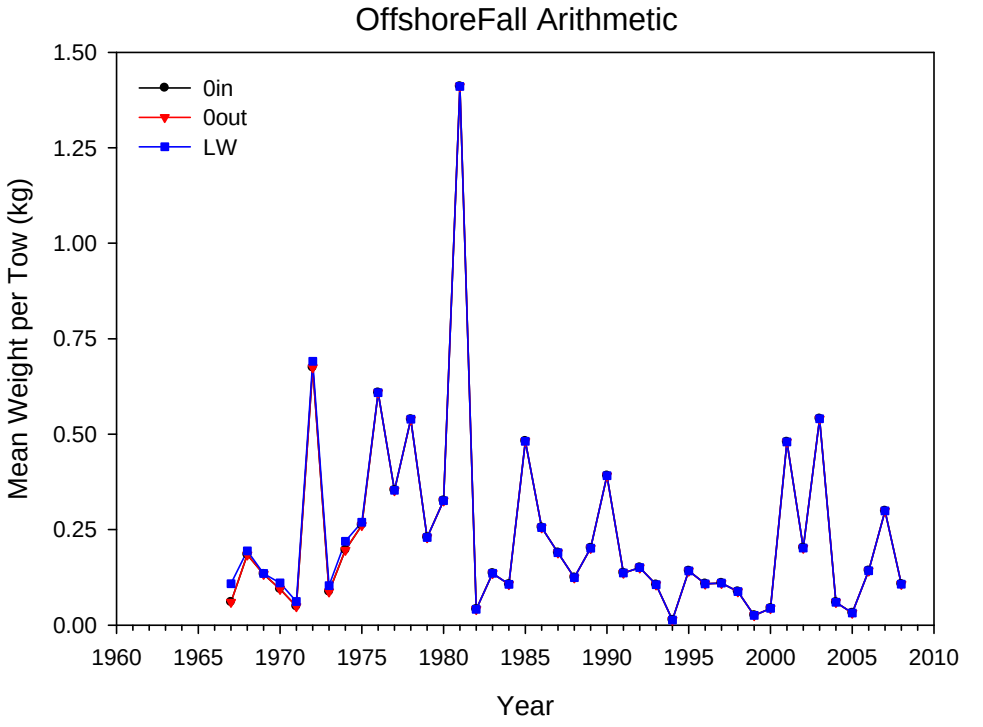
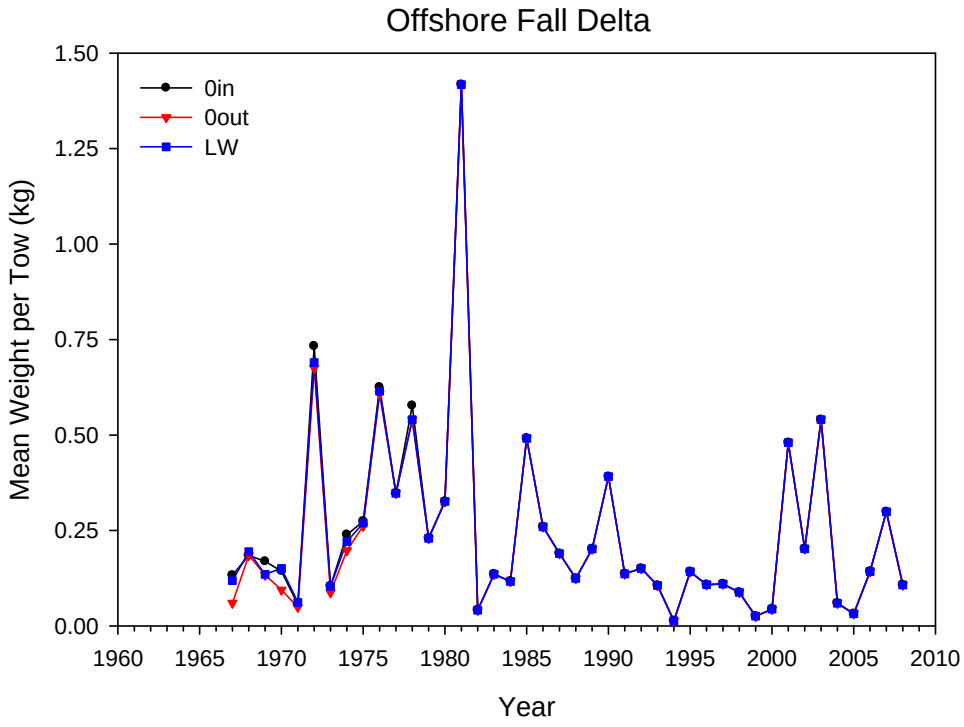


Figure D14. Comparison of the arithmetic and delta transformed mean weight per tow from the fall survey with three methods of handling missing weight data.





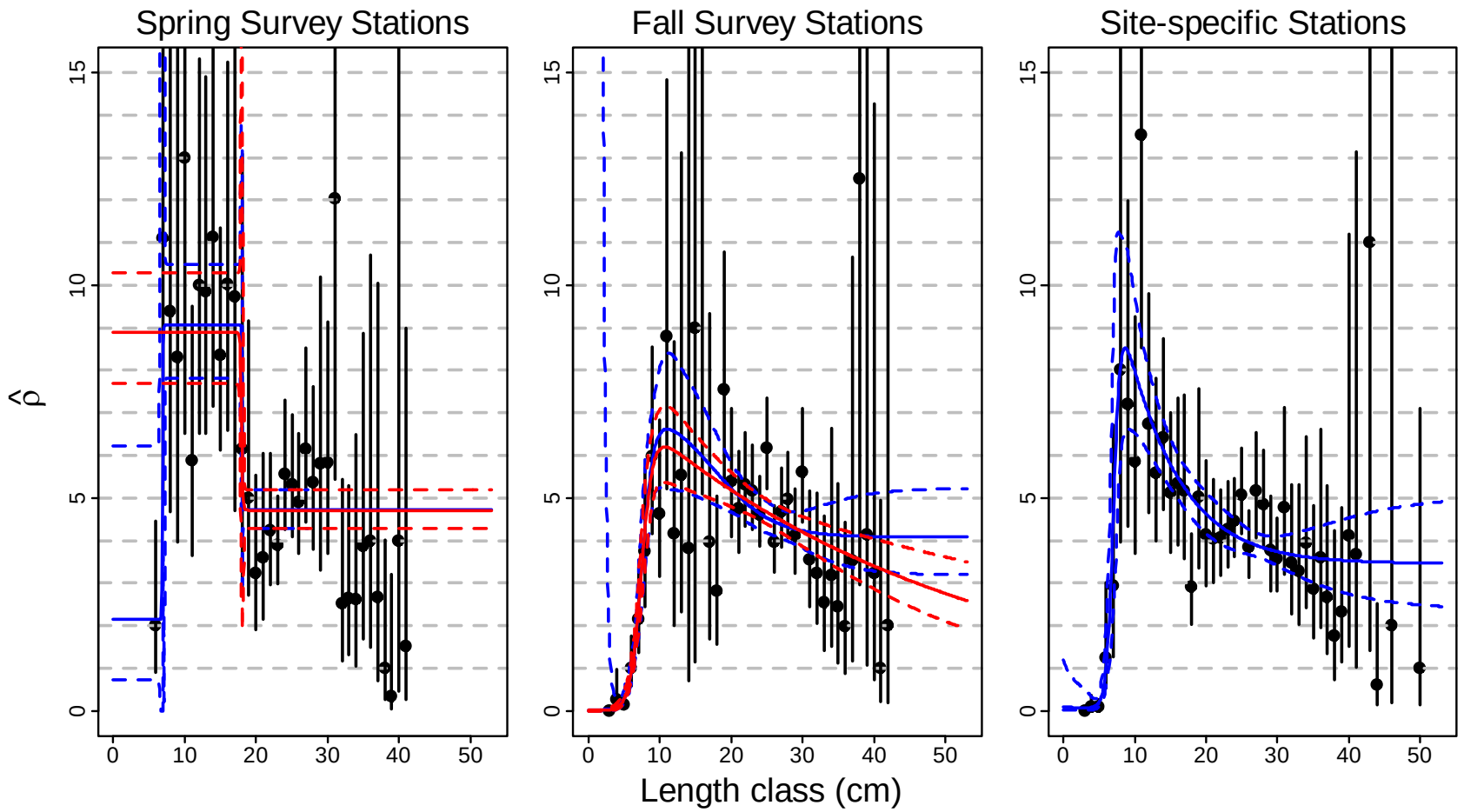


Figure D15. Beta-binomial based estimates of calibration factors and corresponding 95% confidence intervals by length class (1 cm bins) for **silver hake**. The black points and vertical bars represent results where different calibration factors are estimated for each length class. The blue lines represent results from fully parameterized double-logistic models. For the spring, the red lines represent results for a (single) logistic model whereas they represent results for a double logistic model with no minima for the ascending or descending logistic function for the fall.

Figure D16. Stratified mean number (top) and weight (kg) per tow of offshore hake for the NEFSC fall surveys, 1967-2009.

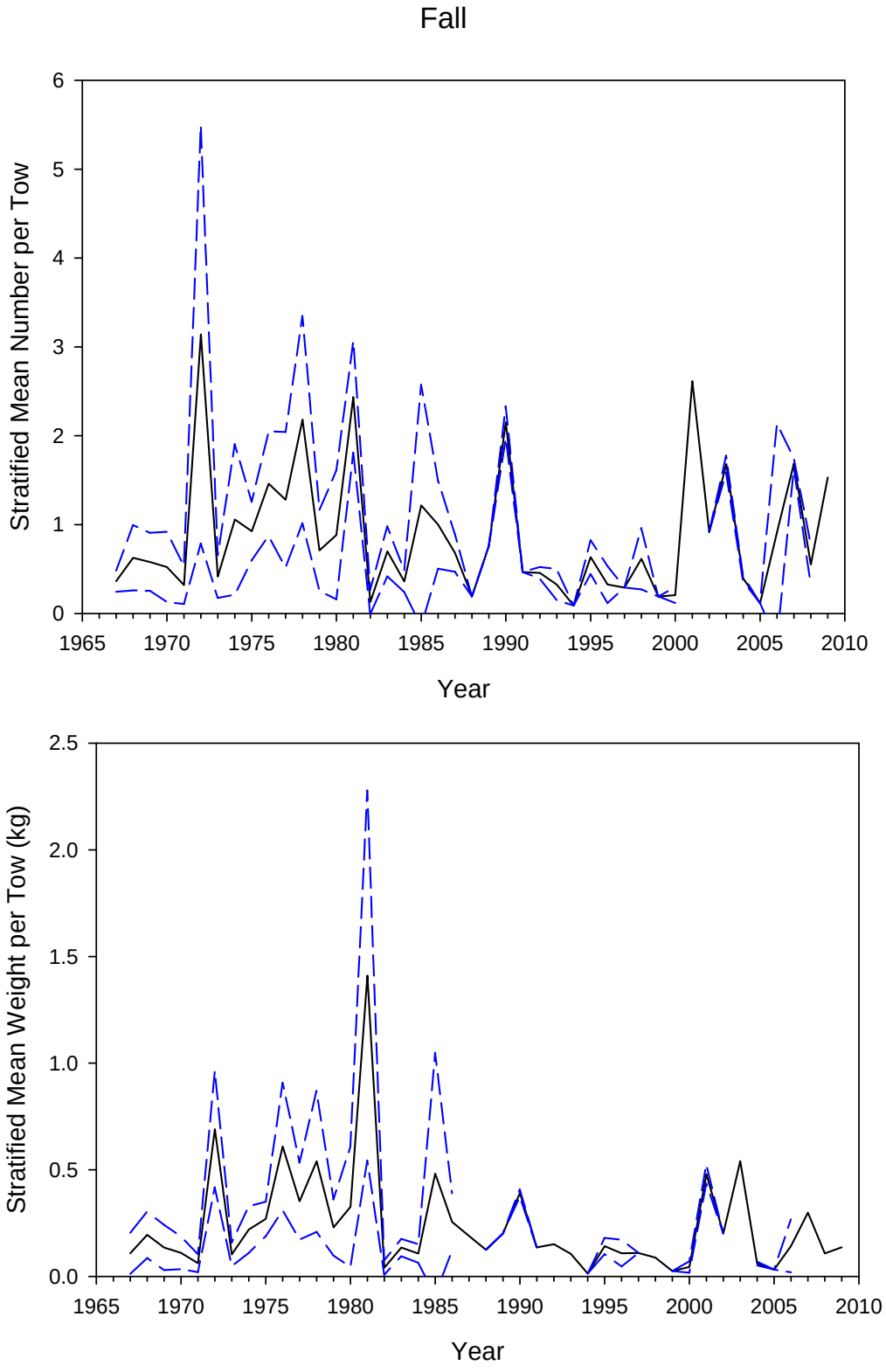


Figure D17. Swept area abundance (millions, top) and biomass (kg, bottom) of offshore hake for the NEFSC fall surveys, 1967-2009.

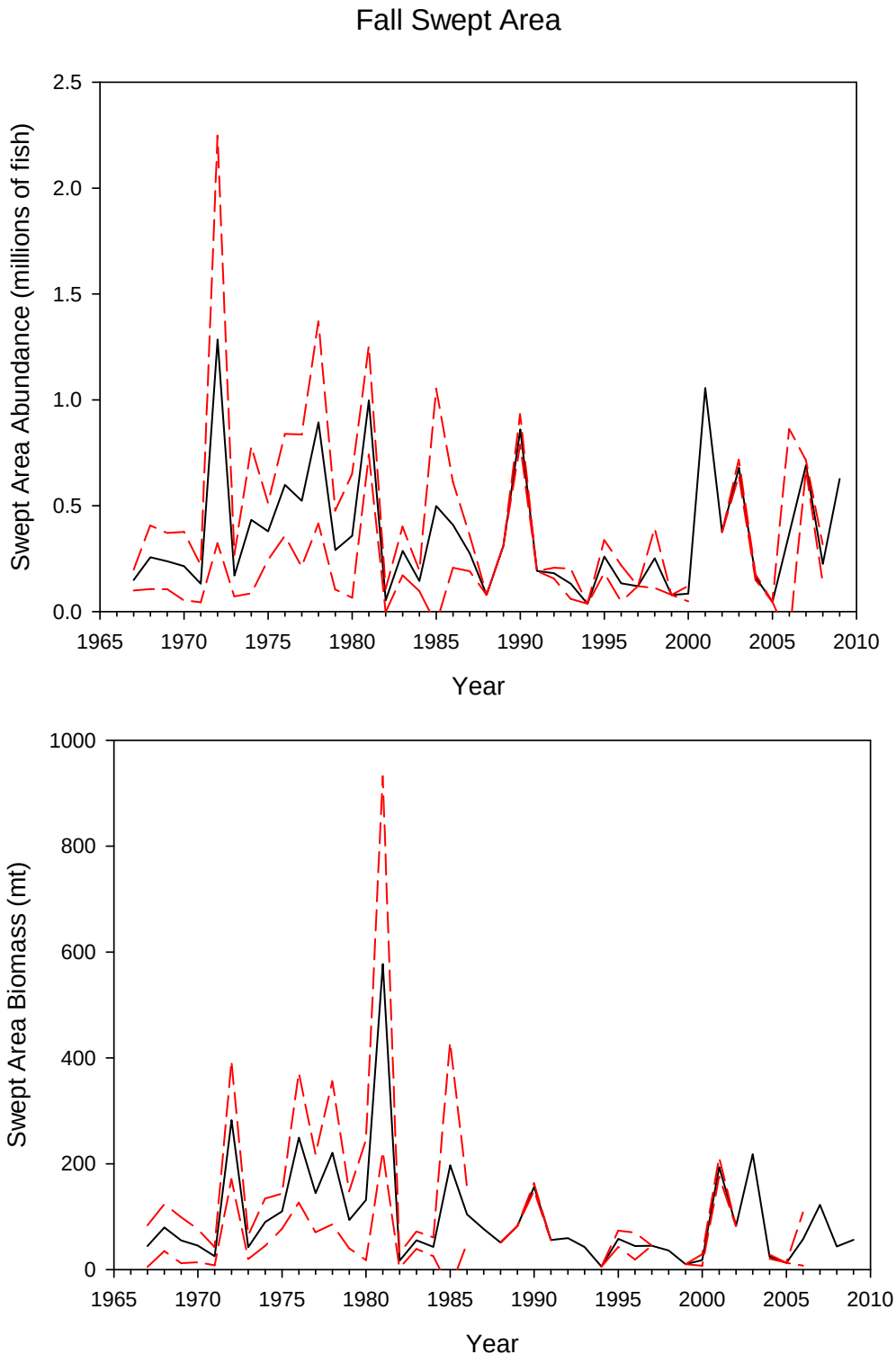


Figure D18. Stratified mean number (top) and weight (kg) per tow of offshore hake for the NEFSC spring surveys, 1968-2010.

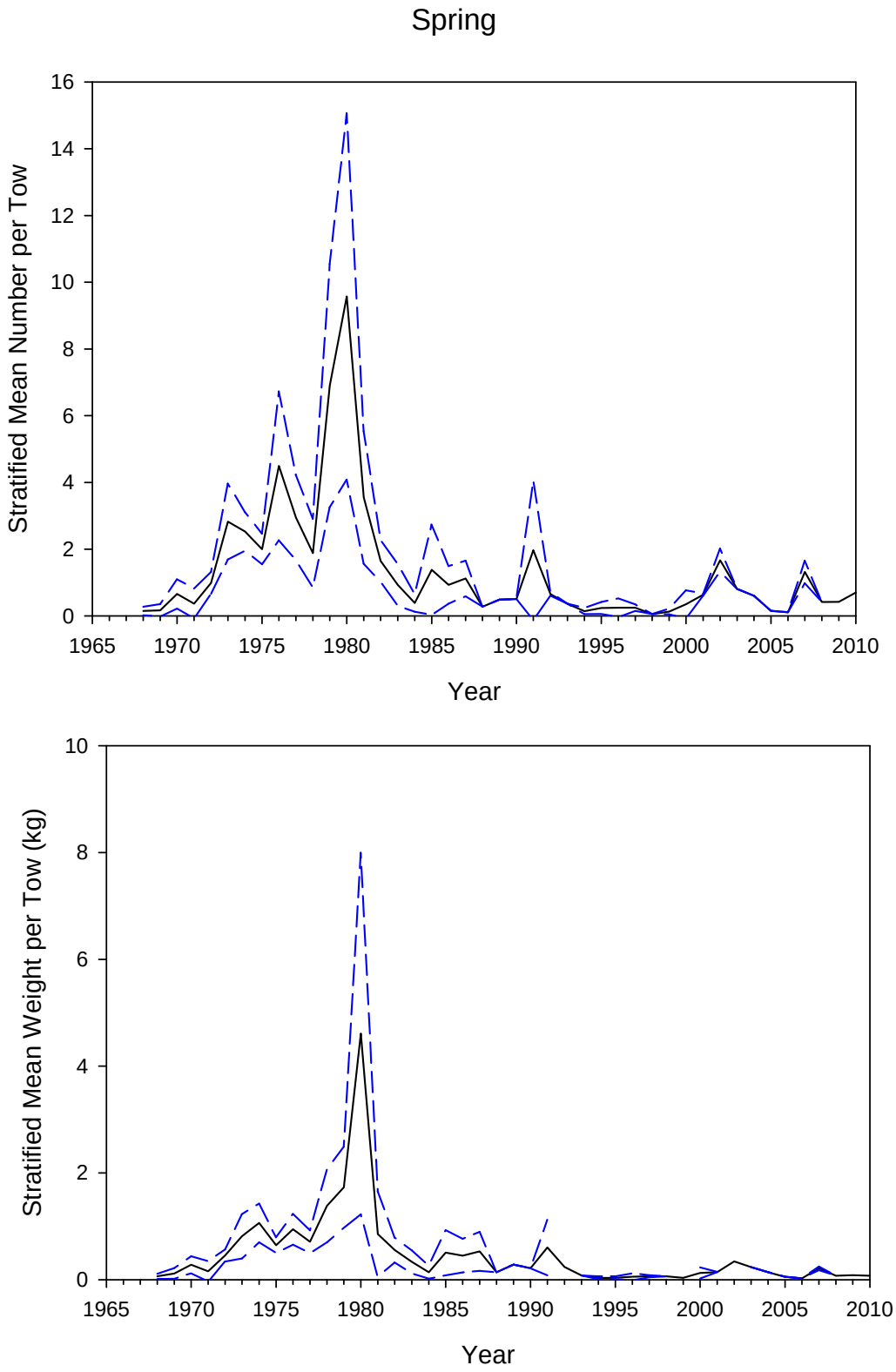


Figure D19. Swept area abundance (millions, top) and biomass (kg, bottom) of offshore hake for the NEFSC spring surveys, 1968-2010.

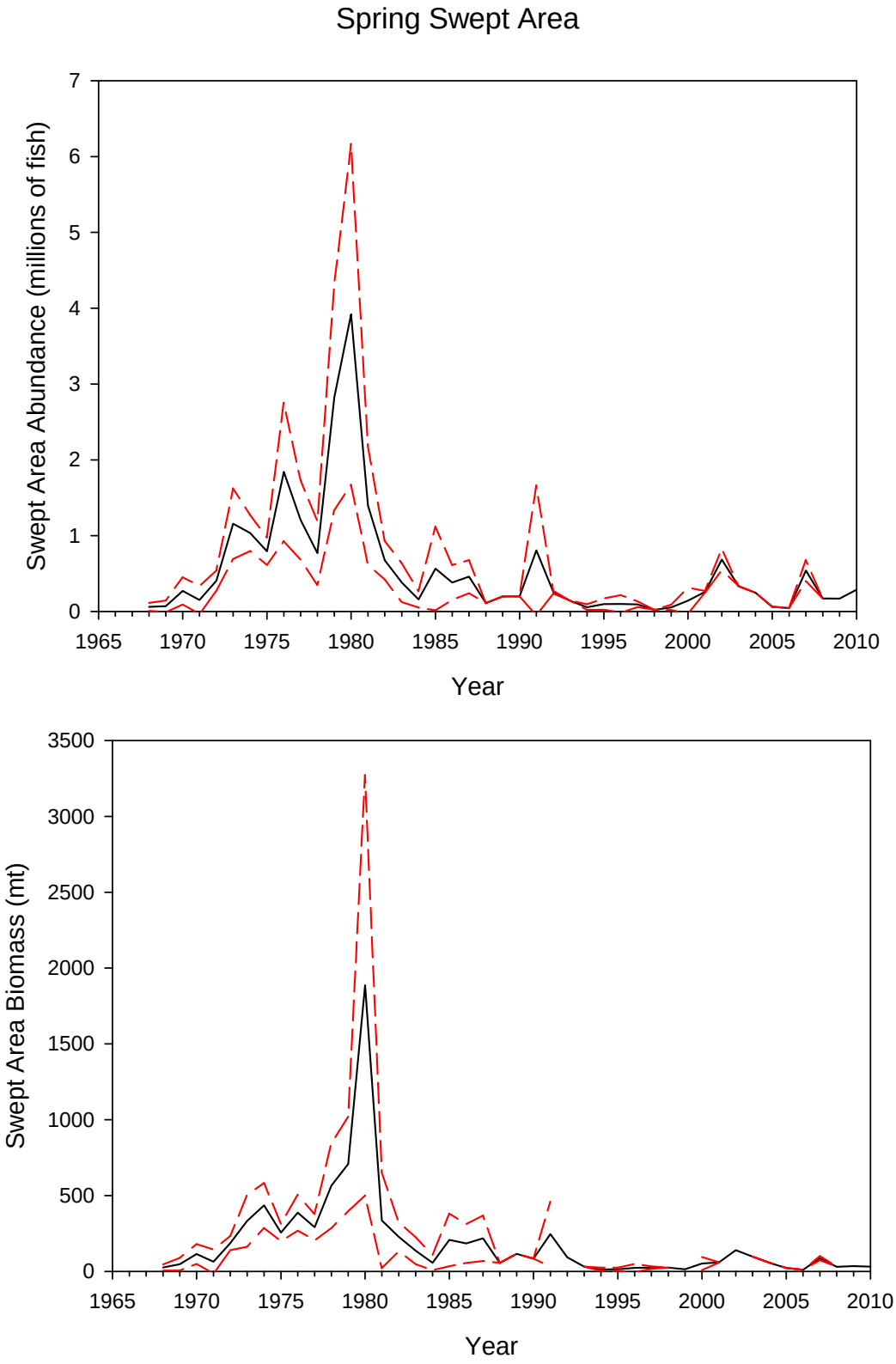


Figure D20. Stratified mean number (top) and weight (kg) per tow of offshore hake for the NEFSC winter surveys, 1998-2007.

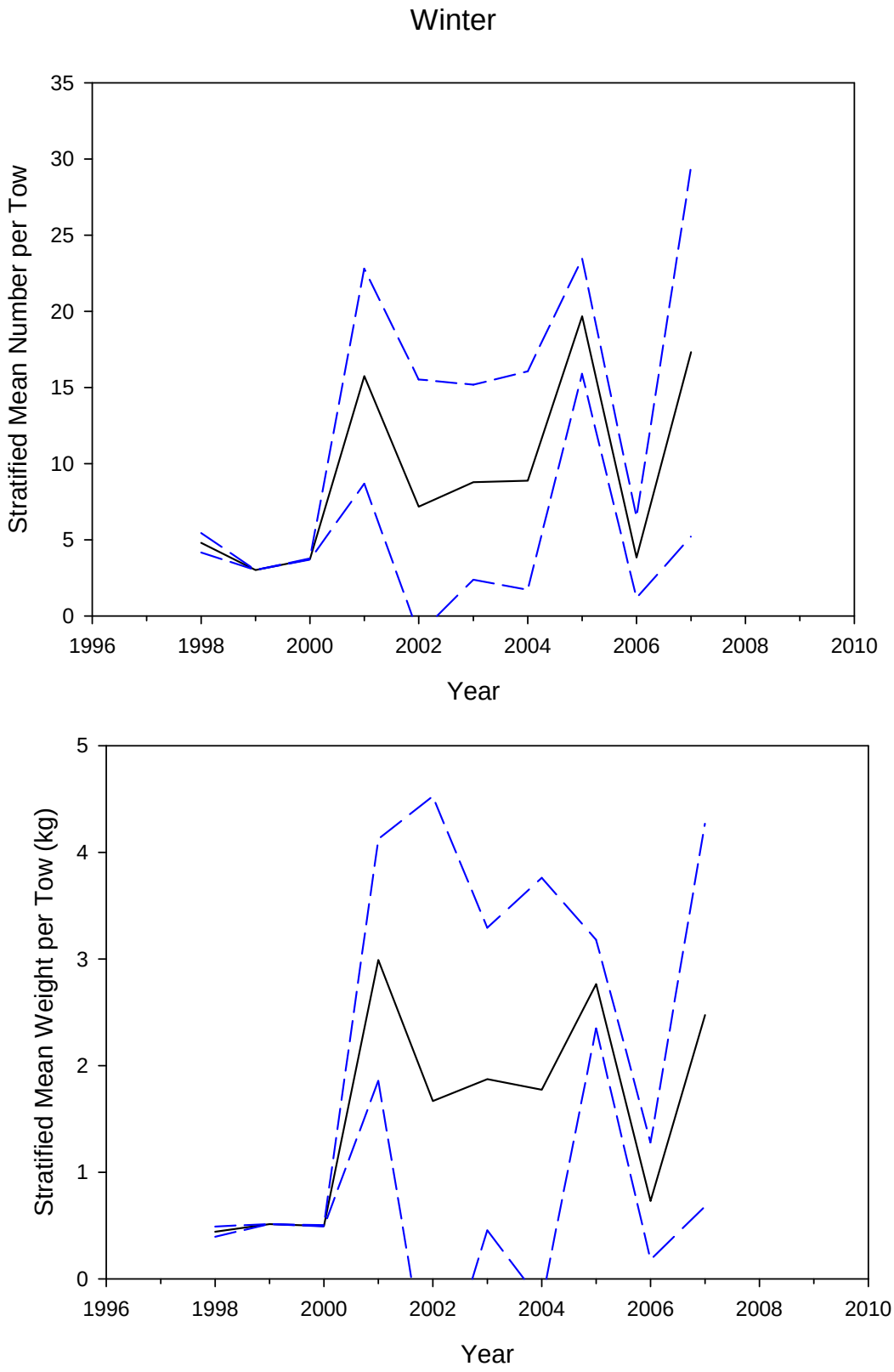
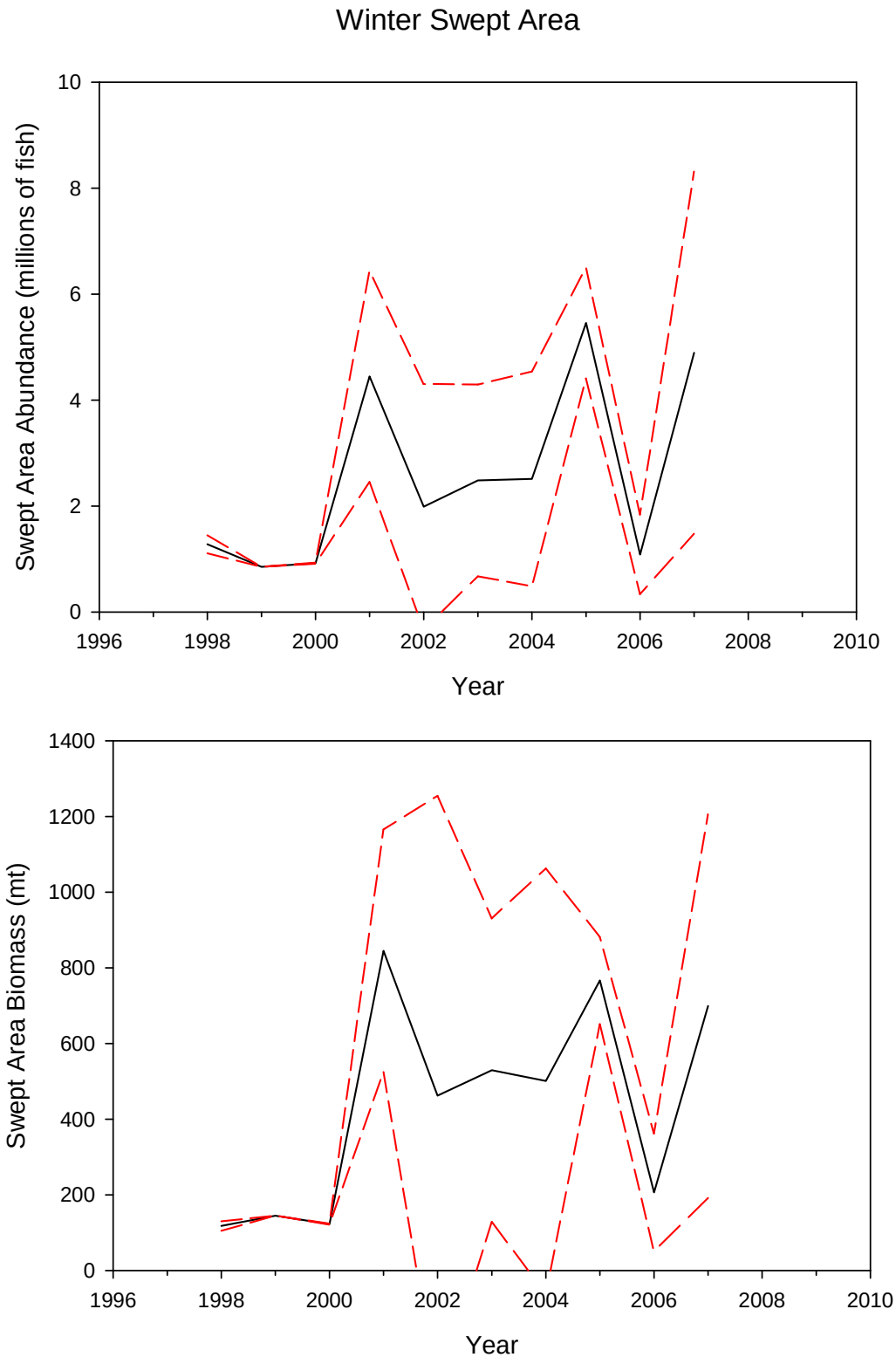


Figure D21. Swept area abundance (millions, top) and biomass (kg, bottom) of offshore hake for the NEFSC winter surveys, 1998-2007.



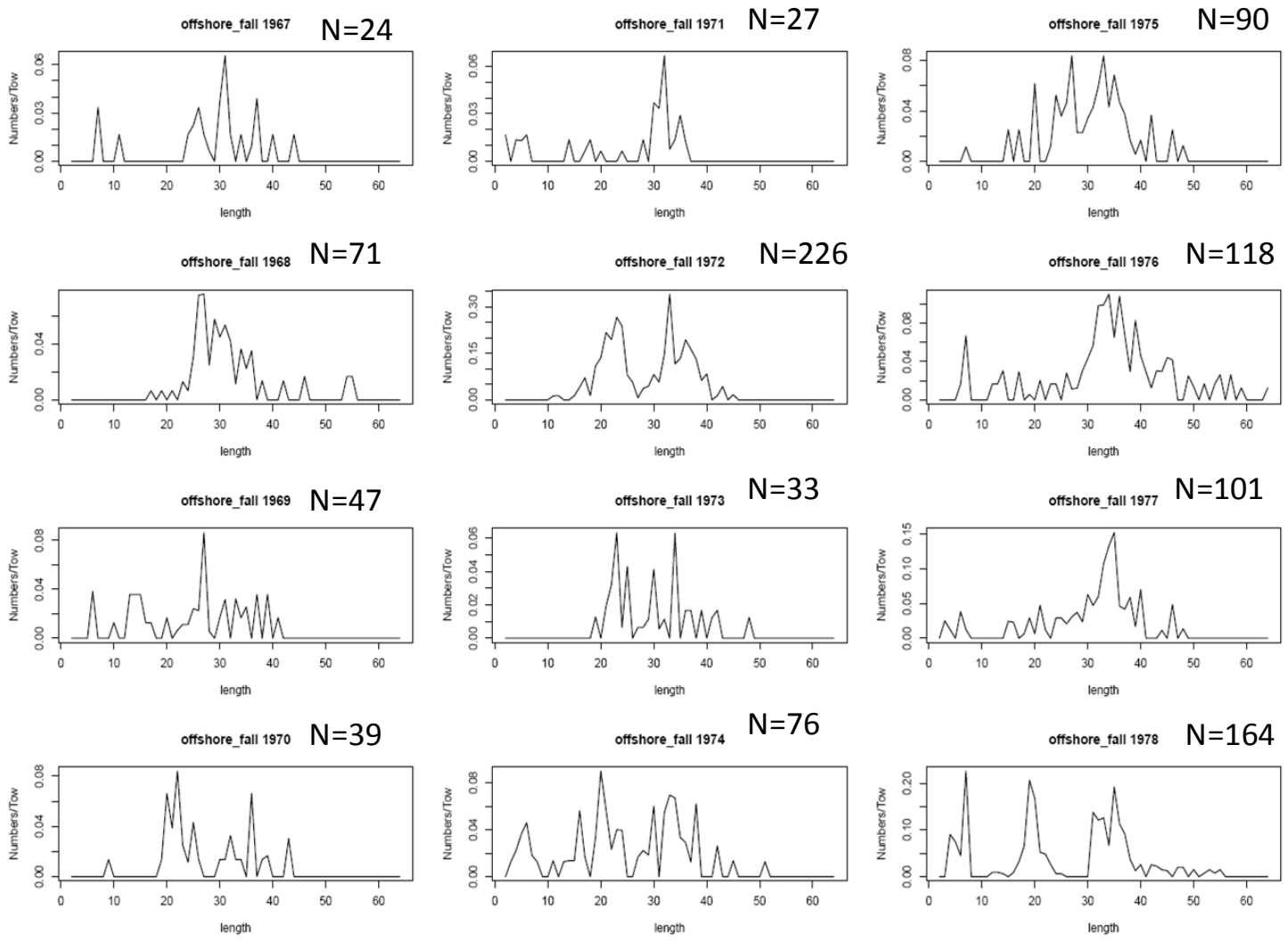


Figure D22a. Length composition (stratified mean number per tow) of offshore hake for the fall survey, 1967-2009.

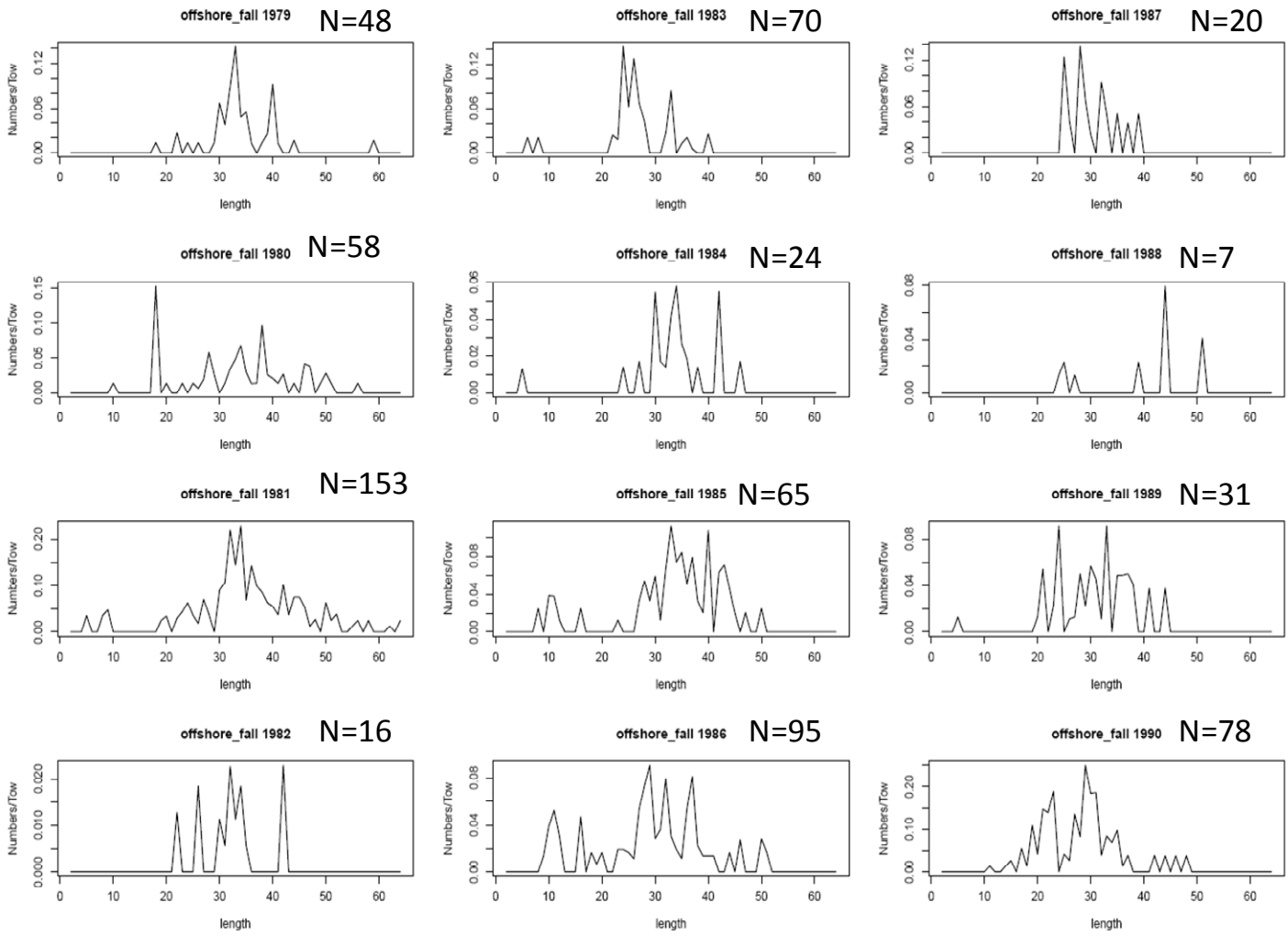


Figure D22b. Length composition (stratified mean number per tow) of offshore hake for the fall survey, 1967-2009.

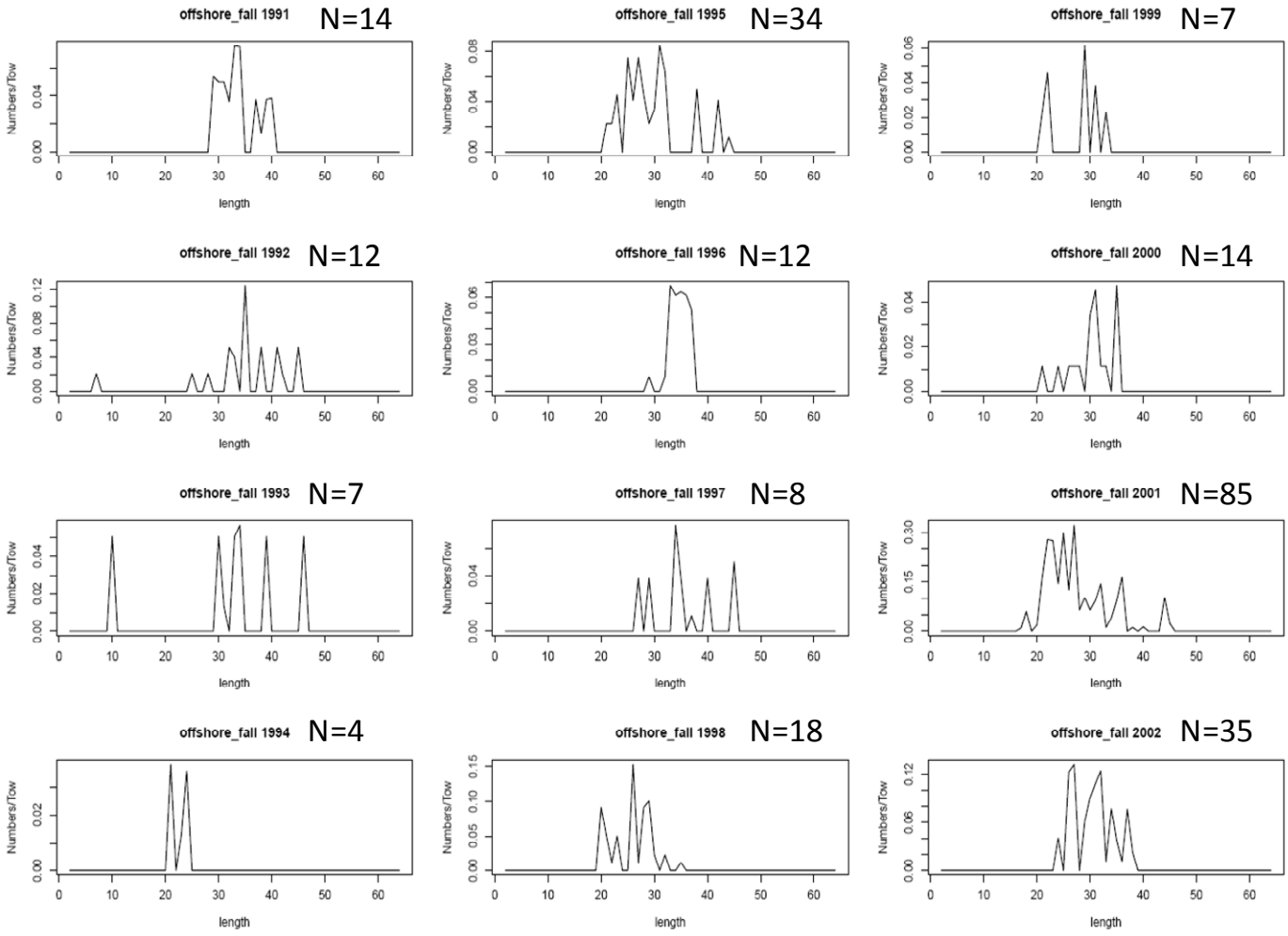


Figure D22c. Length composition (stratified mean number per tow) of offshore hake for the fall survey, 1967-2009.

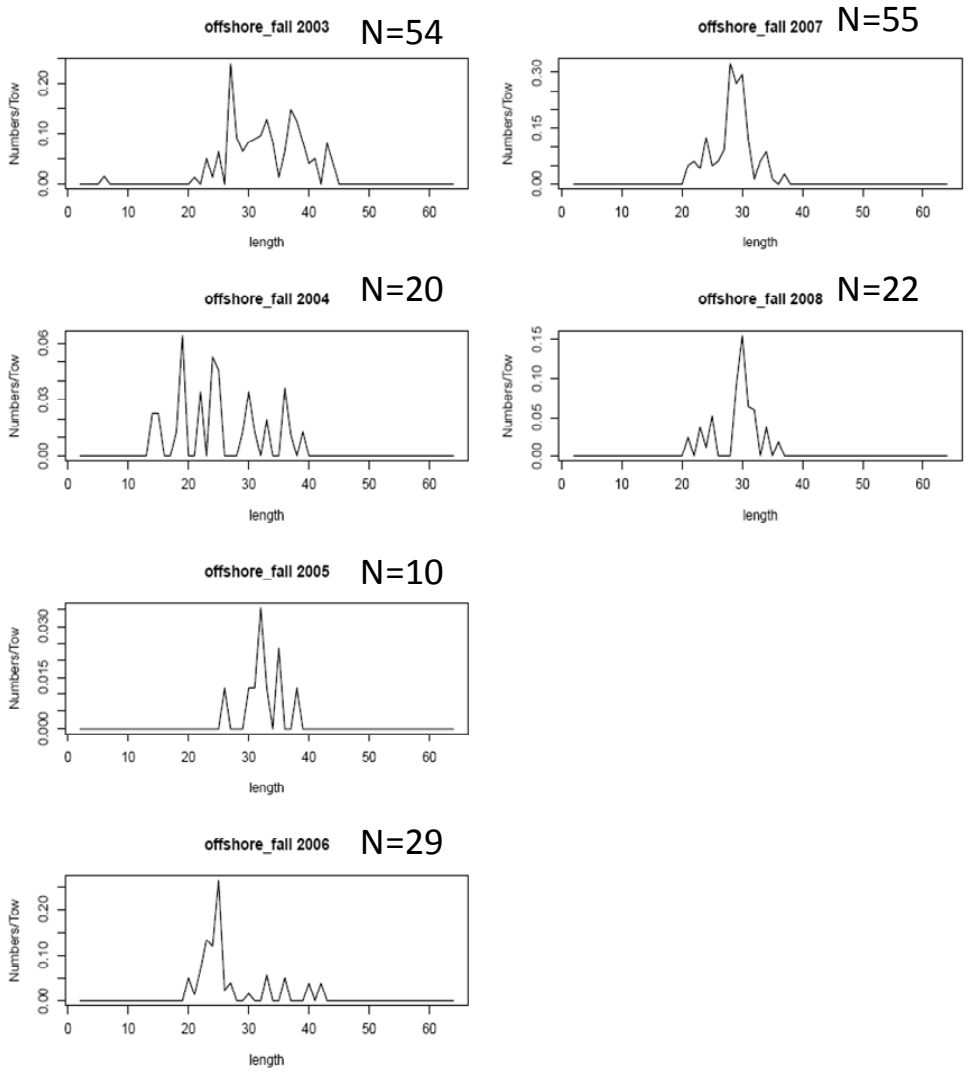


Figure D22d. Length composition (stratified mean number per tow) of offshore hake for the fall survey, 1967-2009.

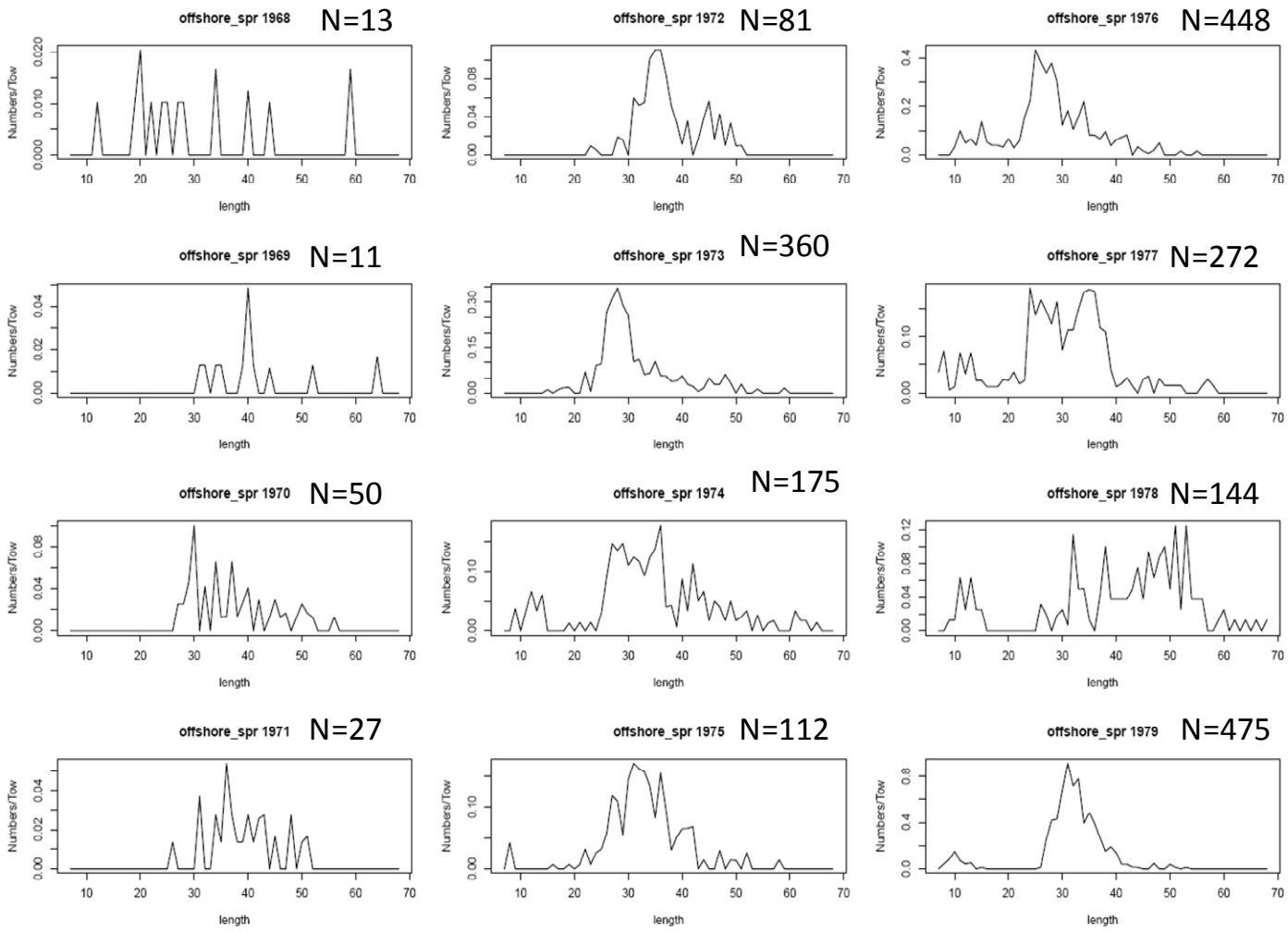


Figure D23a. Length composition (stratified mean number per tow) of offshore hake for the spring survey, 1968-2009.

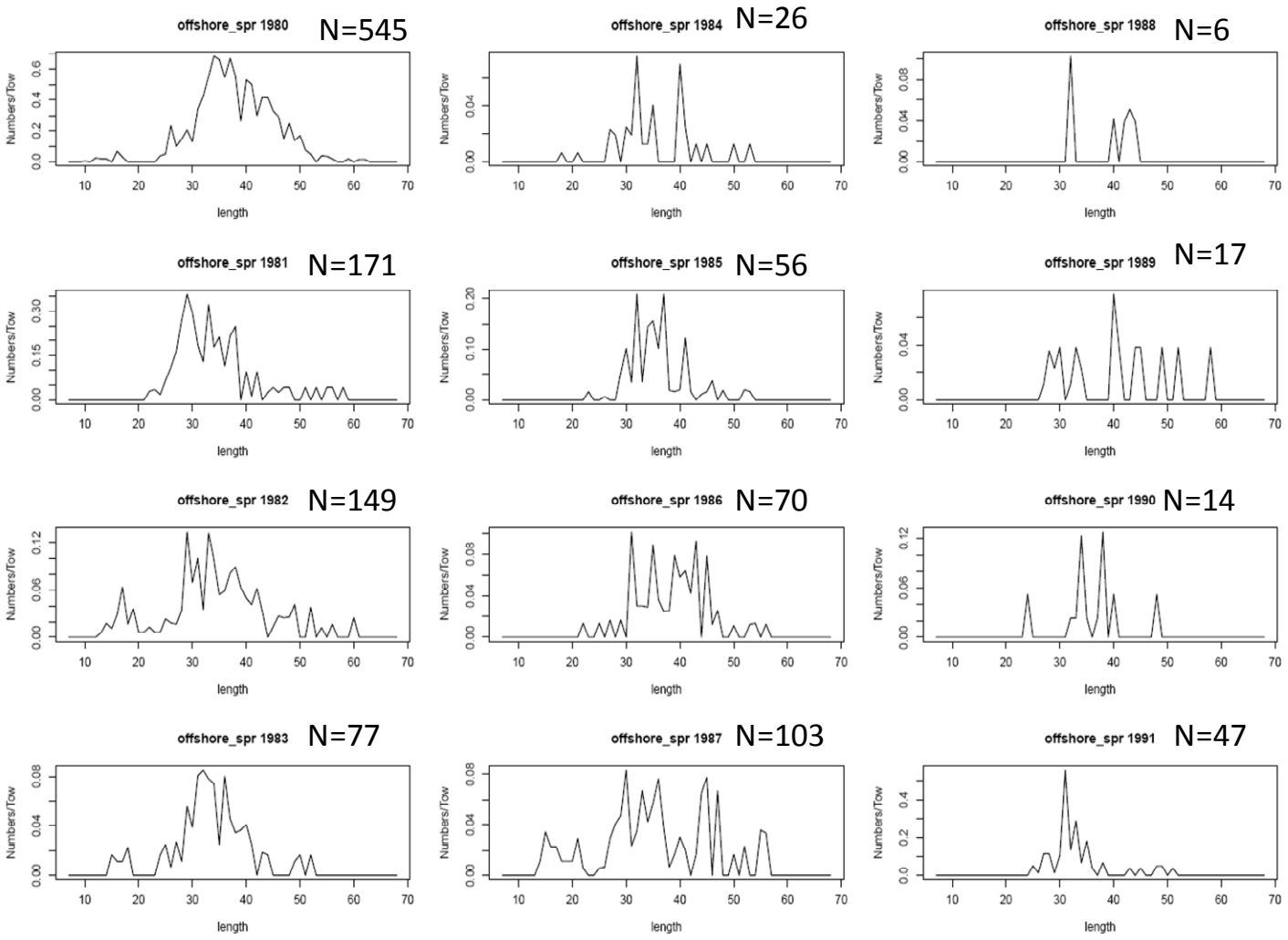


Figure D23b. Length composition (stratified mean number per tow) of offshore hake for the spring survey, 1968-2009.

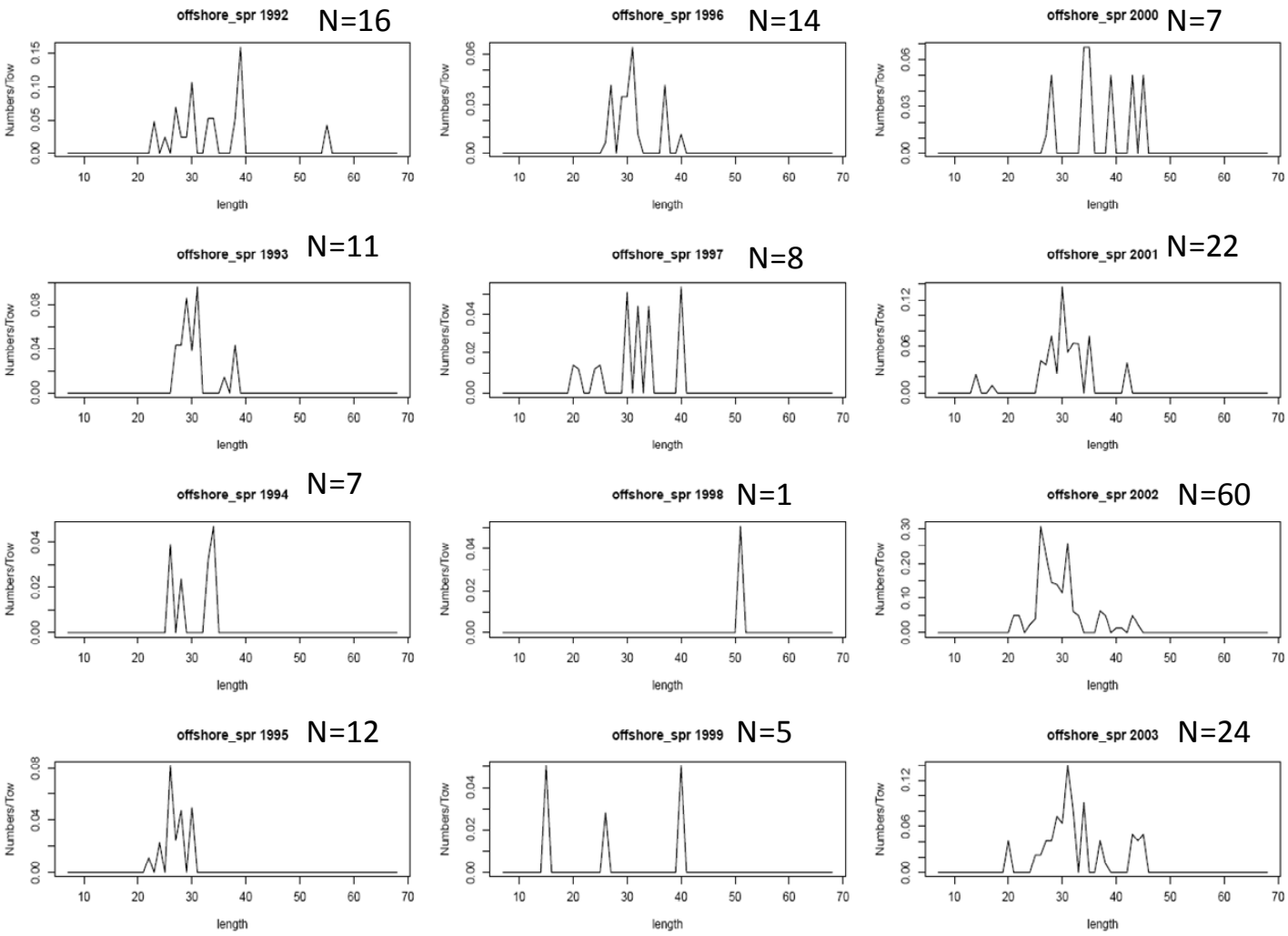


Figure D23c. Length composition (stratified mean number per tow) of offshore hake for the spring survey, 1968-2009.

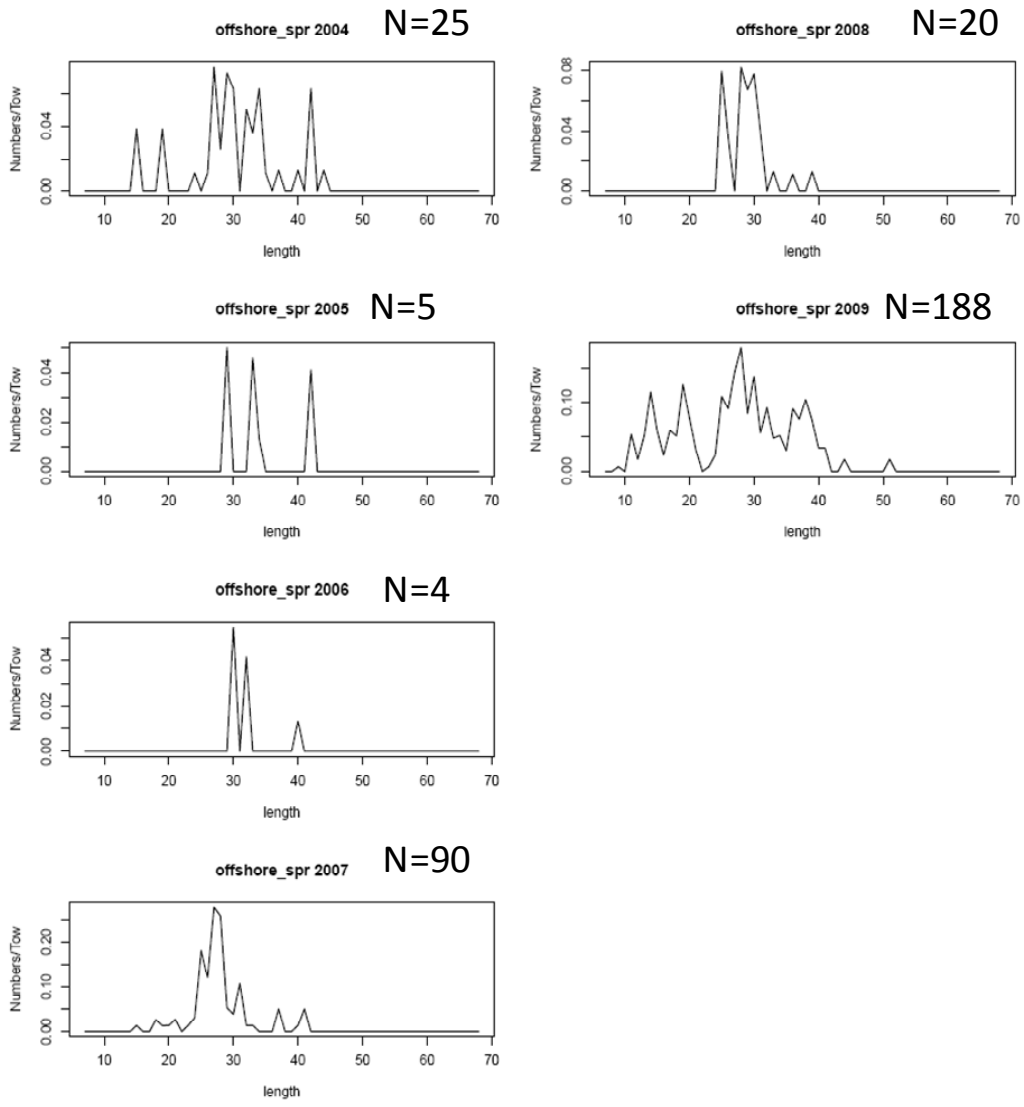


Figure D23d. Length composition (stratified mean number per tow) of offshore hake for the spring survey, 1968-2009.

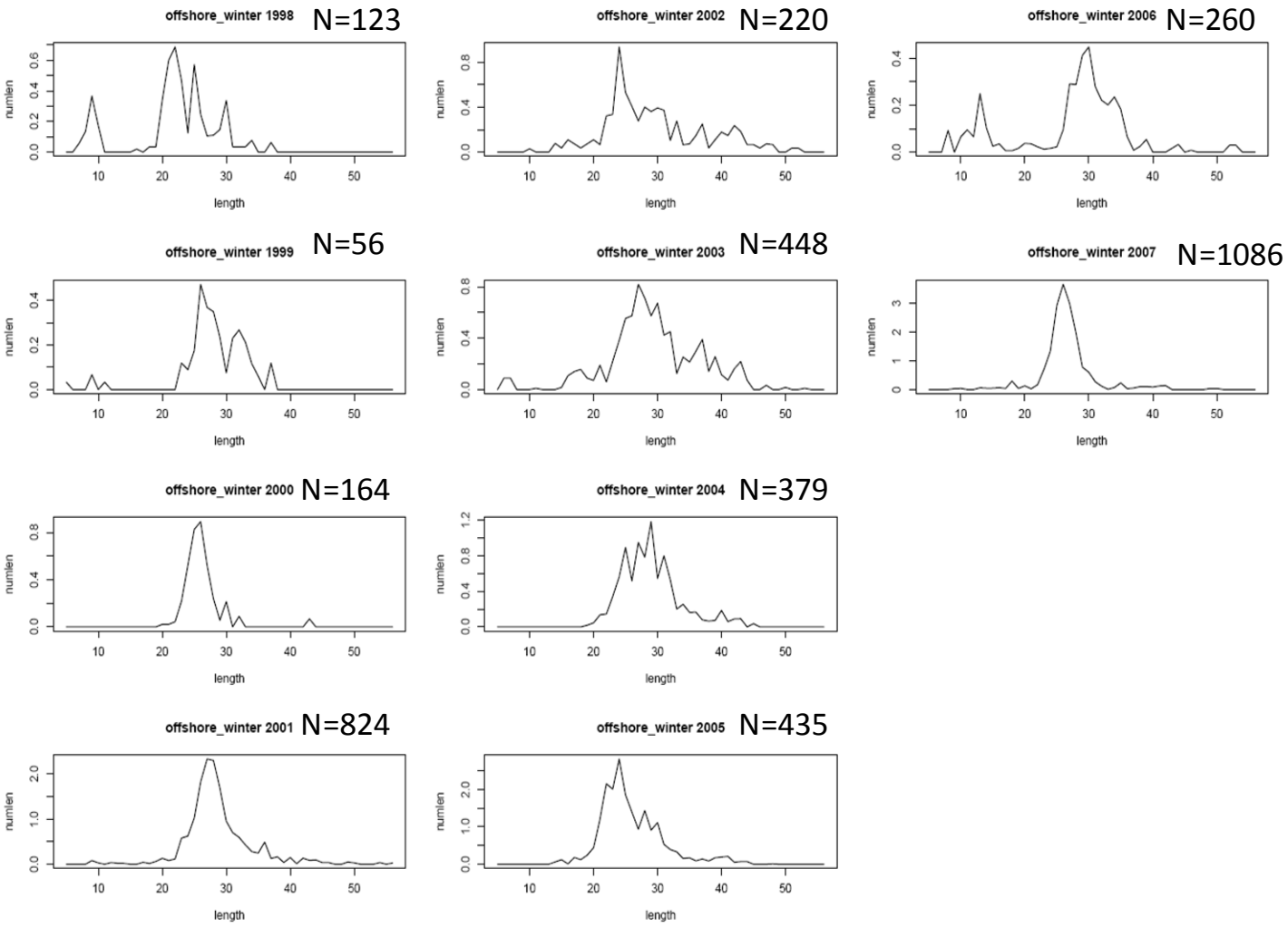


Figure D24. Length composition (stratified mean number per tow) of offshore hake for the winter survey, 1998-2007.

Figure D25a. Three-year moving average length composition (stratified mean number per tow) of offshore hake for the fall survey, 1969-2008.

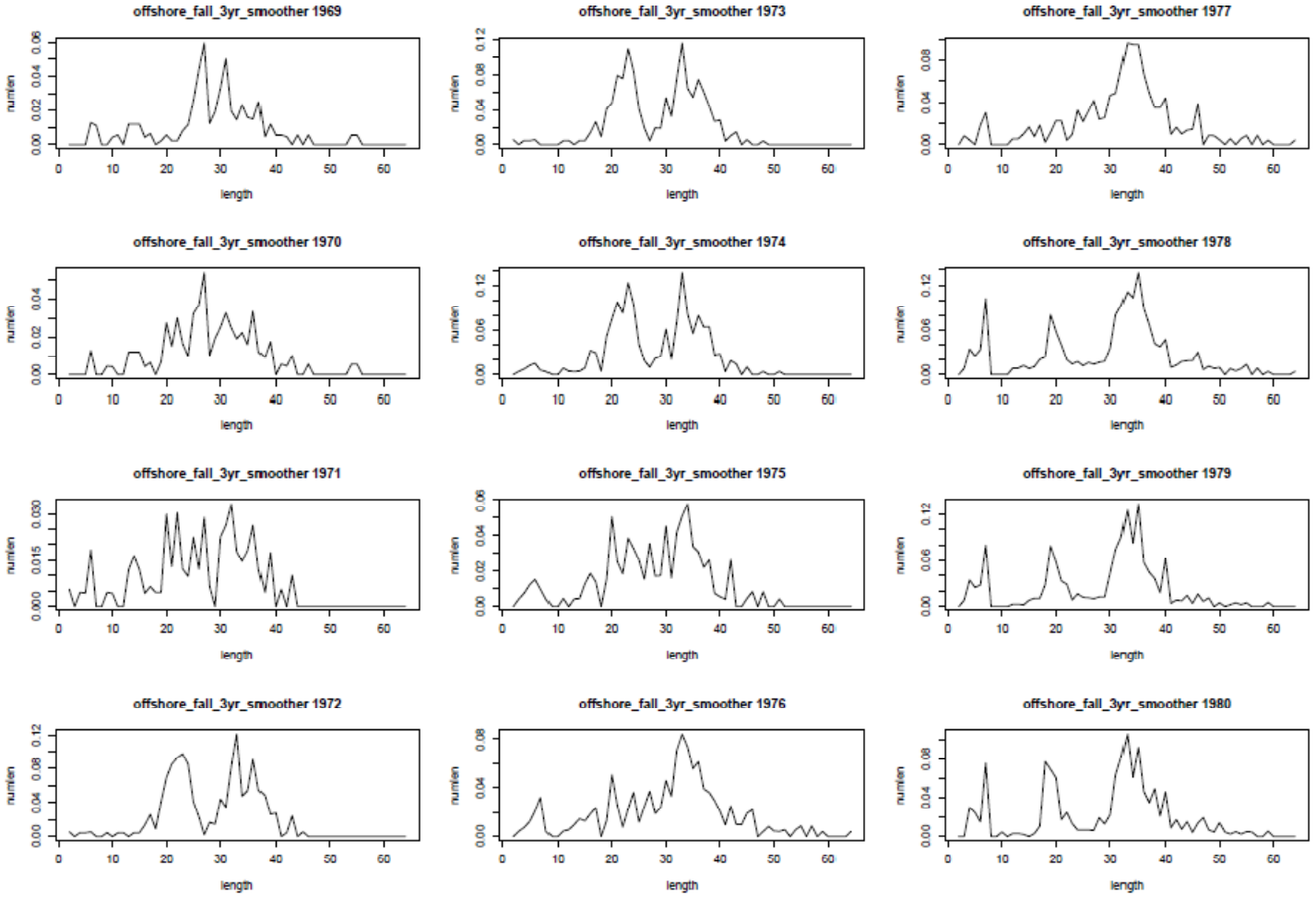


Figure D25b. Three-year moving average length composition (stratified mean number per tow) of offshore hake for the fall survey, 1969-2008.

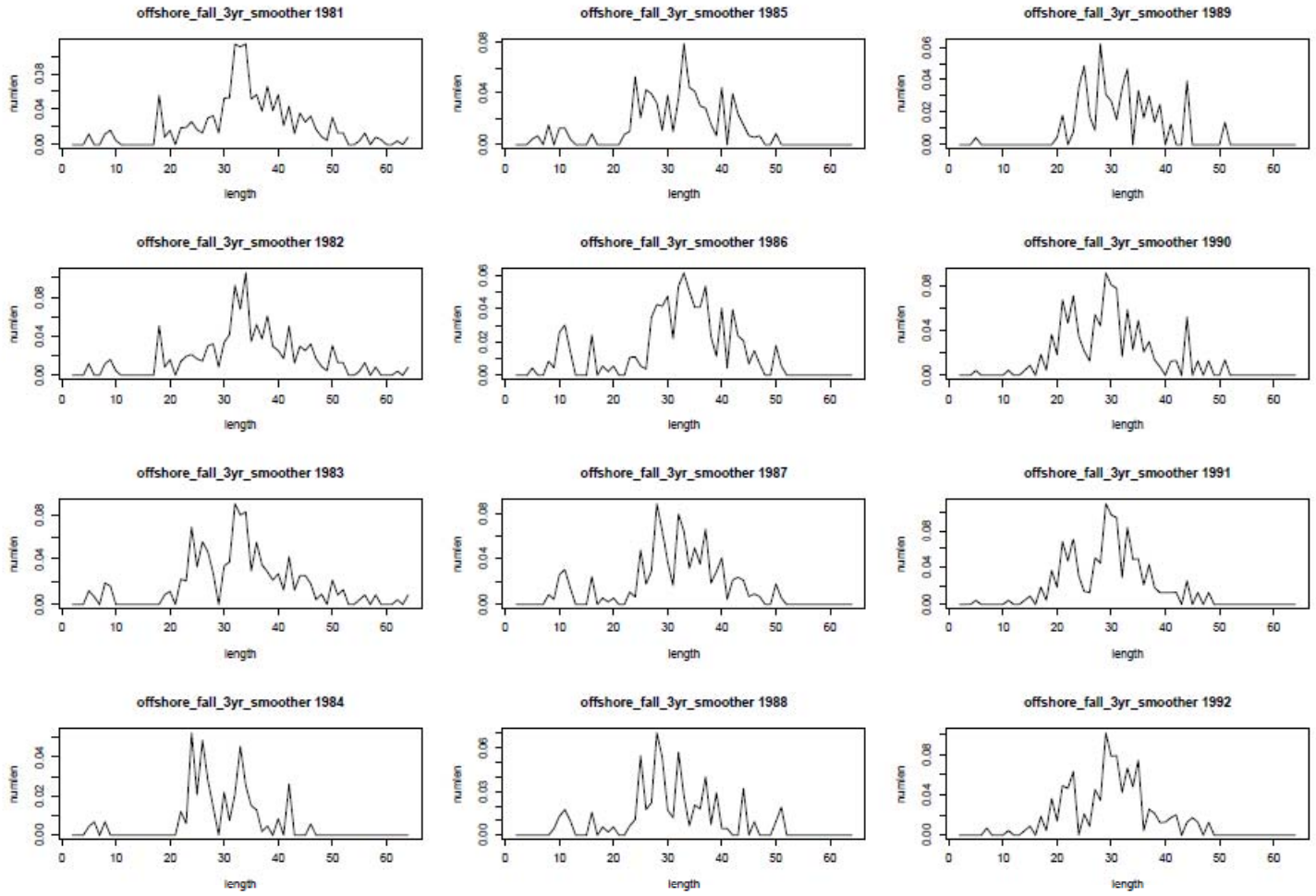


Figure D25c. Three-year moving average length composition (stratified mean number per tow) of offshore hake for the fall survey, 1969-2008.

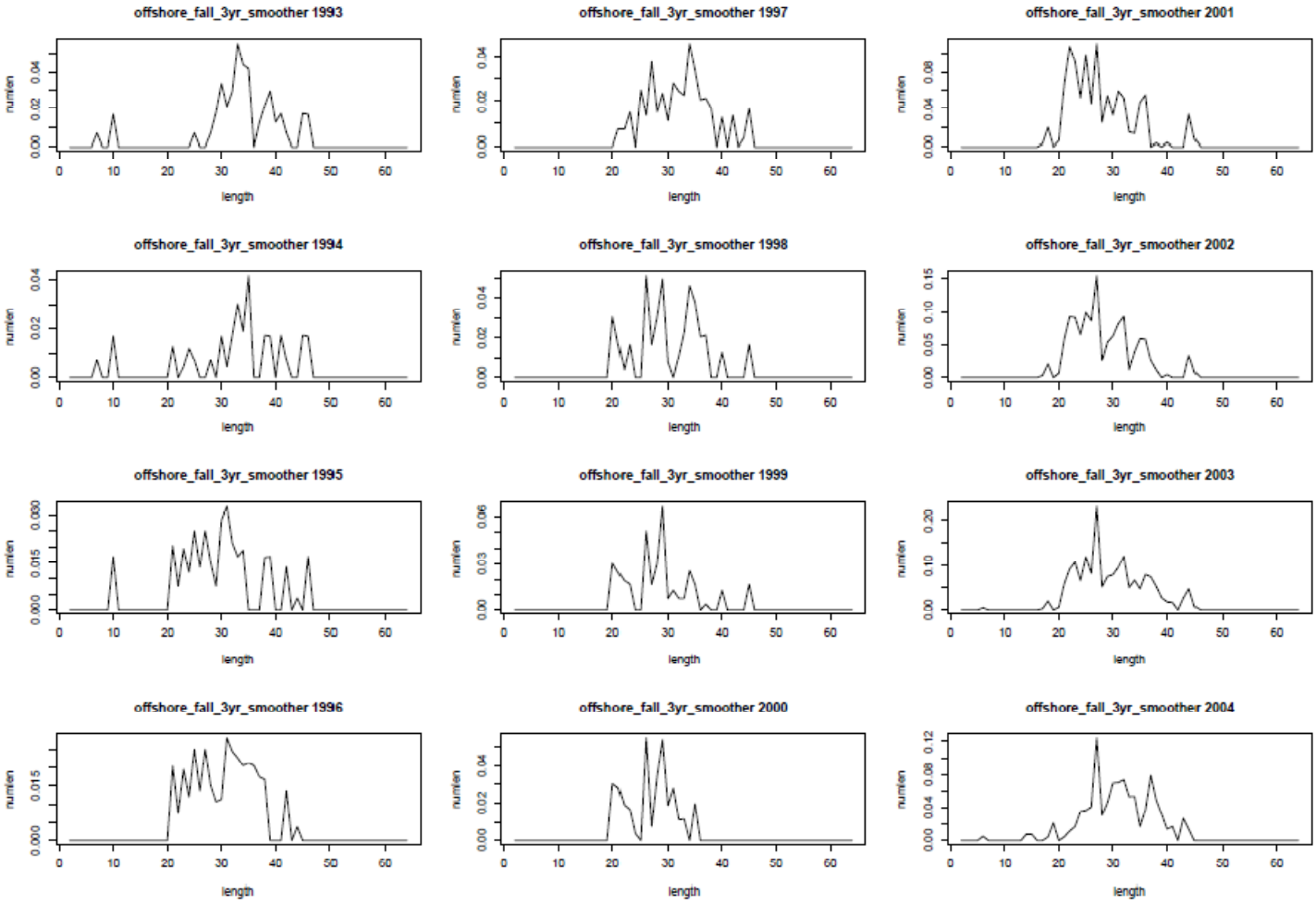
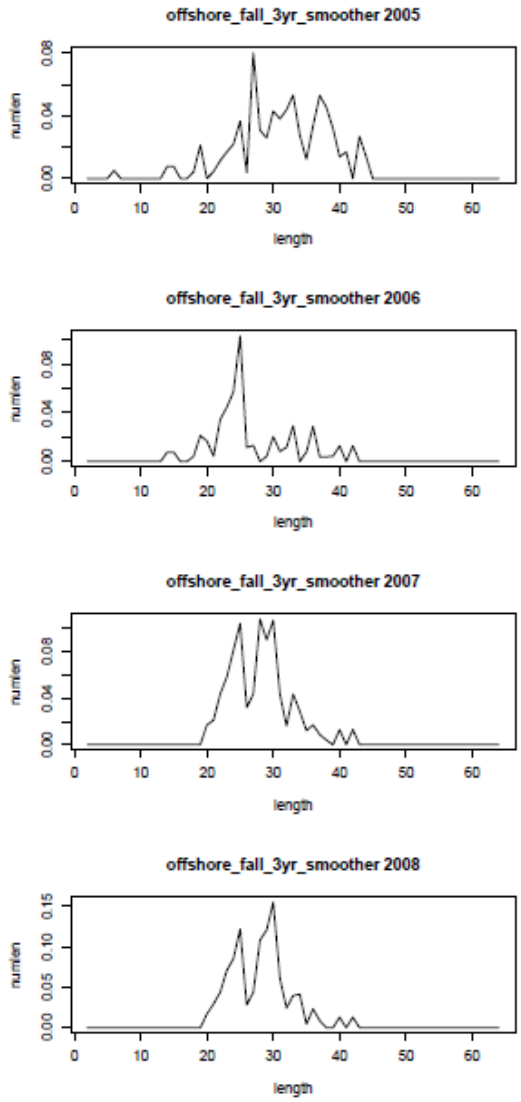


Figure D25d. Three-year moving average length composition (stratified mean number per tow) of offshore hake for the fall survey, 1969-2008.



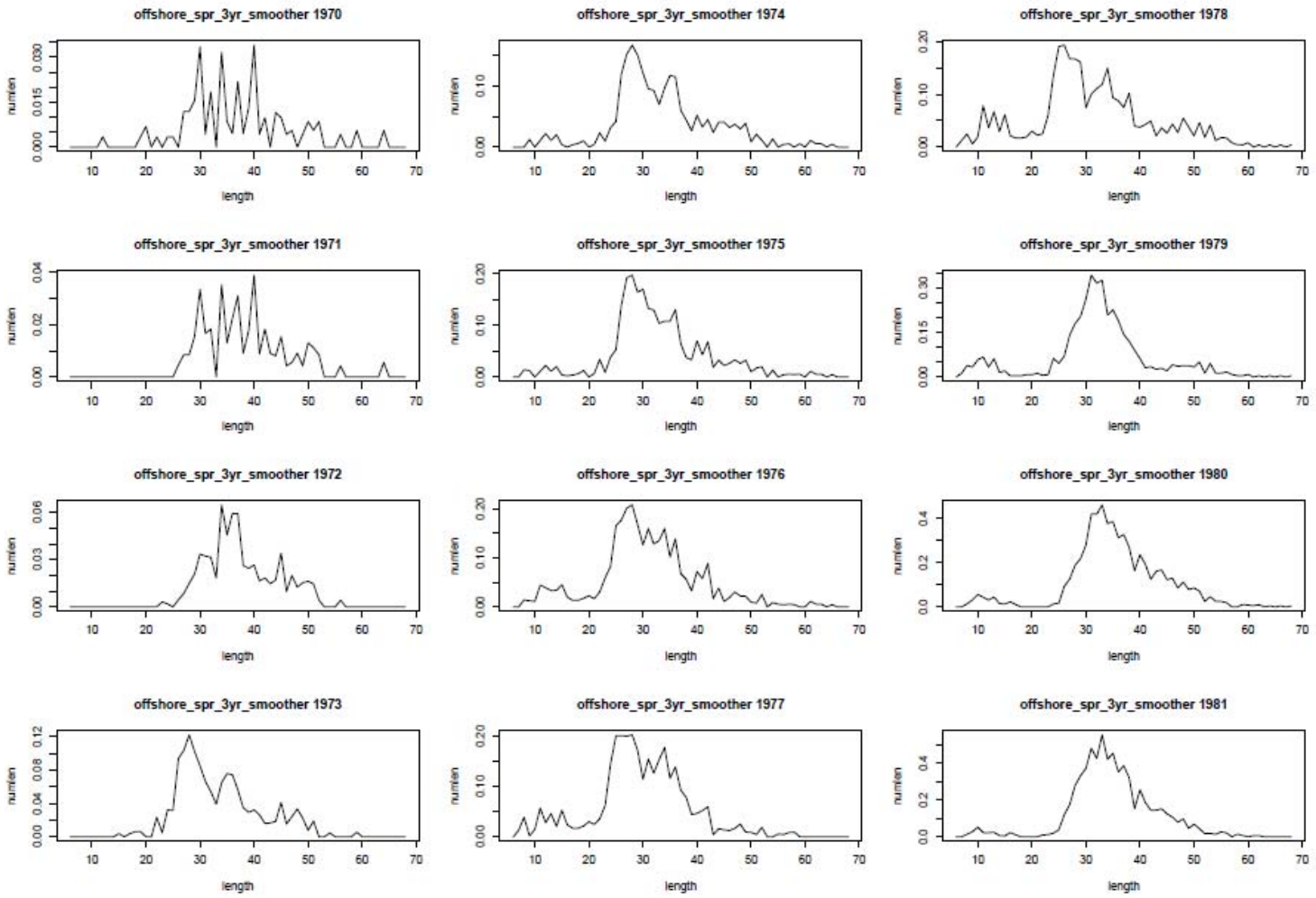


Figure D26a. Three-year moving average length composition (stratified mean number per tow) of offshore hake for the spring survey, 1970-2008.

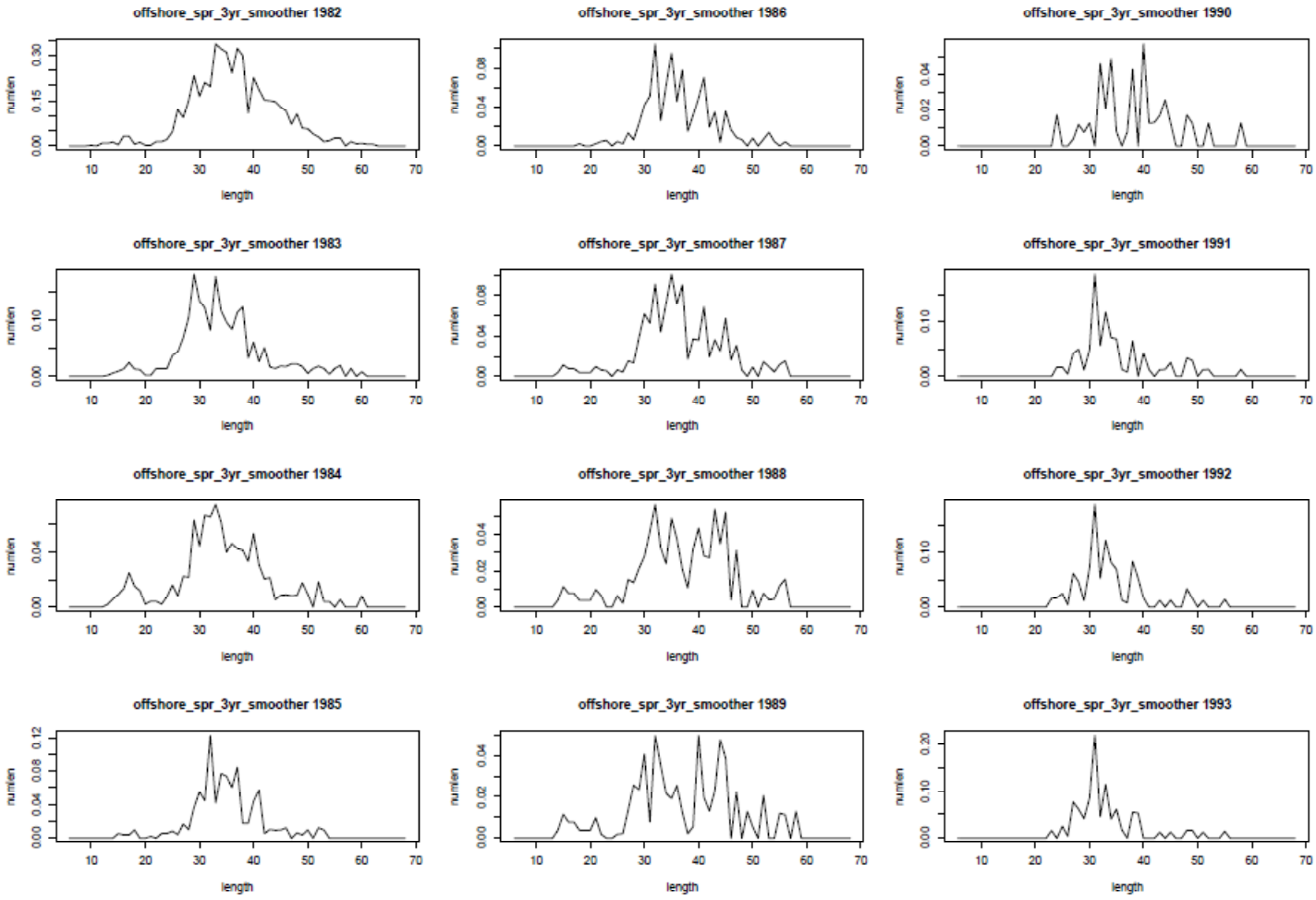


Figure D26b. Three-year moving average length composition (stratified mean number per tow) of offshore hake for the spring survey, 1970-2008.

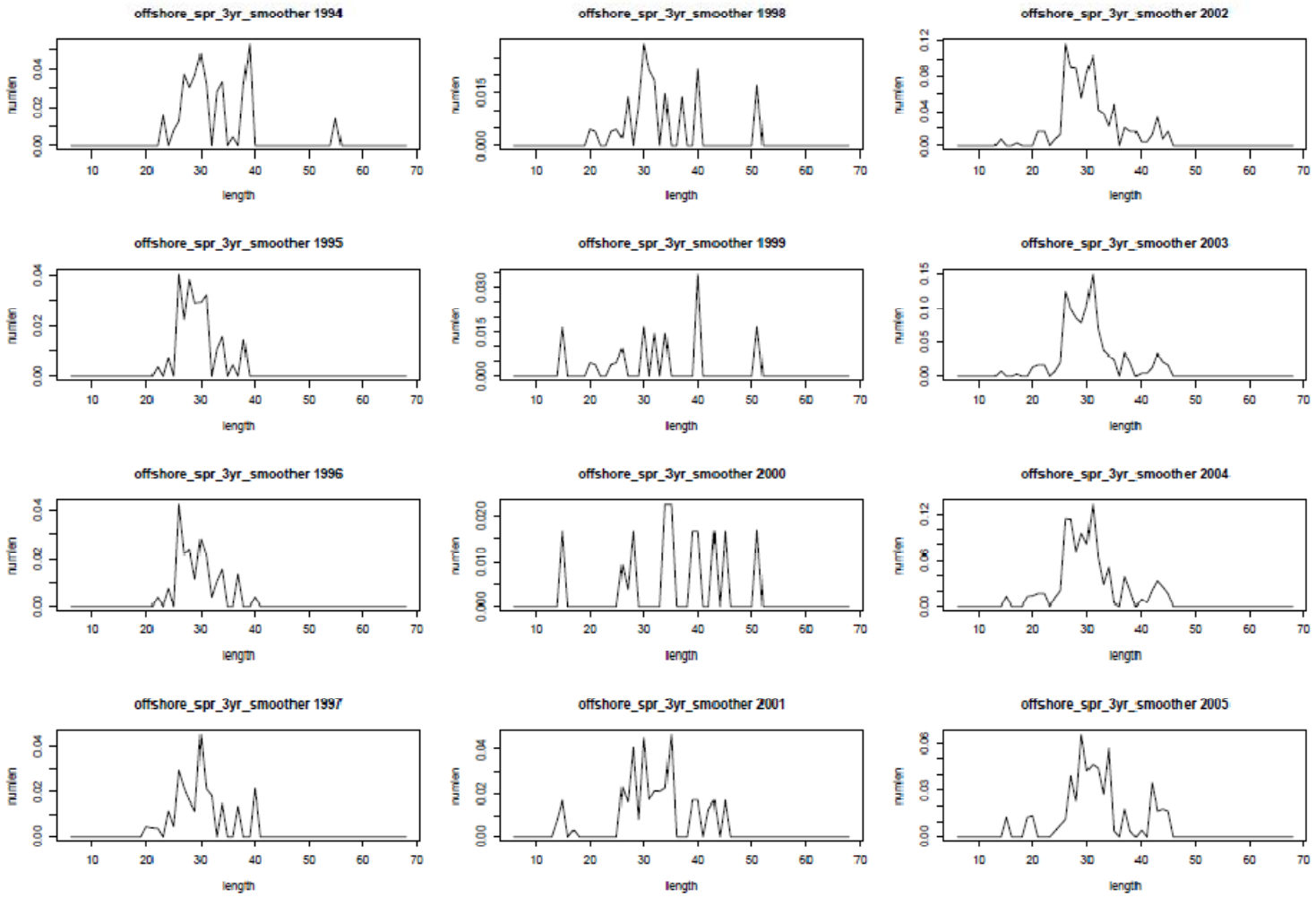


Figure D26c. Three-year moving average length composition (stratified mean number per tow) of offshore hake for the spring survey, 1970-2008.

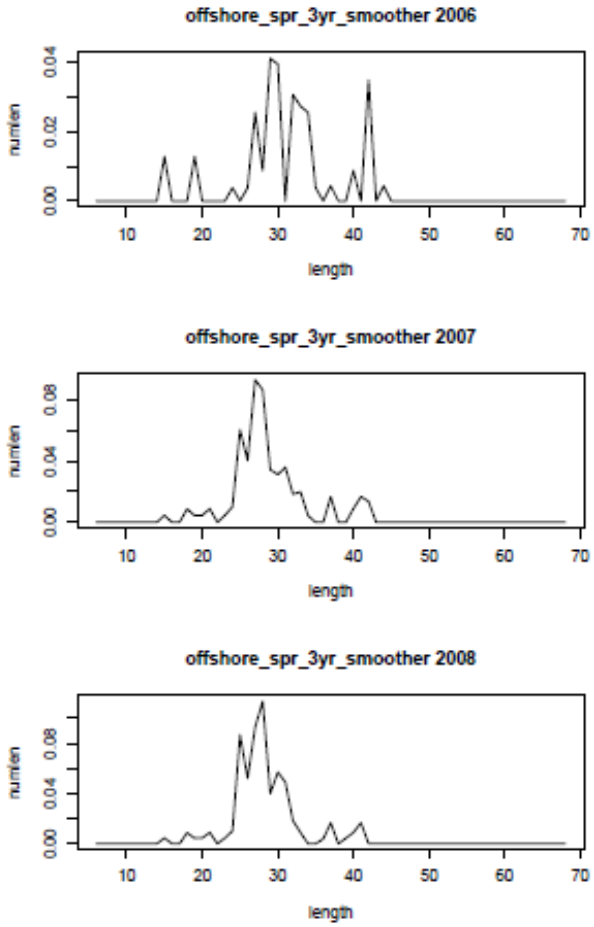


Figure D26d. Three-year moving average length composition (stratified mean number per tow) of offshore hake for the spring survey, 1970-2008.

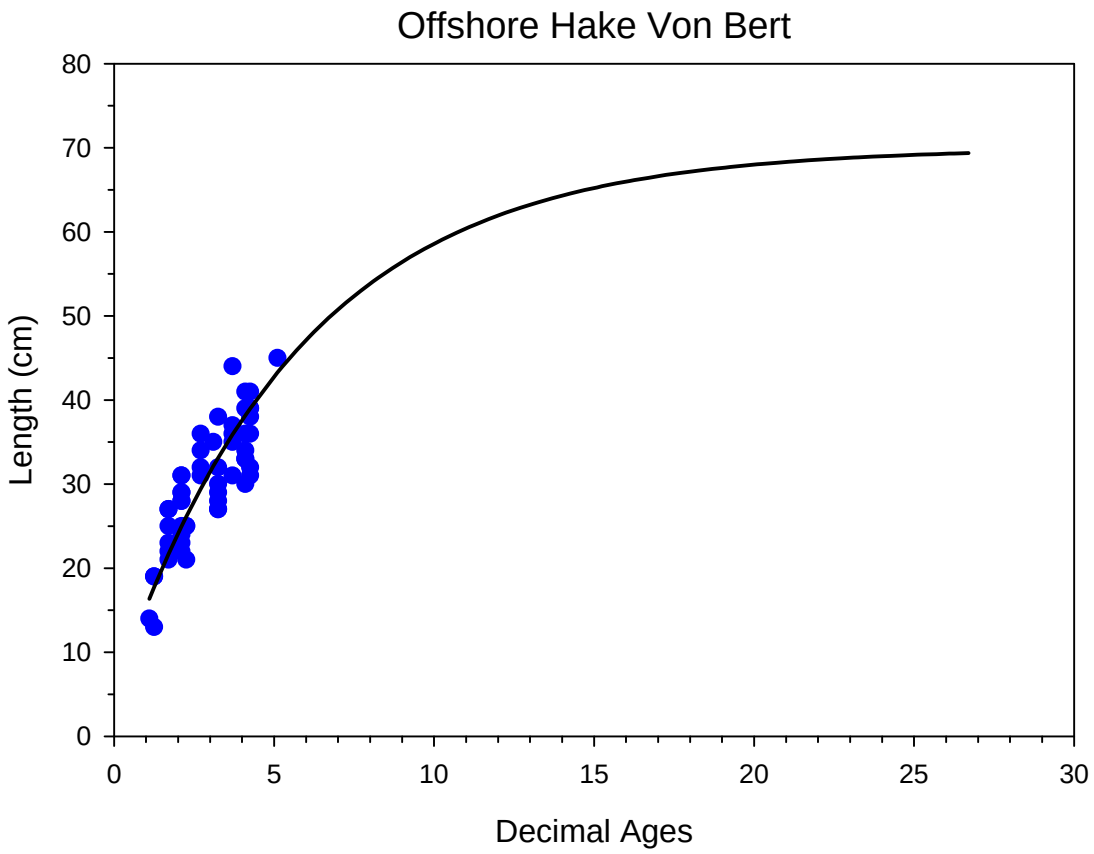


Figure D27. Von Bertalanffy estimates for offshore hake, using the NEFSC preliminary ages.

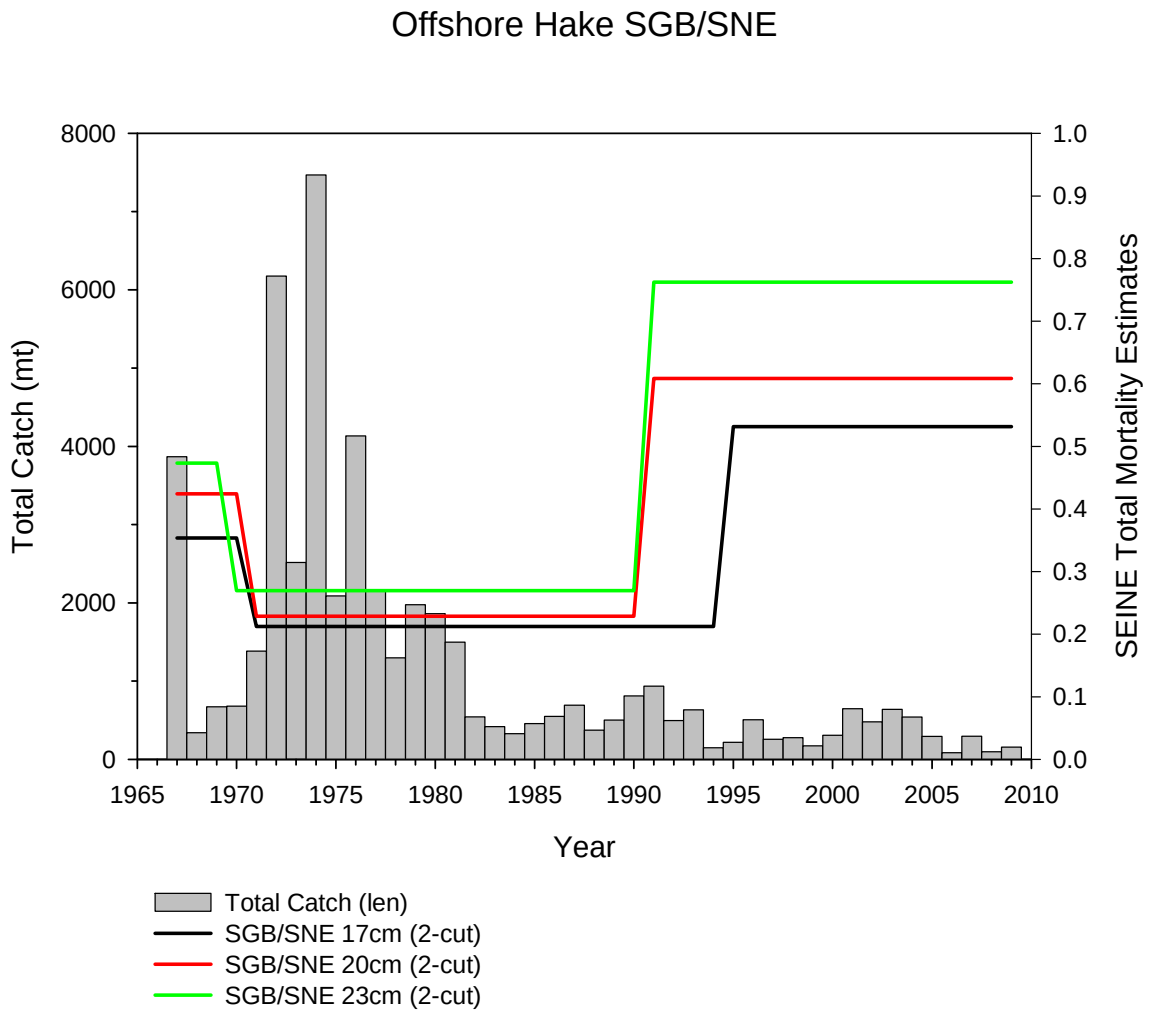


Figure D28. Offshore hake SEINE model results using silver hake average of Southern Georges Bank and Southern New England growth parameters, laid over total catch (metric tons). Lines indicate mortality estimates.

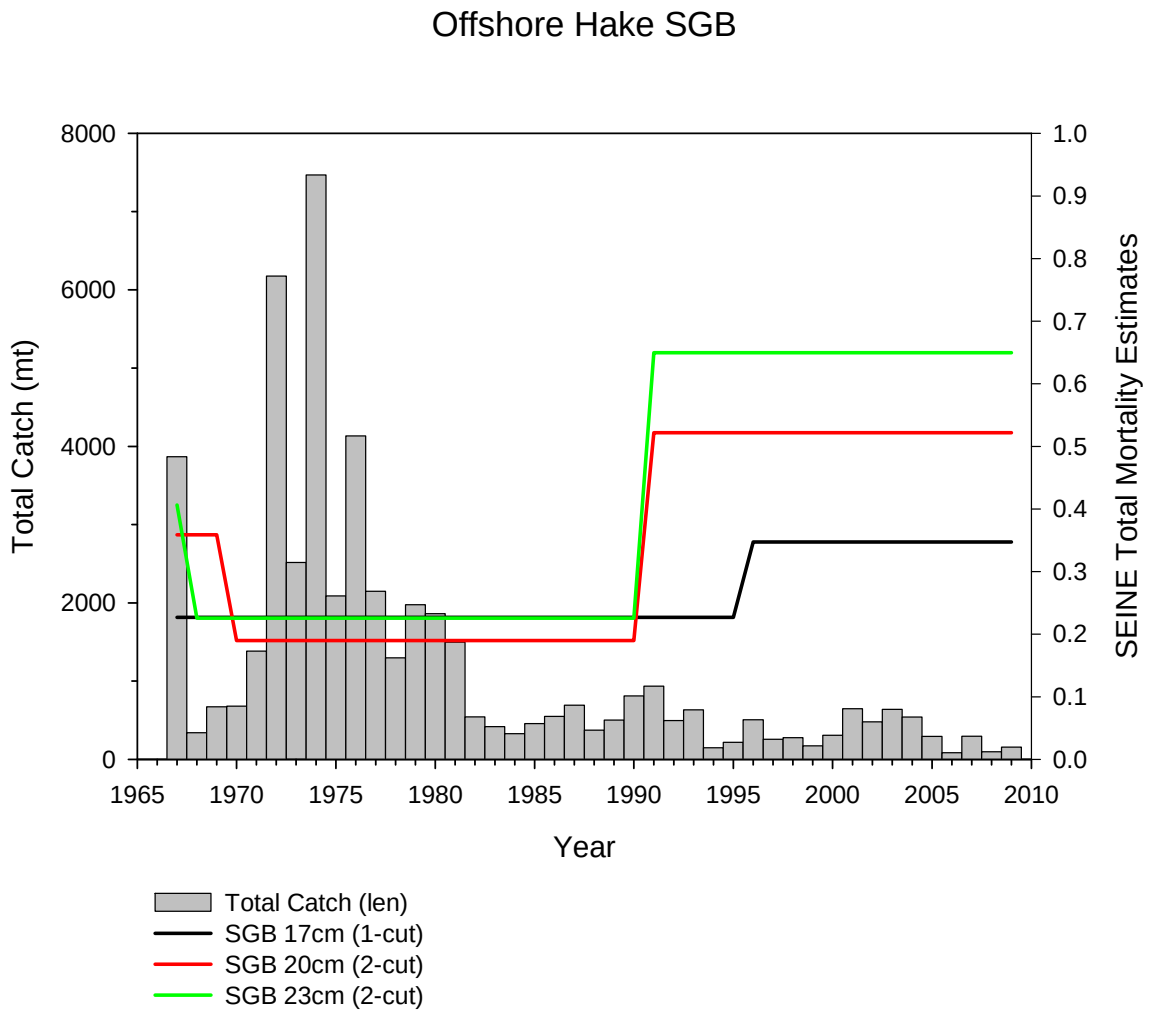


Figure D29. Offshore hake SEINE model results using silver hake Southern Georges Bank growth parameters, laid over total catch (metric tons). Lines indicate mortality estimates.

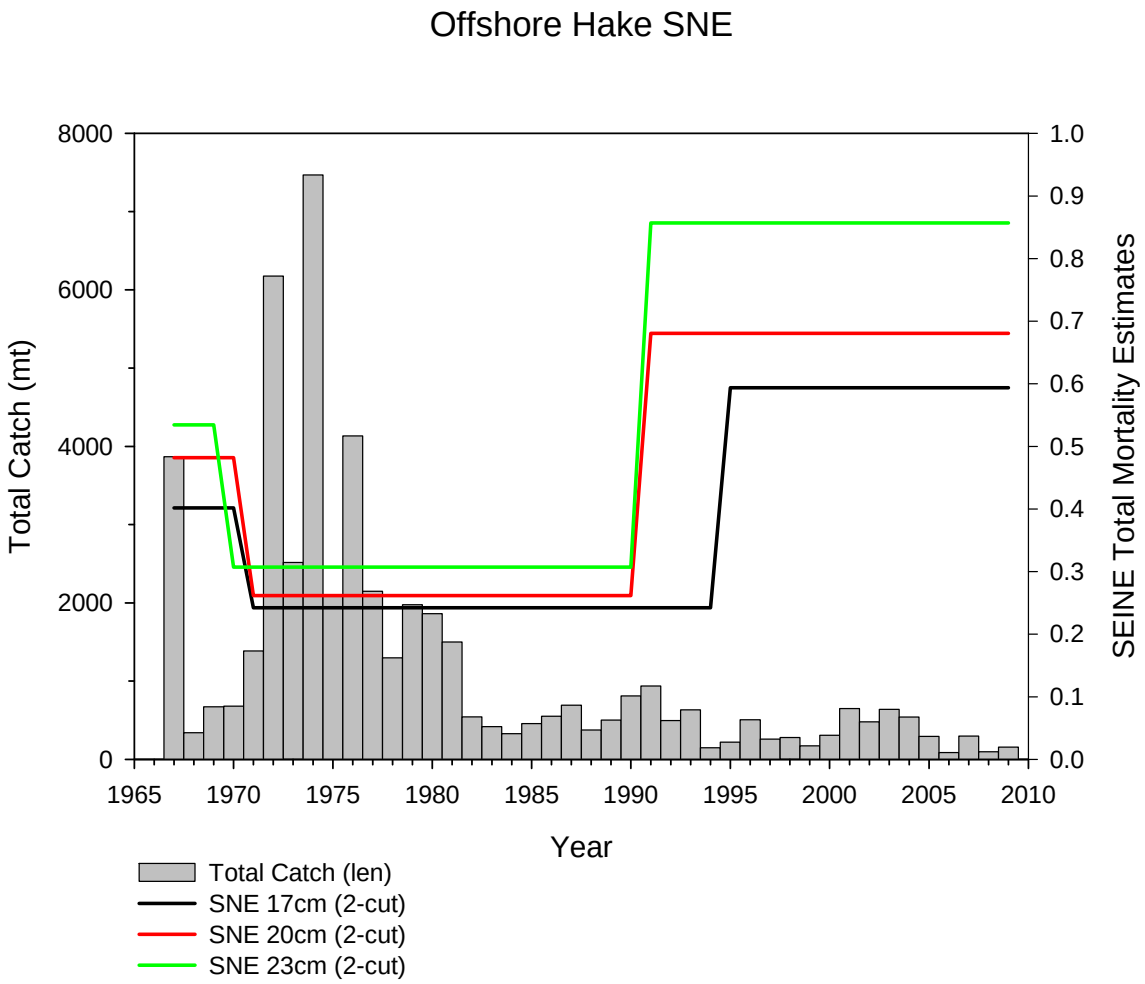


Figure D30. Offshore hake SEINE model results using silver hake Southern New England growth parameters, laid over total catch (metric tons). Lines indicate mortality estimates.

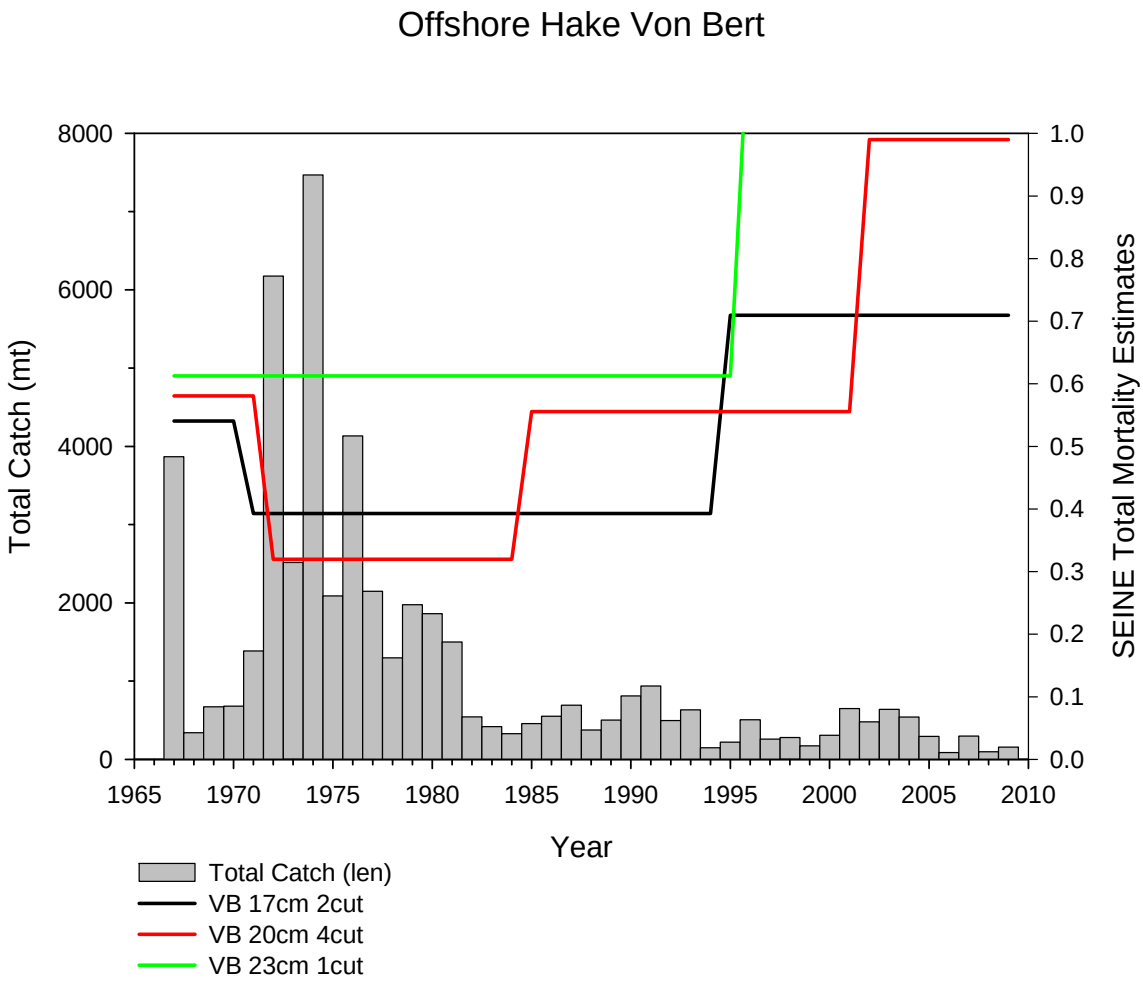


Figure D31. SEINE model results using the estimated von Bertalanffy growth parameters for offshore hake, laid over total catch (metric tons). Lines indicate mortality estimates.

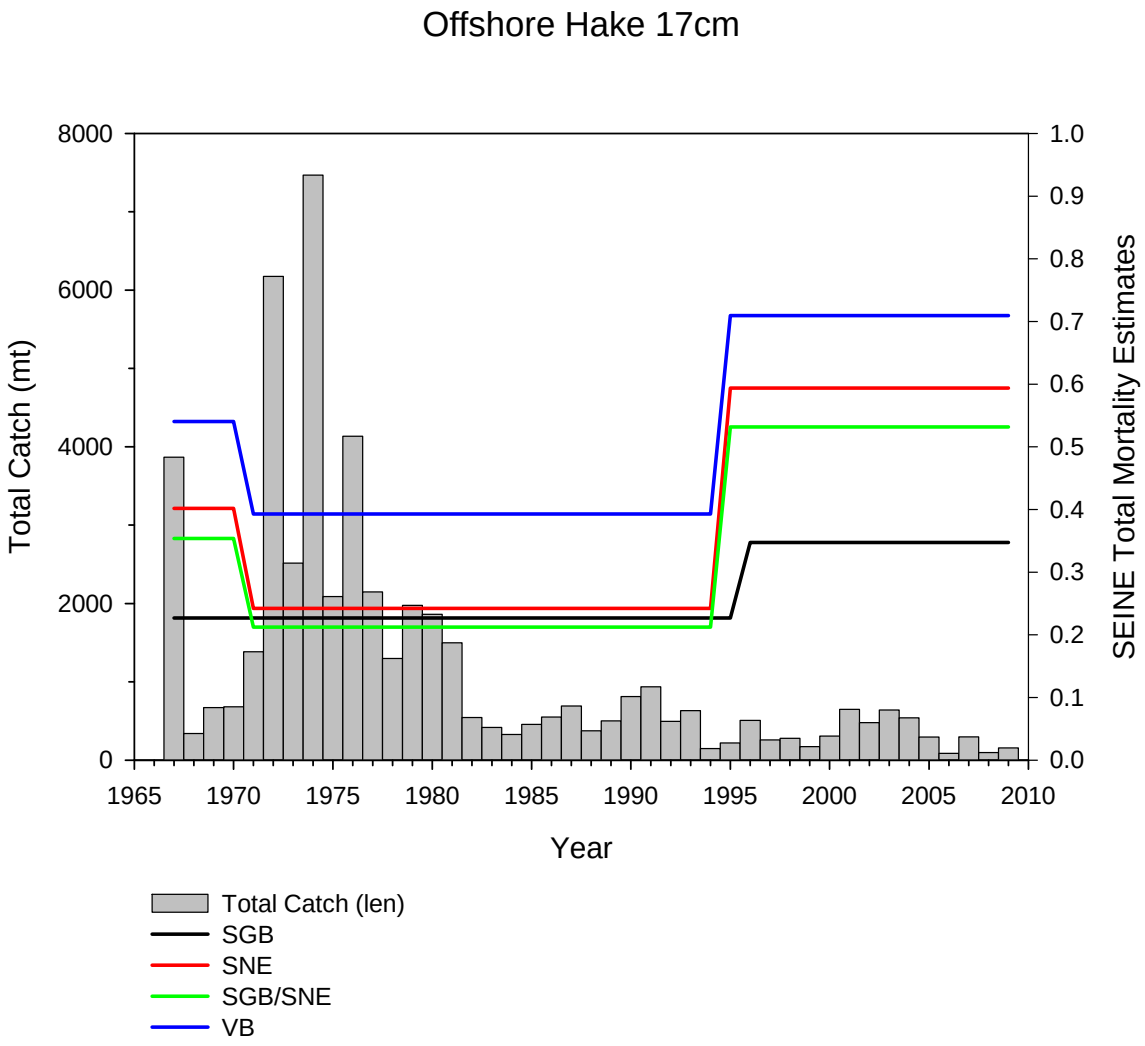


Figure D32. Offshore hake SEINE model results for the 17cm mortality cut, laid over total catch (metric tons). Lines indicate mortality estimates.

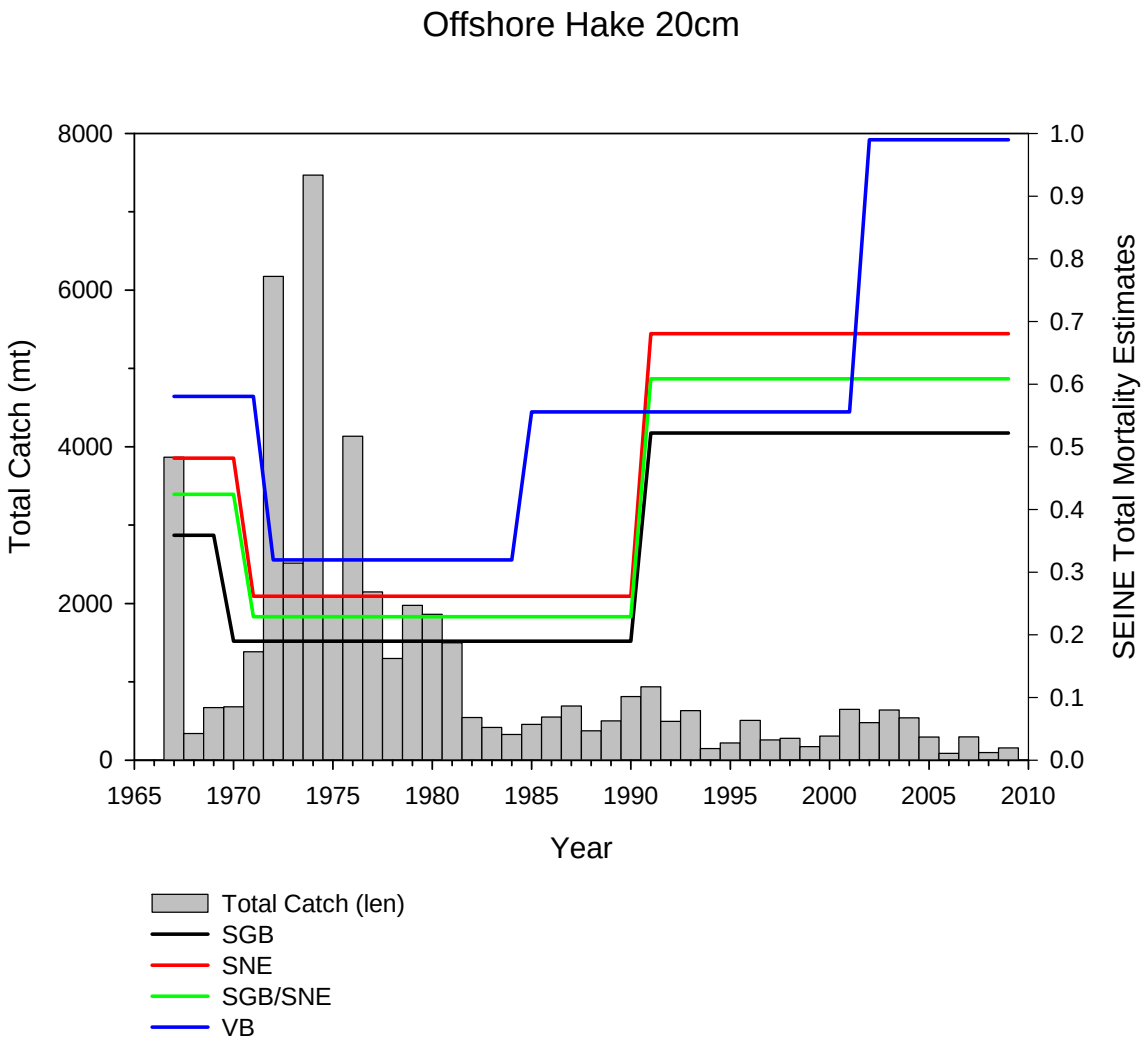


Figure D33. Offshore hake SEINE model results for the 20cm mortality cut, laid over total catch (metric tons). Lines indicate mortality estimates.

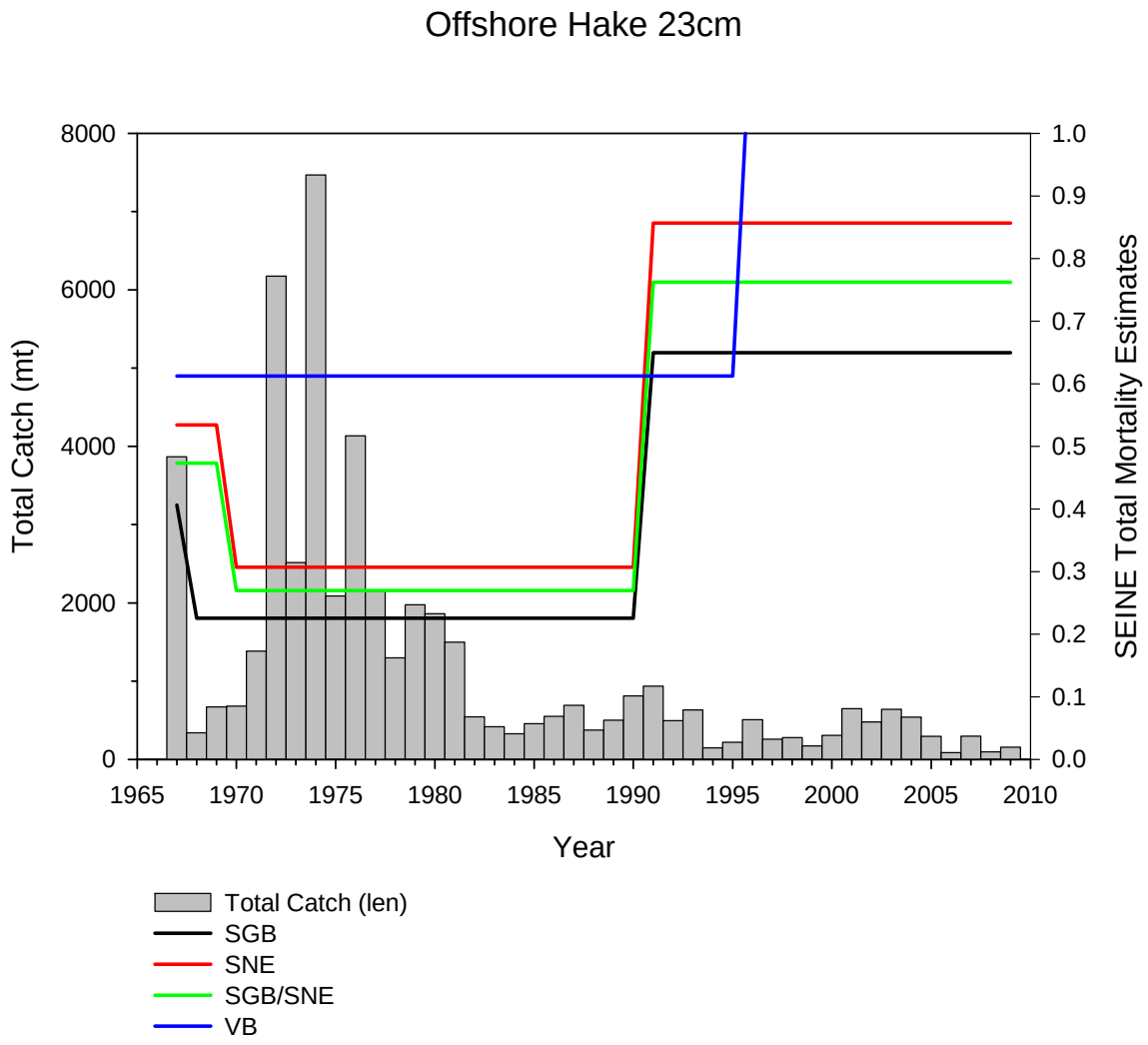


Figure D34. Offshore hake SEINE model results for the 23cm mortality cut, laid over total catch (metric tons). Lines indicate mortality estimates.

Figure D35. Six panel plot for offshore hake depicting trends in relative biomass, landings, relative fishing mortality and replacement ratios for the NEFSC Fall bottom trawl survey index and landings based on the Sosebee method. Horizontal dashed lines (---) represent replacement ratios in the top two panels and the replacement F in the lower right panel. Smooth lines represent Lowess smooths (tension =0.3). The confidence ellipse in the top left panel has a nominal probability level of 0.68. The regression line in the top left panel is a robust regression using bisquare downweighting of residuals.

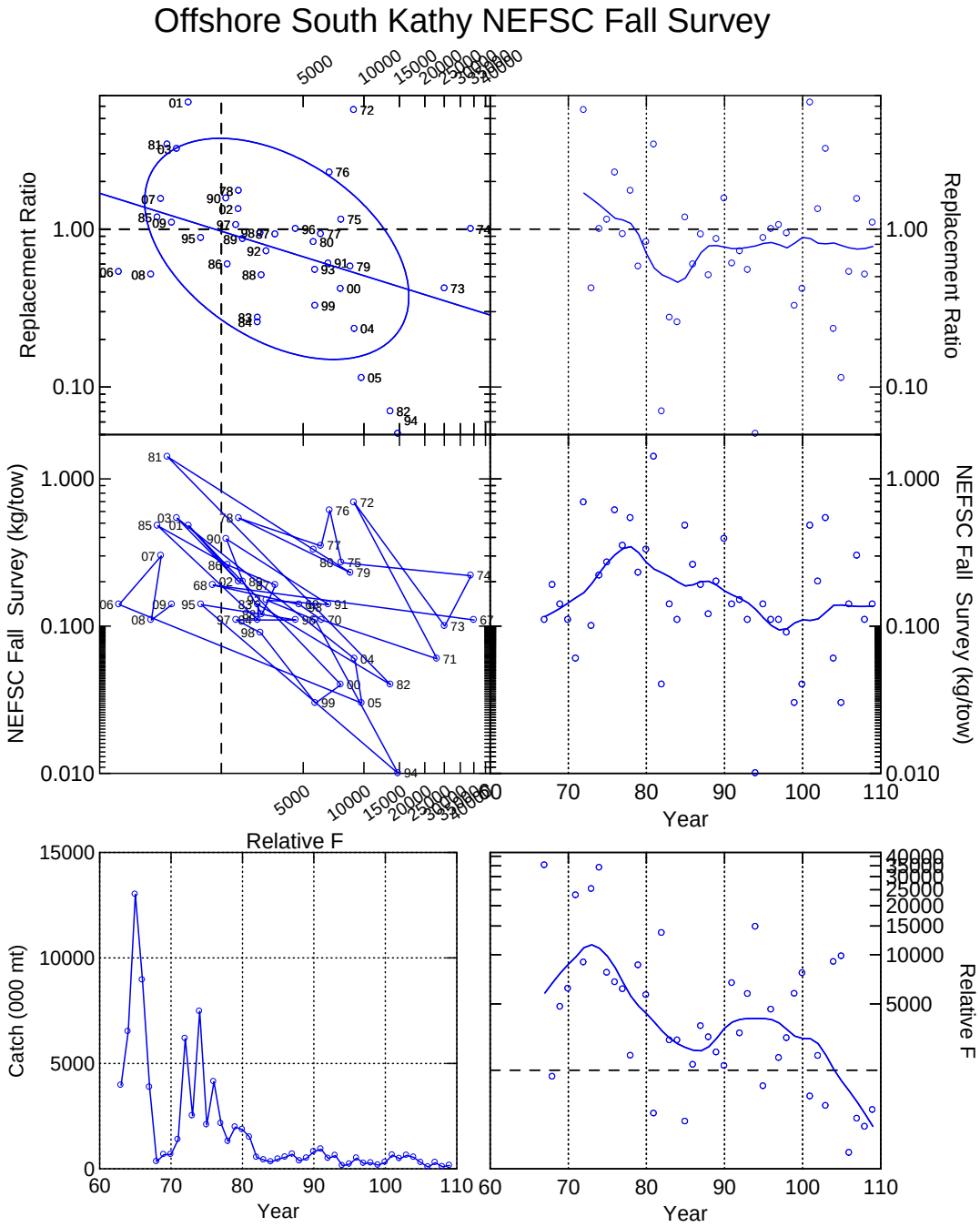


Figure D36. Six panel plot for offshore hake depicting trends in relative biomass, landings, relative fishing mortality and replacement ratios for the NEFSC spring bottom trawl survey index and landings based on the Sosebee method . Horizontal dashed lines (---) represent replacement ratios in the top two panels and the replacement F in the lower right panel. Smooth lines represent Lowess smooths (tension =0.3). The confidence ellipse in the top left panel has a nominal probability level of 0.68. The regression line in the top left panel is a robust regression using bisquare downweighting of residuals.

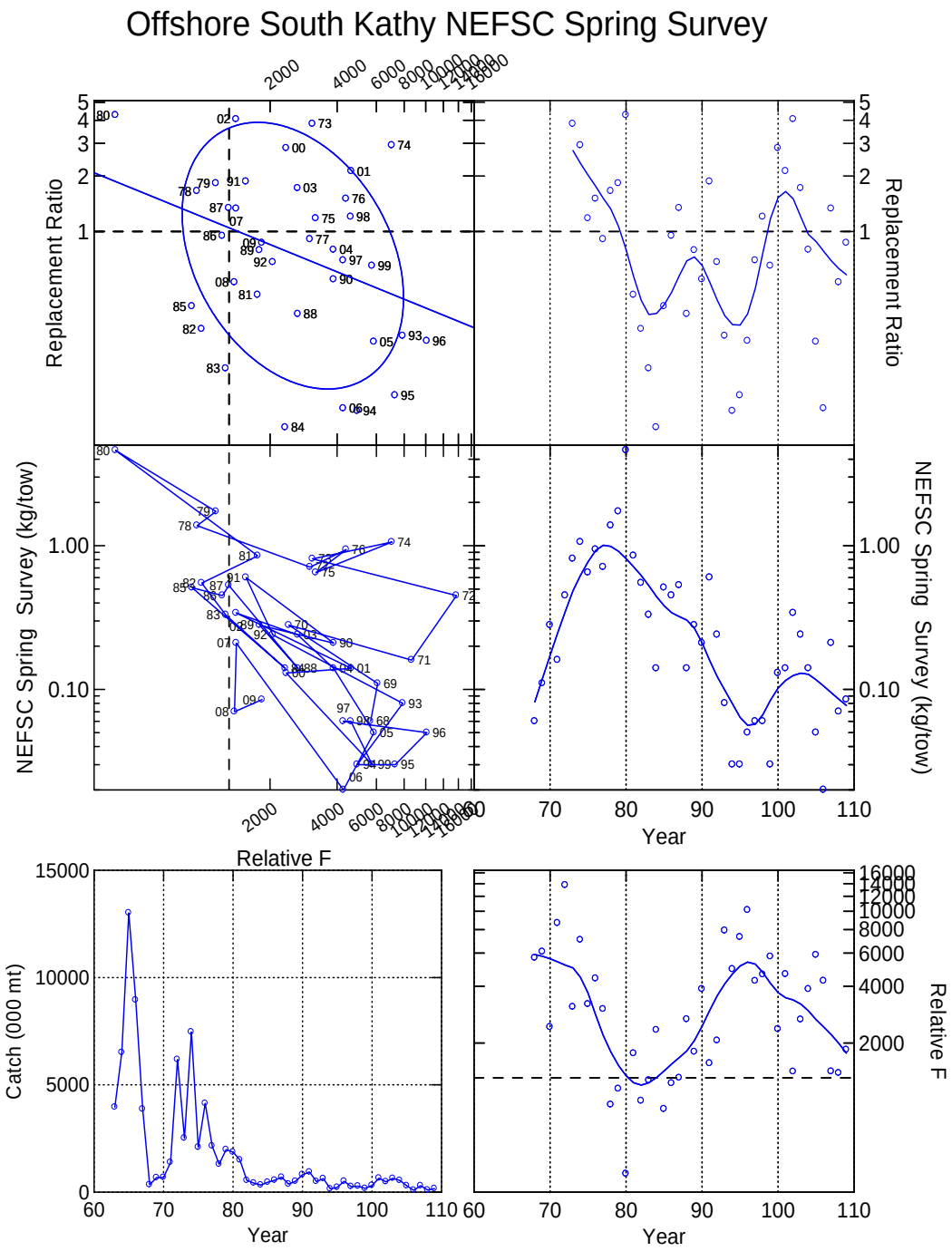


Figure D37. Randomization tests summary of sampling distribution of correlation coefficient between replacement ratio and relative F for fall (top) and spring (bottom) survey indices.

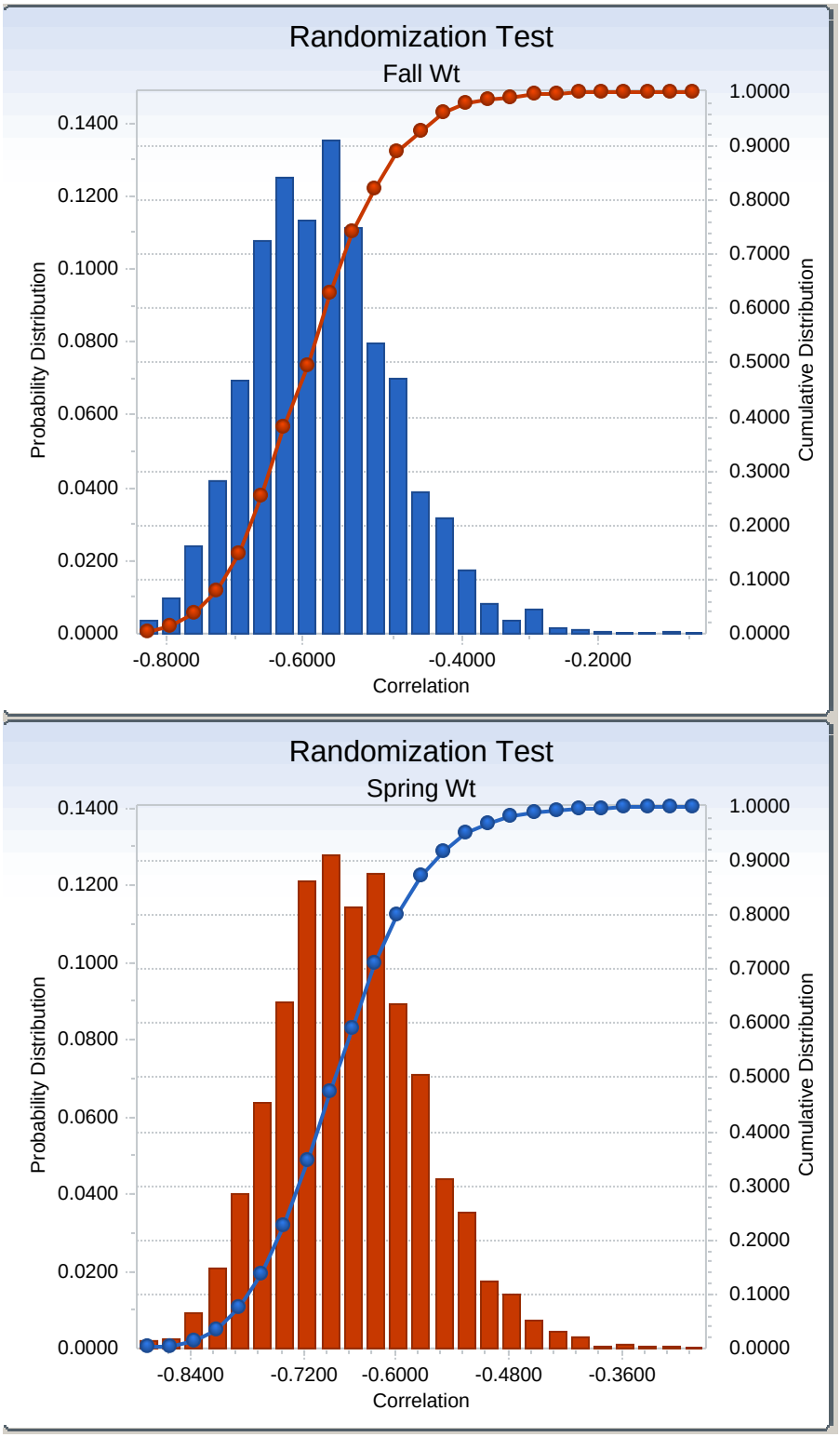


Figure D38. Exploitation ratios for total catch (total catch/swept area biomass) for offshore hake during fall surveys.

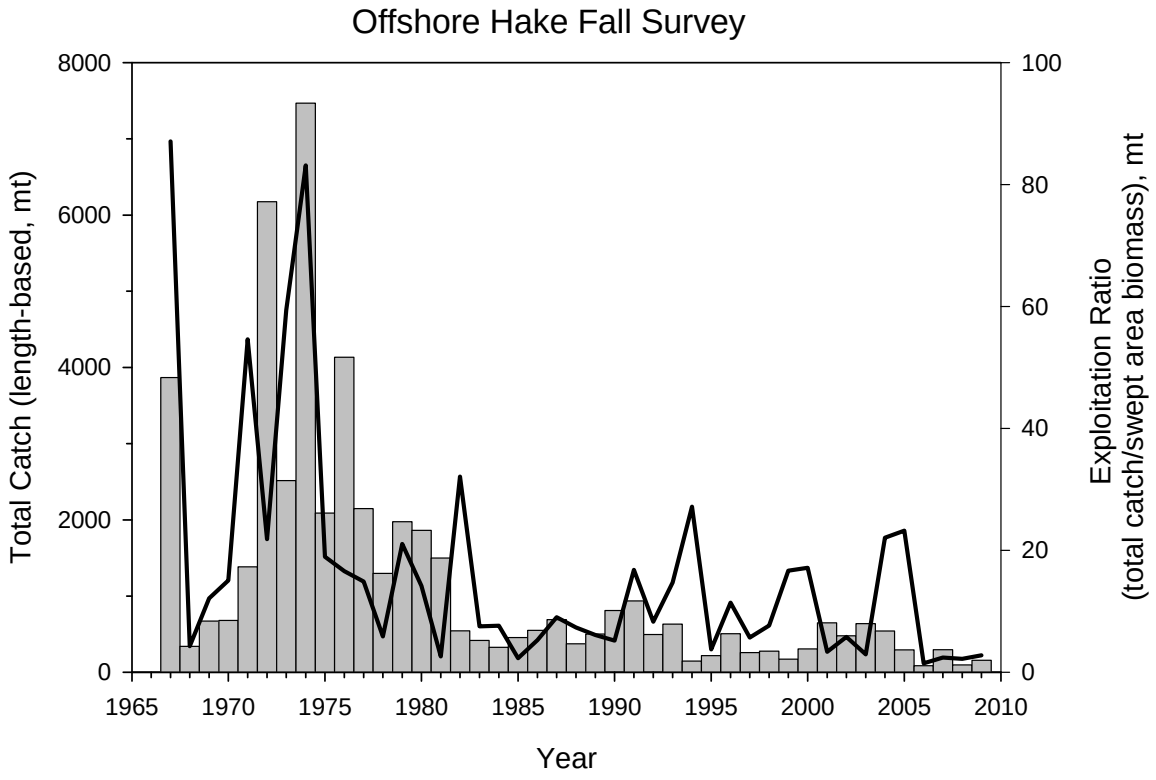


Figure D39. Exploitation ratios for total catch (total catch/swept area biomass) for offshore hake during spring surveys.

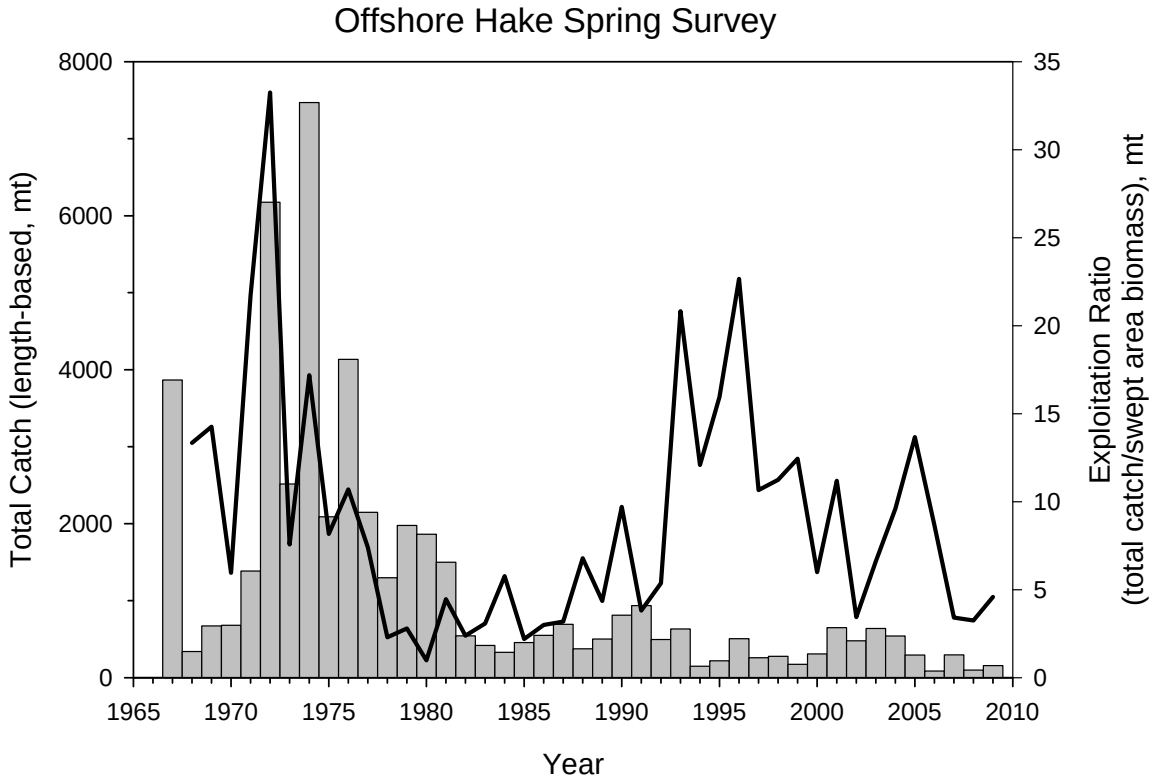


Figure D40. Exploitation ratios for total catch (total catch/swept area biomass) for offshore hake during winter surveys.

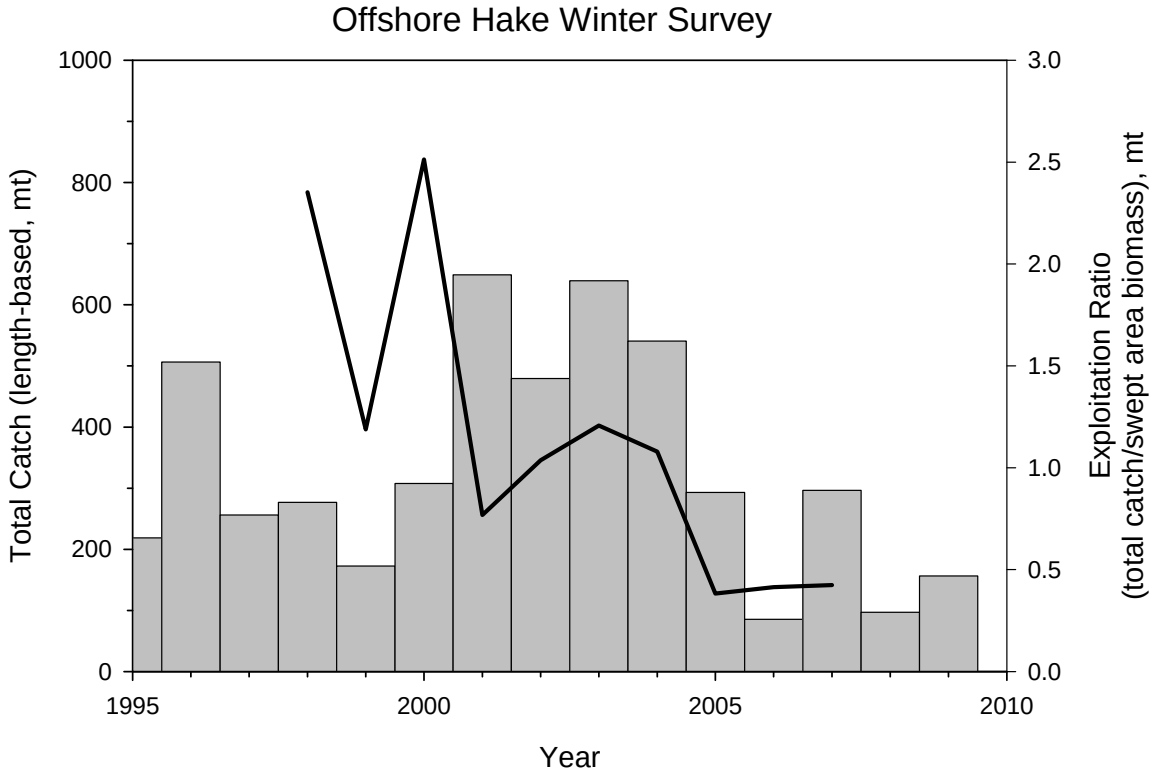


Figure D41. Exploitation ratios for landings (landings/swept area biomass) for offshore hake during fall surveys.

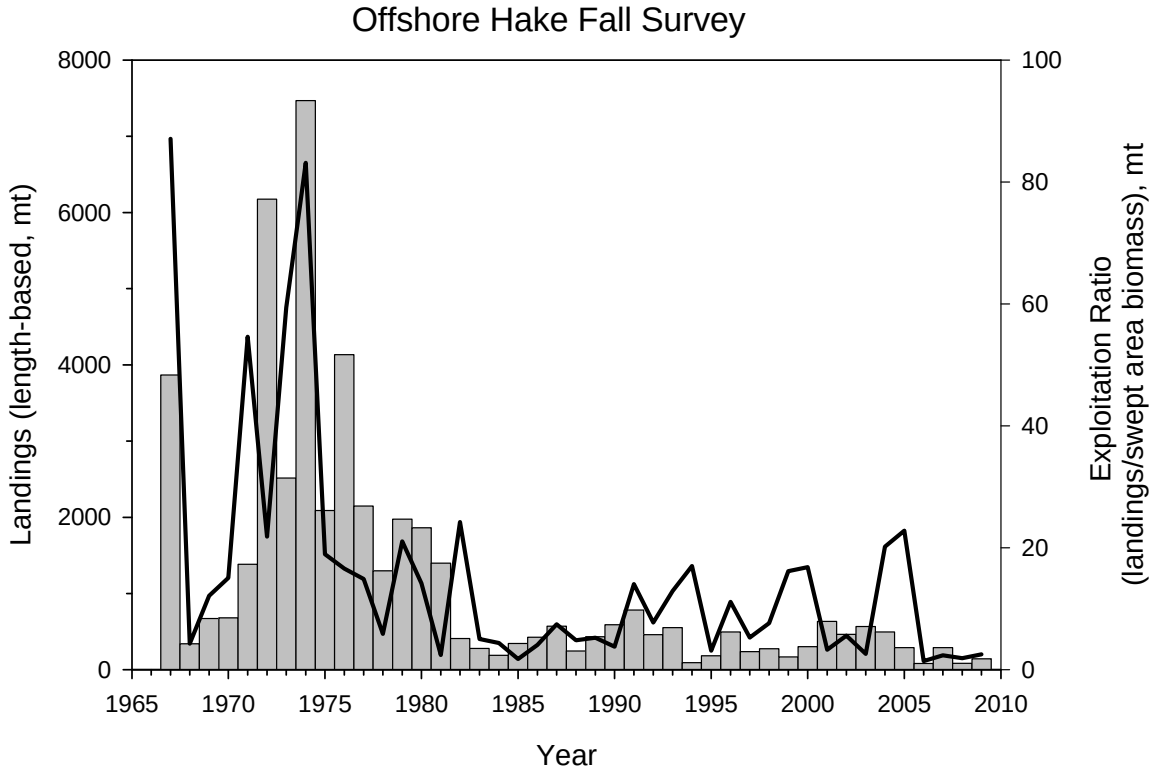


Figure D42. Exploitation ratios for landings (landings/swept area biomass) for offshore hake during spring surveys.

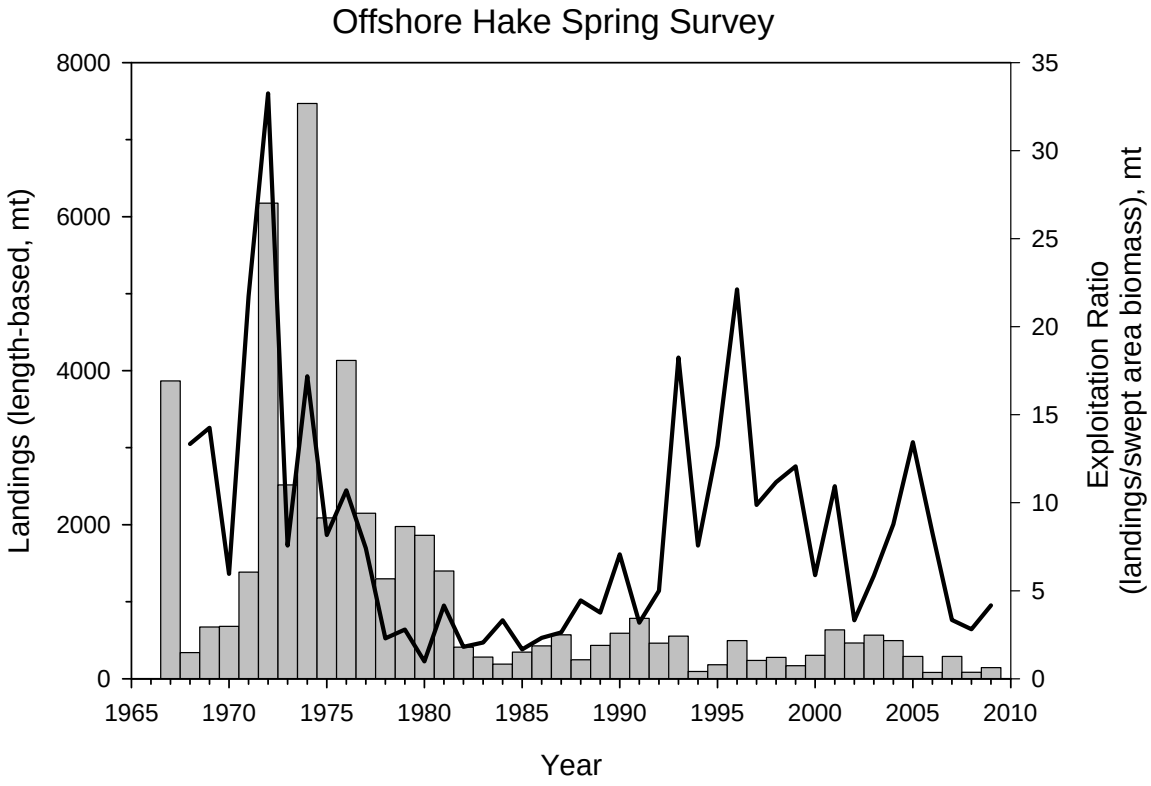
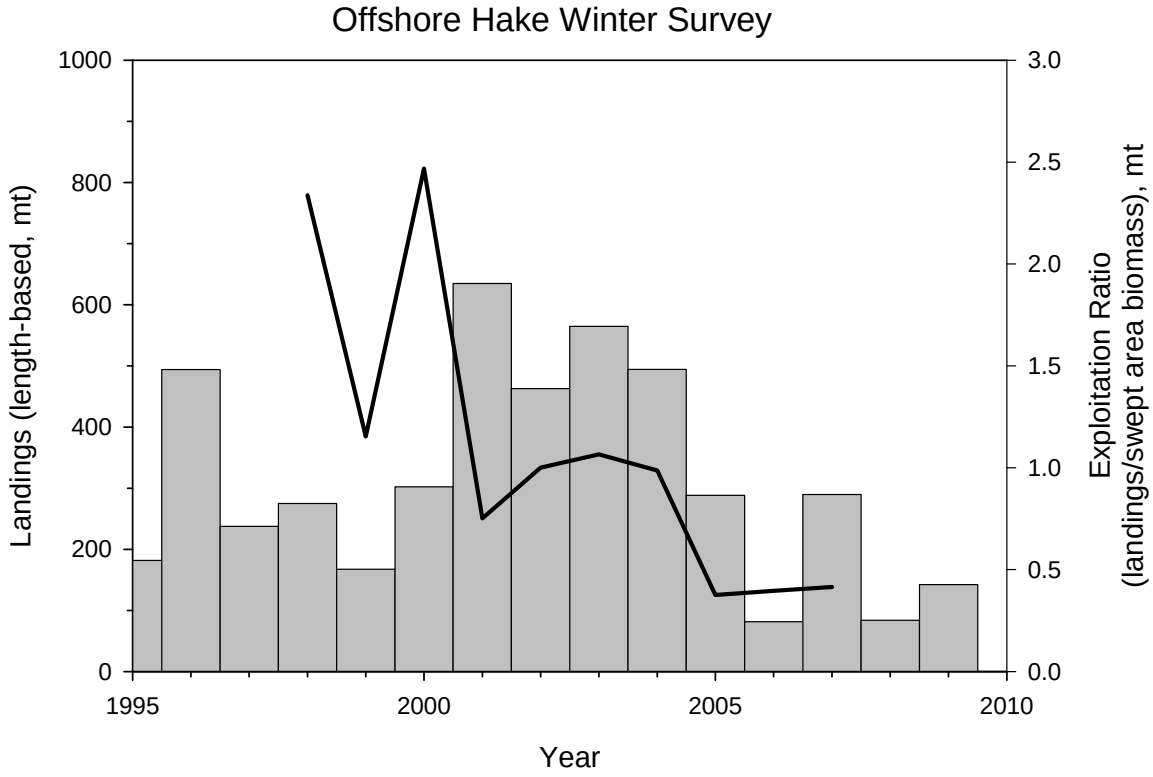


Figure D43. Exploitation ratios for landings (landings/swept area biomass) for offshore hake during winter surveys.



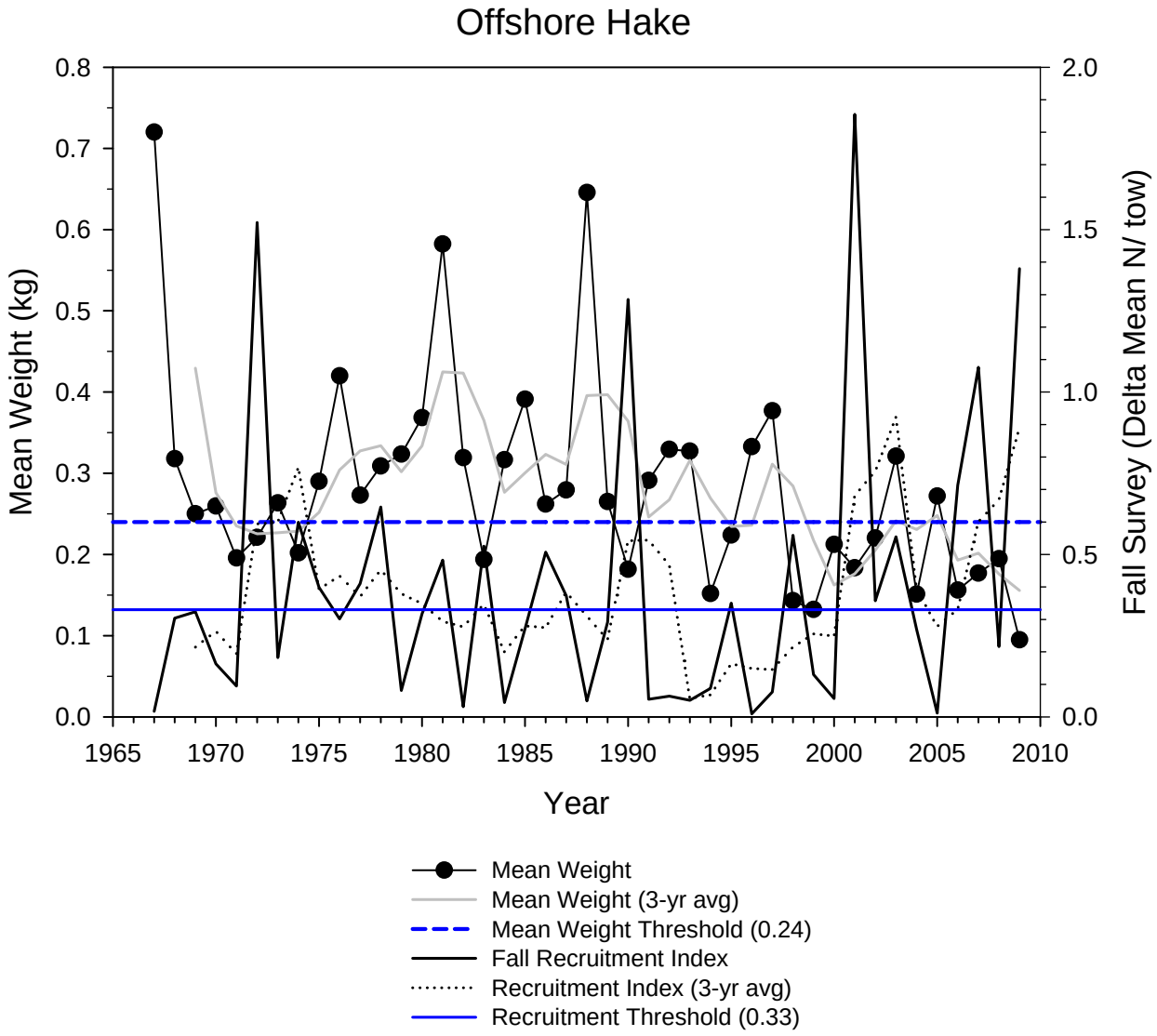


Figure D44. Comparison of current stock status indicators to existing biological reference points for offshore hake.