SUPPLEMENT 1
Catch per unit effort (CPUE) analyses and characterisation of the North Island commercial freshwater eel fishery, 1990–91 to 2014–15

Appendices A to F: Plots of eel fishery characterisation and CPUE analyses by ESA. The plots relating to shortfin are shown first followed by longfin.

APPENDIX A: NORTHLAND (ESA AA)

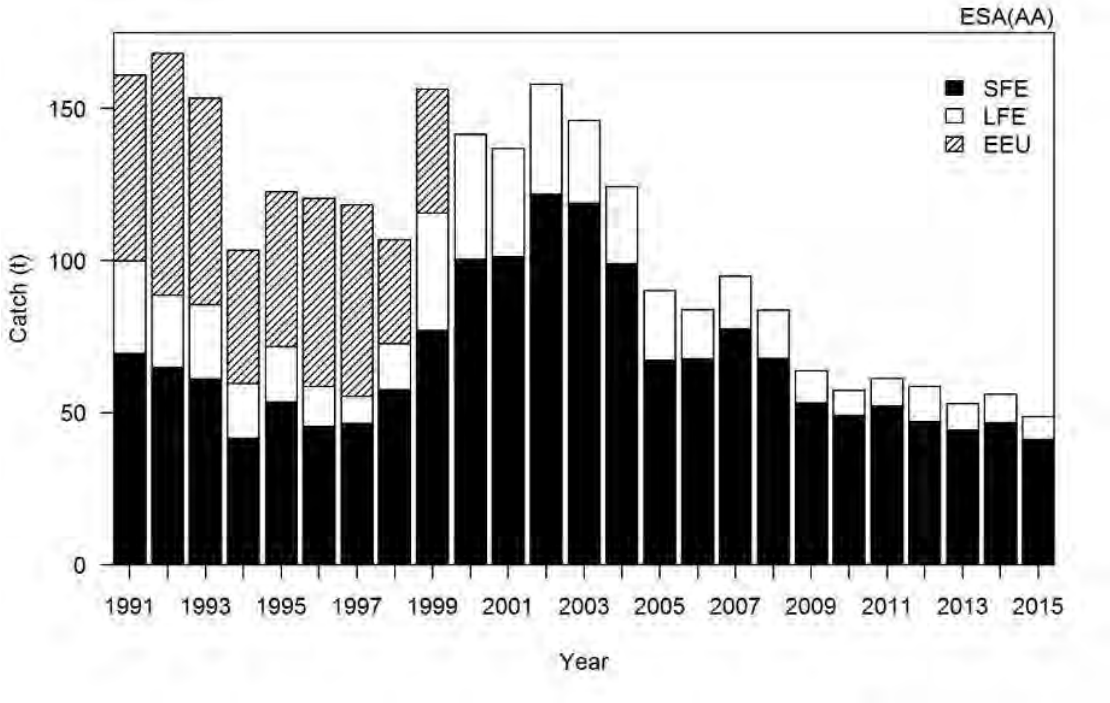


Figure A1: Total estimated commercial catch of shortfin (SFE), longfin (LFE), and unclassified eel catch (EEU) for the years 1990–91 to 2014–15 (ESA AA).

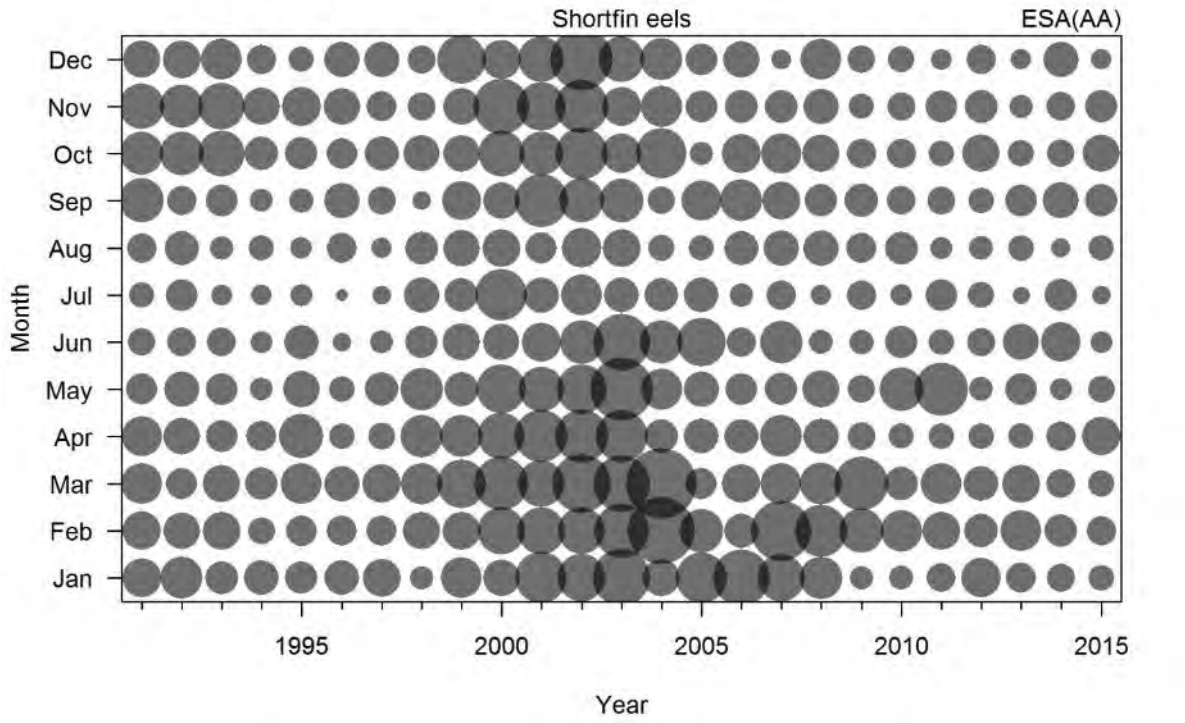


Figure A2: Shortfin eel catch by month for the years 1990–91 to 2014–15 (ESA AA).

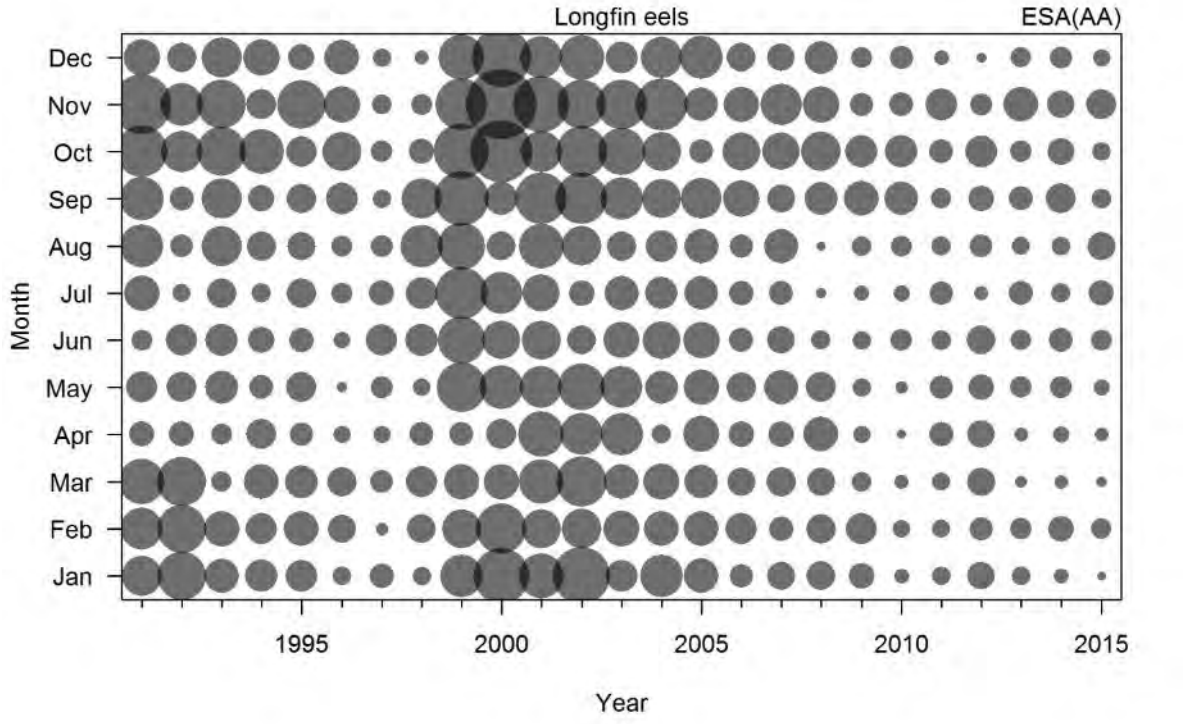


Figure A3: Longfin eel catch by month for the years 1990–91 to 2014–15 (ESA AA).

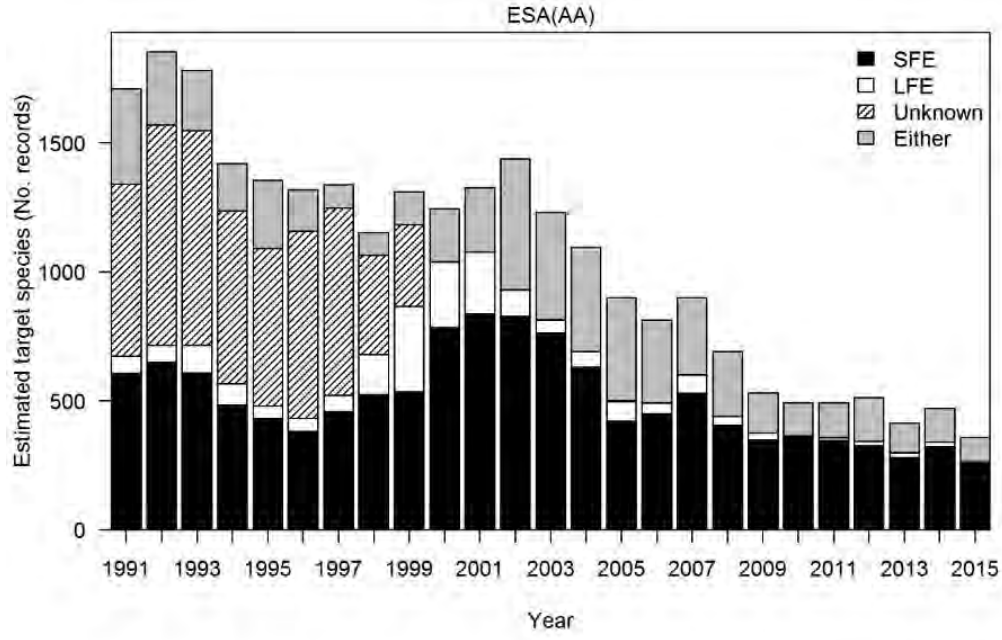


Figure A4: Reconstructed target species for the years 1990–91 to 2014–15 (ESA AA).

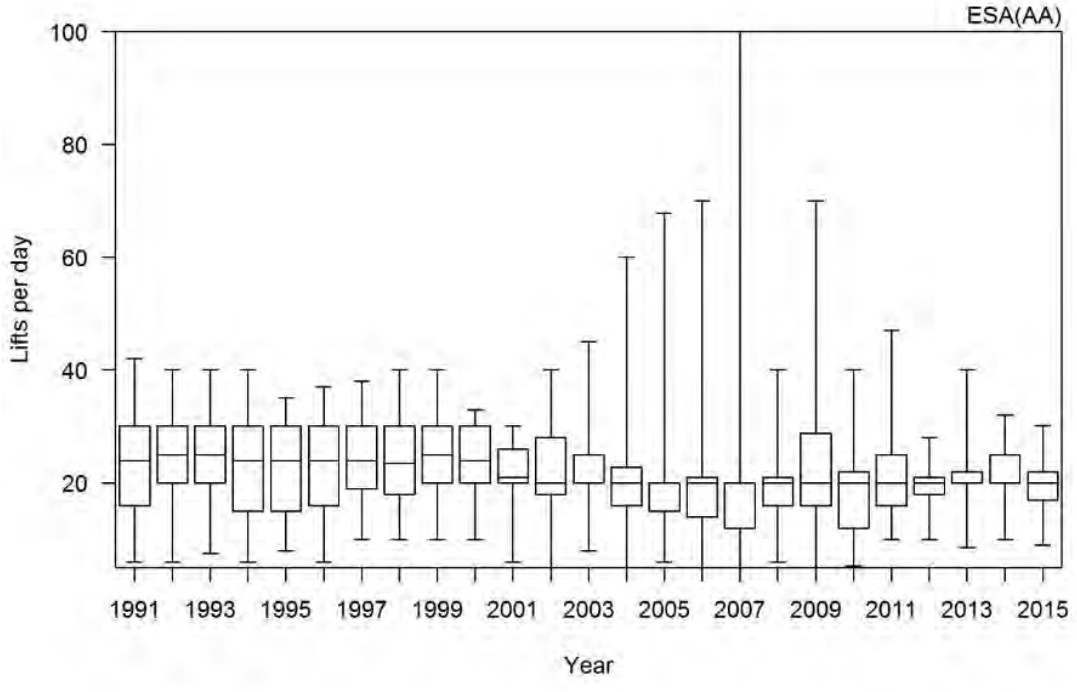


Figure A5: Total lifts per day for the years 1990–91 to 2014–15. The horizontal line is the median, the top and bottom of the box are the interquartiles (25th and 75th), and error bars are the 95th percentile range (ESA AA).

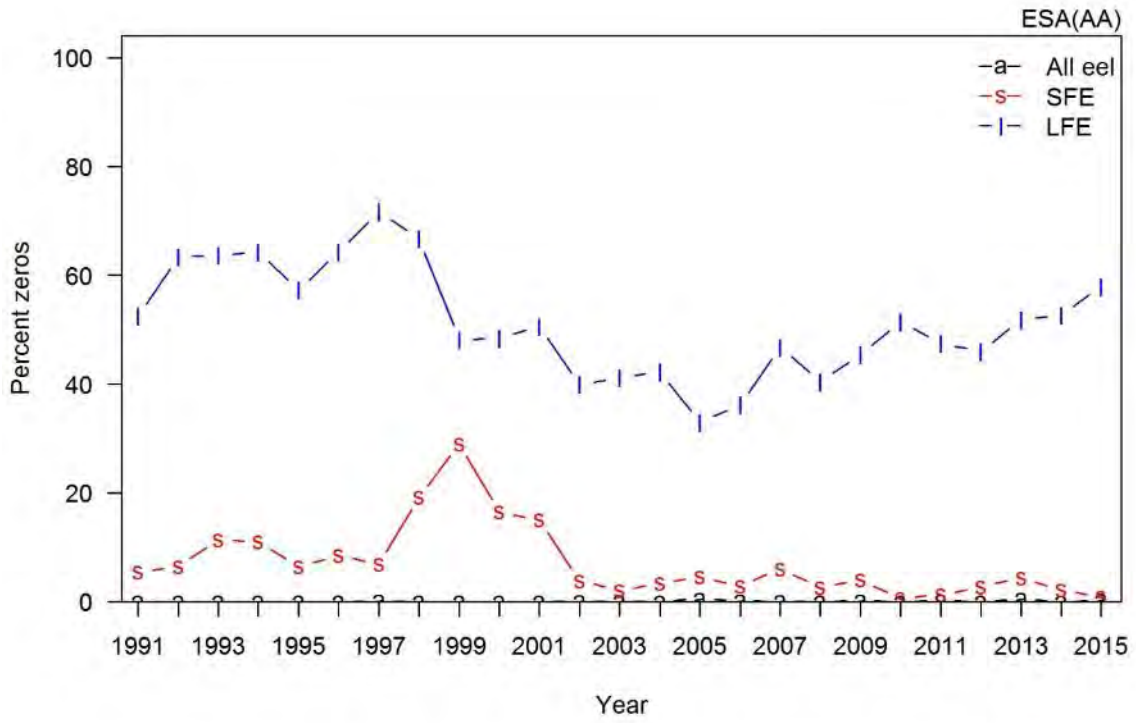


Figure A6: Proportion of valid zero records for all eels, shortfin (SFE), and longfin (LFE) for the years 1990–91 to 2014–15. Excludes zeros associated with reporting EEU (unclassified) (ESA AA).

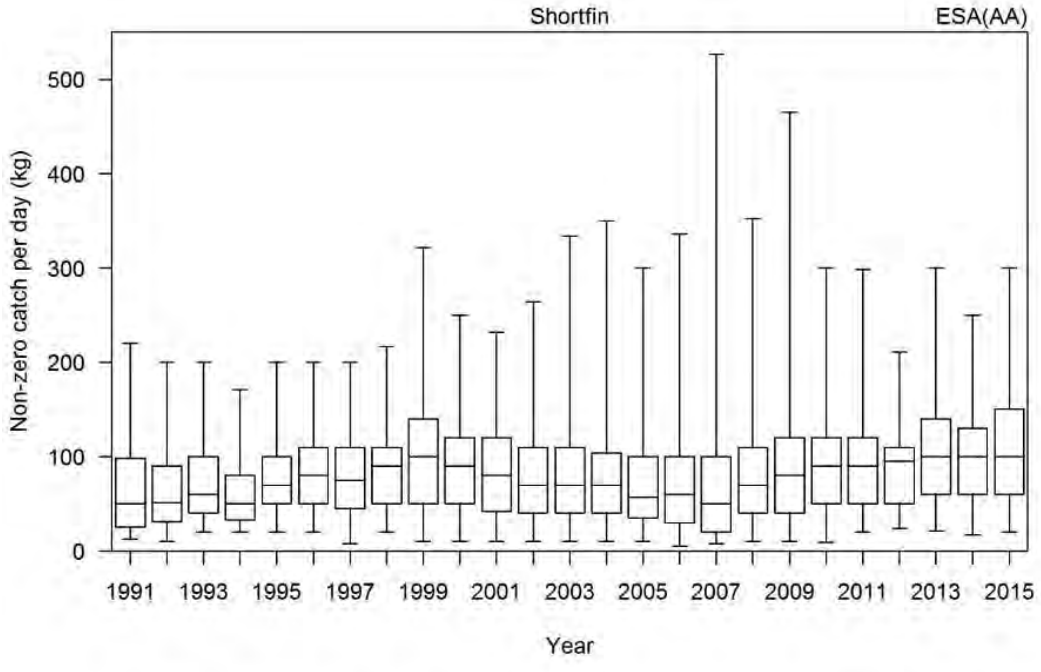


Figure A7: Shortfin catch per day for the years 1990–91 to 2014–15. The horizontal line is the median, the top and bottom of the box are the interquartiles (25th and 75th), and error bars are the 95th percentile range (ESA AA).

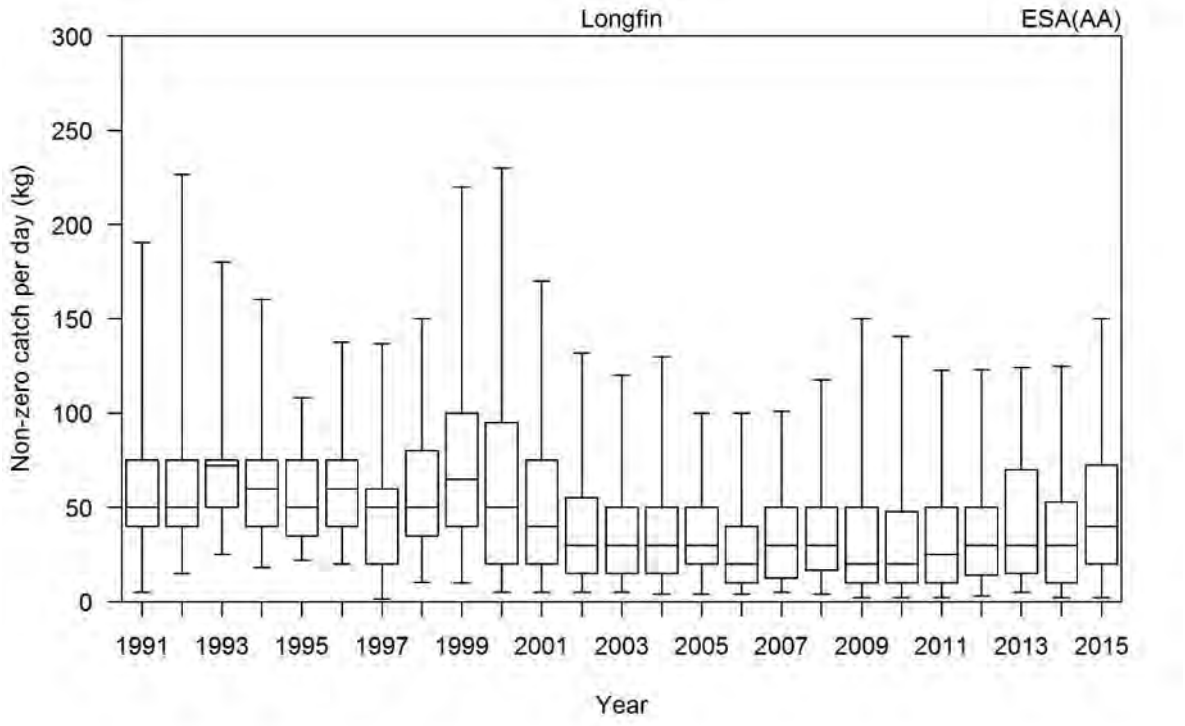


Figure A8: Longfin catch per day for the years 1990–91 to 2014–15. The horizontal line is the median, the top and bottom of the box are the interquartiles (25th and 75th), and error bars are the 95th percentile range (ESA AA).

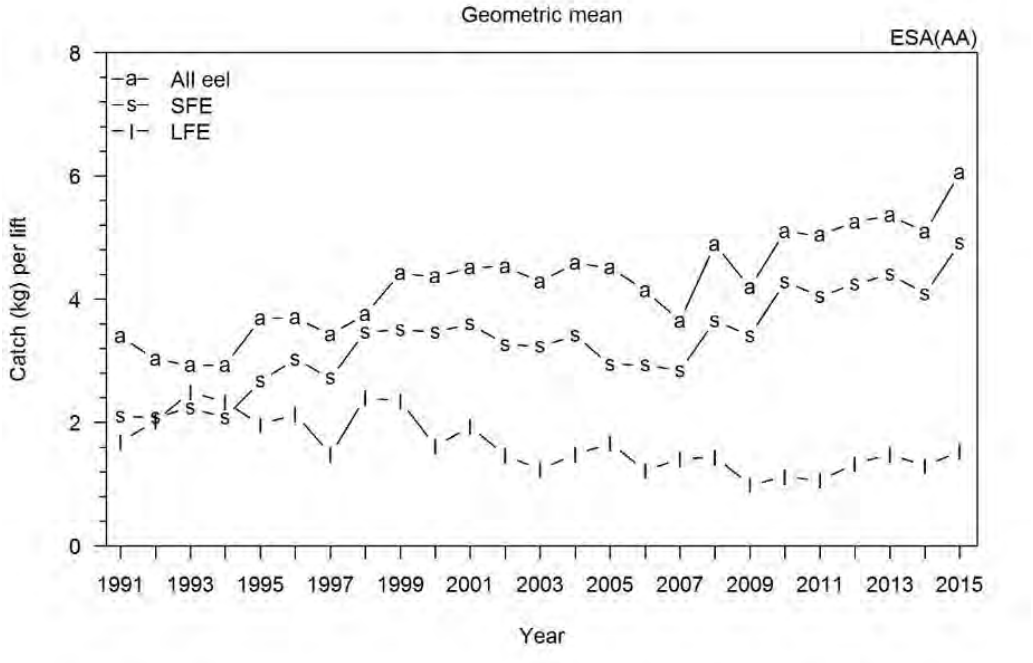


Figure A9: Unstandardised CPUE (geometric mean of catch per lift) for all eels, shortfin (SFE), and longfin (LFE) for the years 1990–91 to 2014–15 (ESA AA).

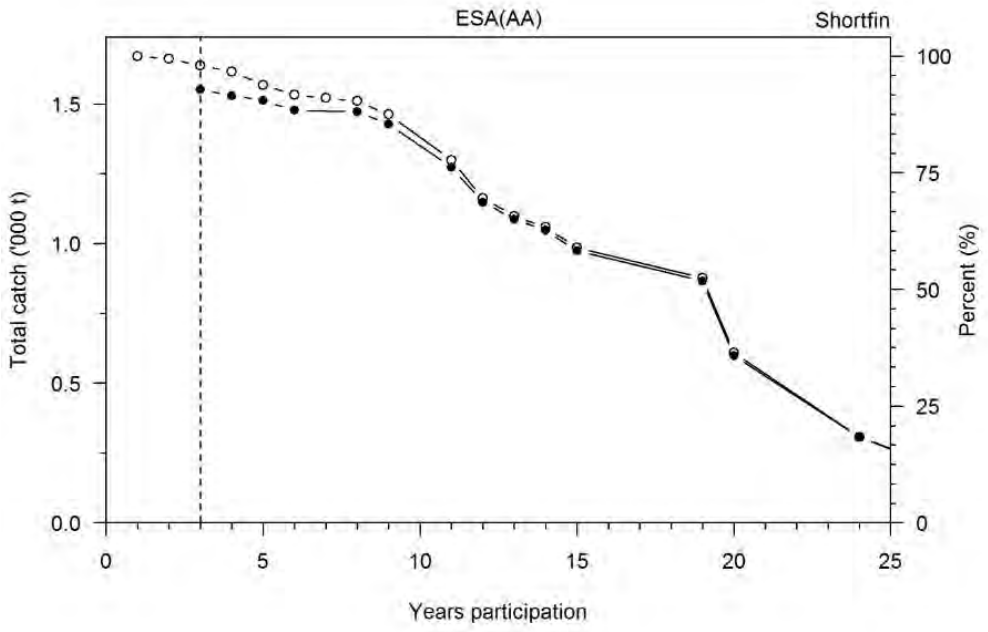


Figure A10: Relationship between years of participation in the fishery and shortfin total catch. The open circles represent all shortfin catch and the closed circles shortfin catch data from fishers who 1) caught shortfin in at least three years in each of which fishing took place in 10 days or more, and 2) caught more than 1000 kg over all years. Dotted vertical line represents 3 years participation and indicates the data included in the core shortfin fisher analyses for the years 1990–91 to 2014–15 (ESA AA).

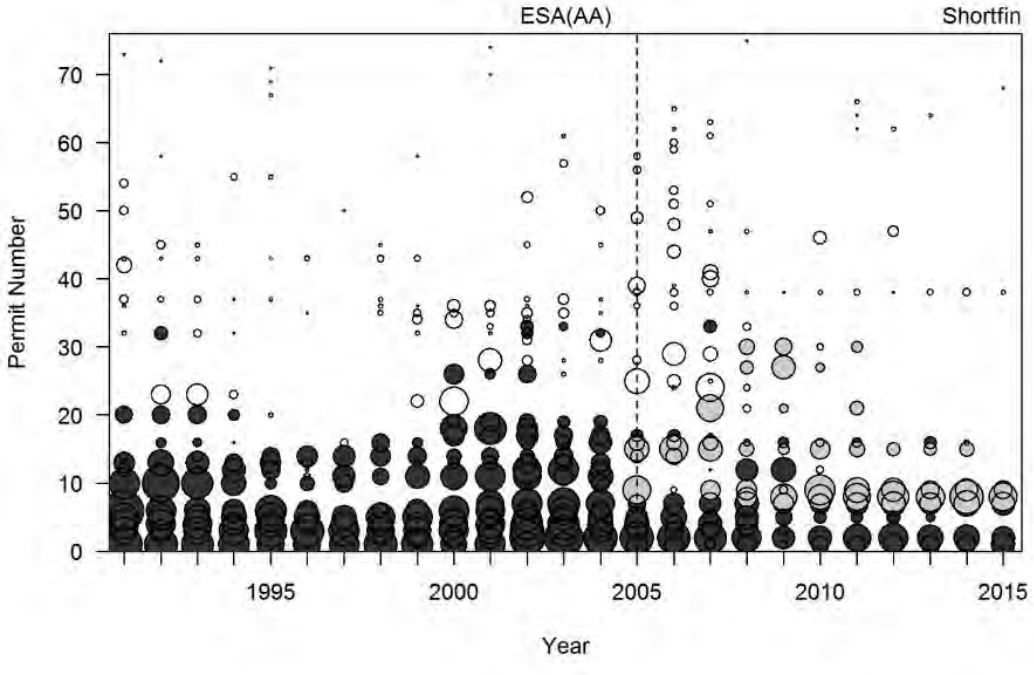


Figure A11: Relative catch of shortfin from all fishers (all circles) for the years 1990–91 to 2014–15, and for core fishers (dark and grey shaded circles) included in the catch per unit effort analyses. The vertical dotted line demarks introduction of the QMS in 2004–05. The dark shaded circles post-QMS are existing fishers and the grey, new entrants (ESA AA).

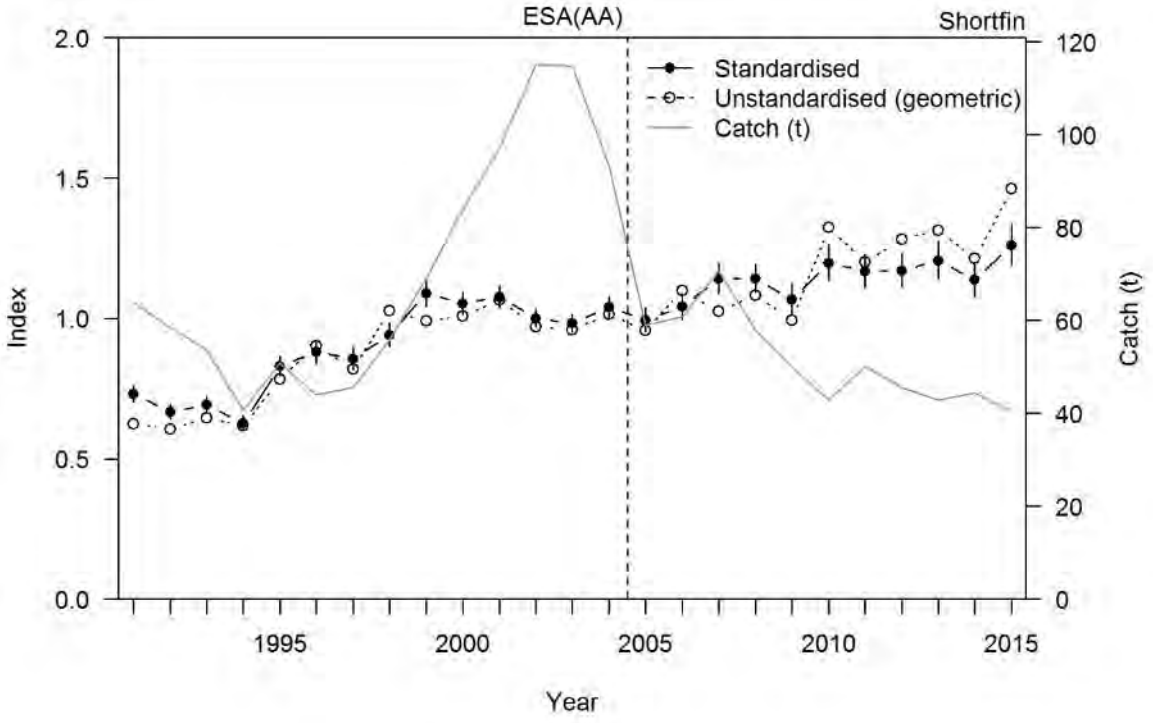


Figure A12: Indices of unstandardised (geometric mean of catch per lift) and standardised CPUE for shortfin (core fishers) for the years 1990–91 to 2014–2015. The shortfin catch by core fishers is also plotted (ESA AA).

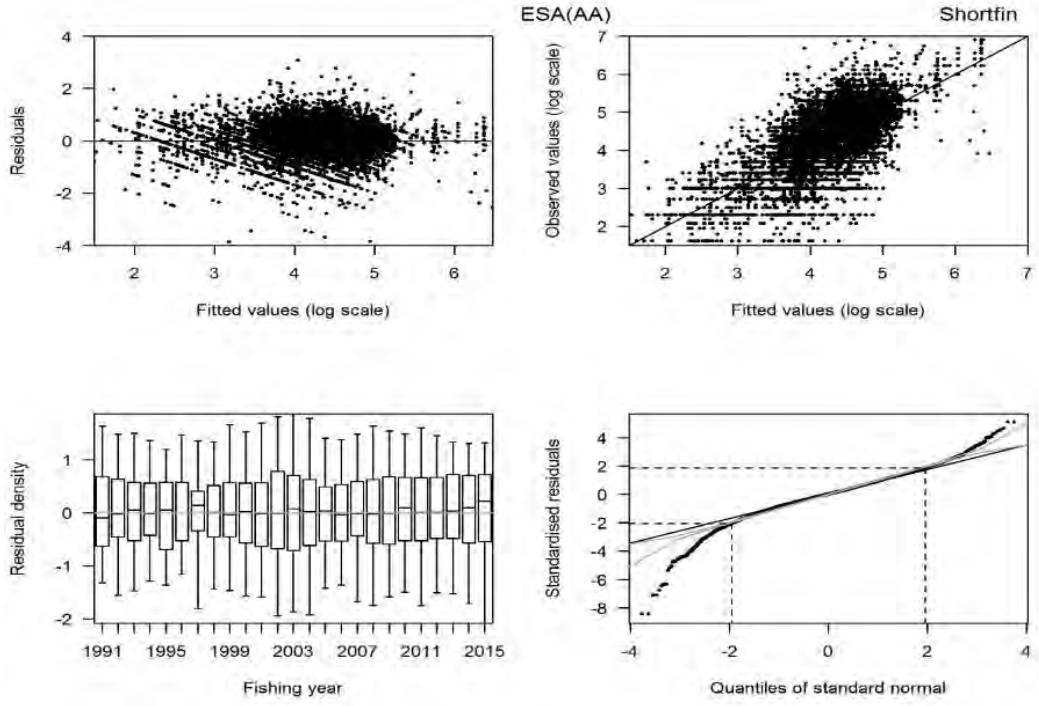


Figure A13: Residual diagnostic plots for the shortfin eel CPUE model for the years 1990–91 to 2014–15. The grey lines on the quantile-quantile plot represent the 95% confidence envelopes of a standard normal distribution (ESA AA).

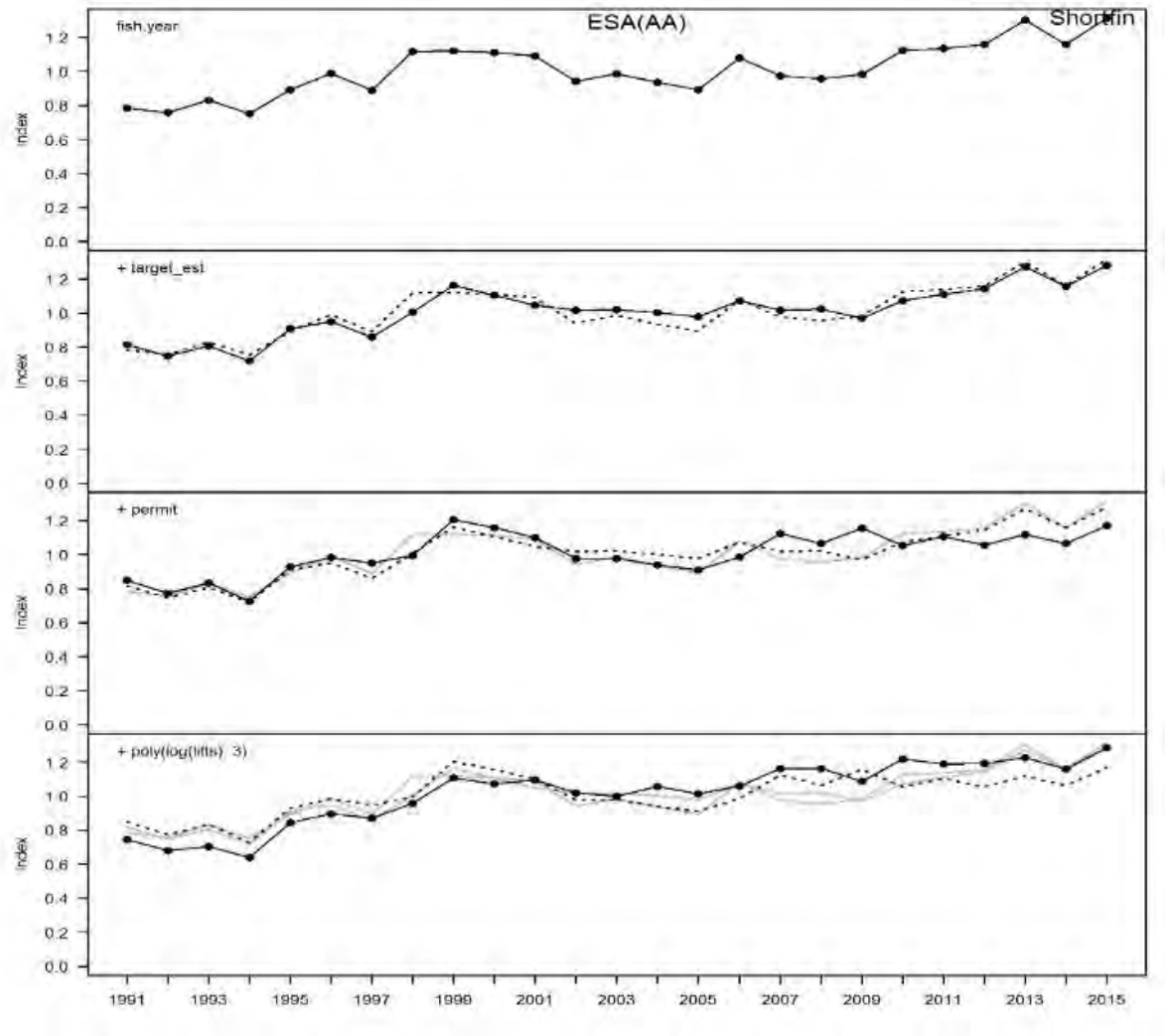


Figure A14: Step plot for the shortfin eel CPUE model for the years 1990–91 to 2014–15. Each panel shows the standardised CPUE index as each explanatory variable is added to the model with the previous index shown by the dotted line and the grey lines for steps before that (ESA AA).

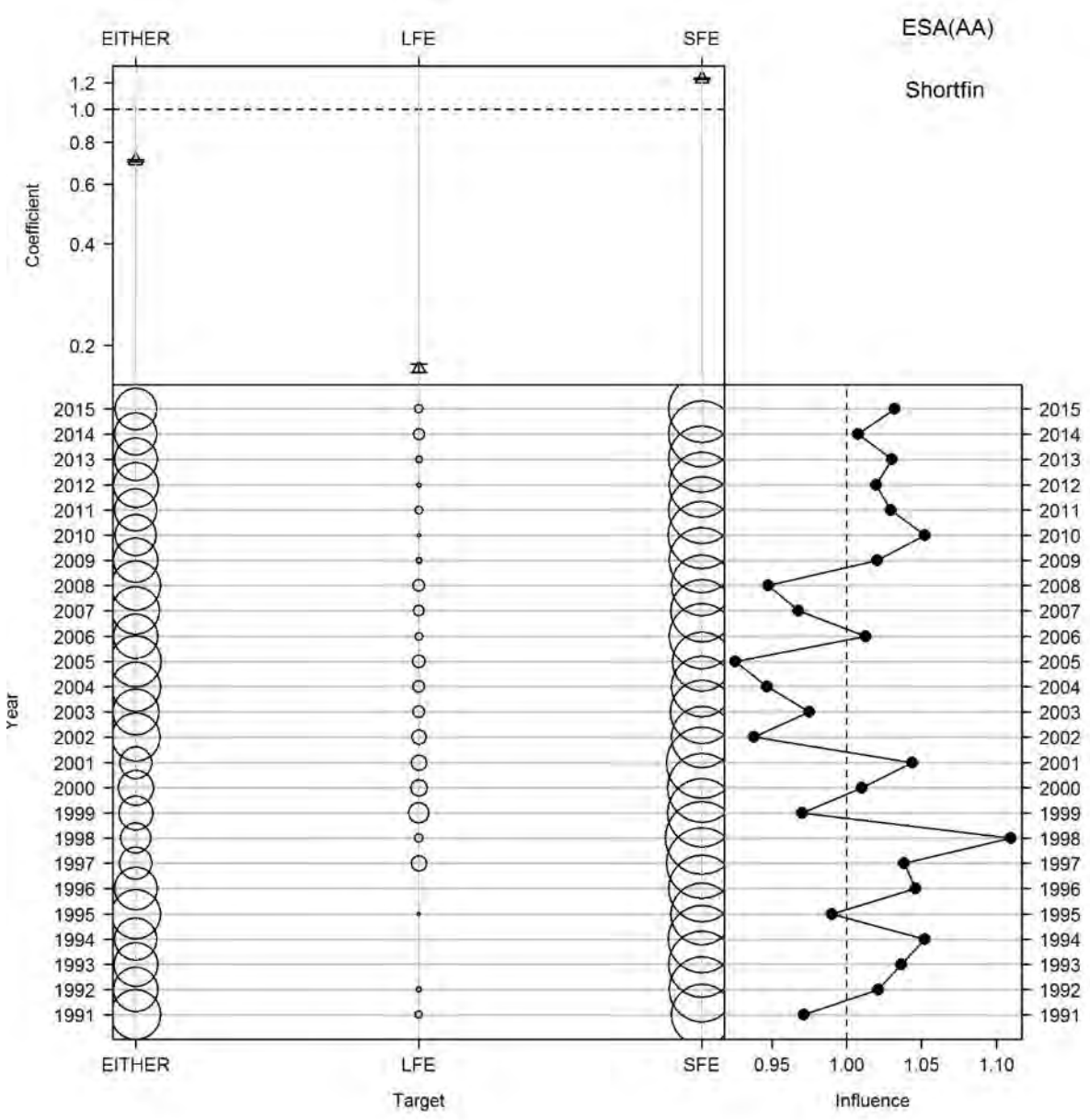


Figure A15: Influence of target for the shortfin CPUE model for the years 1990–91 to 2014–15 (ESA AA).

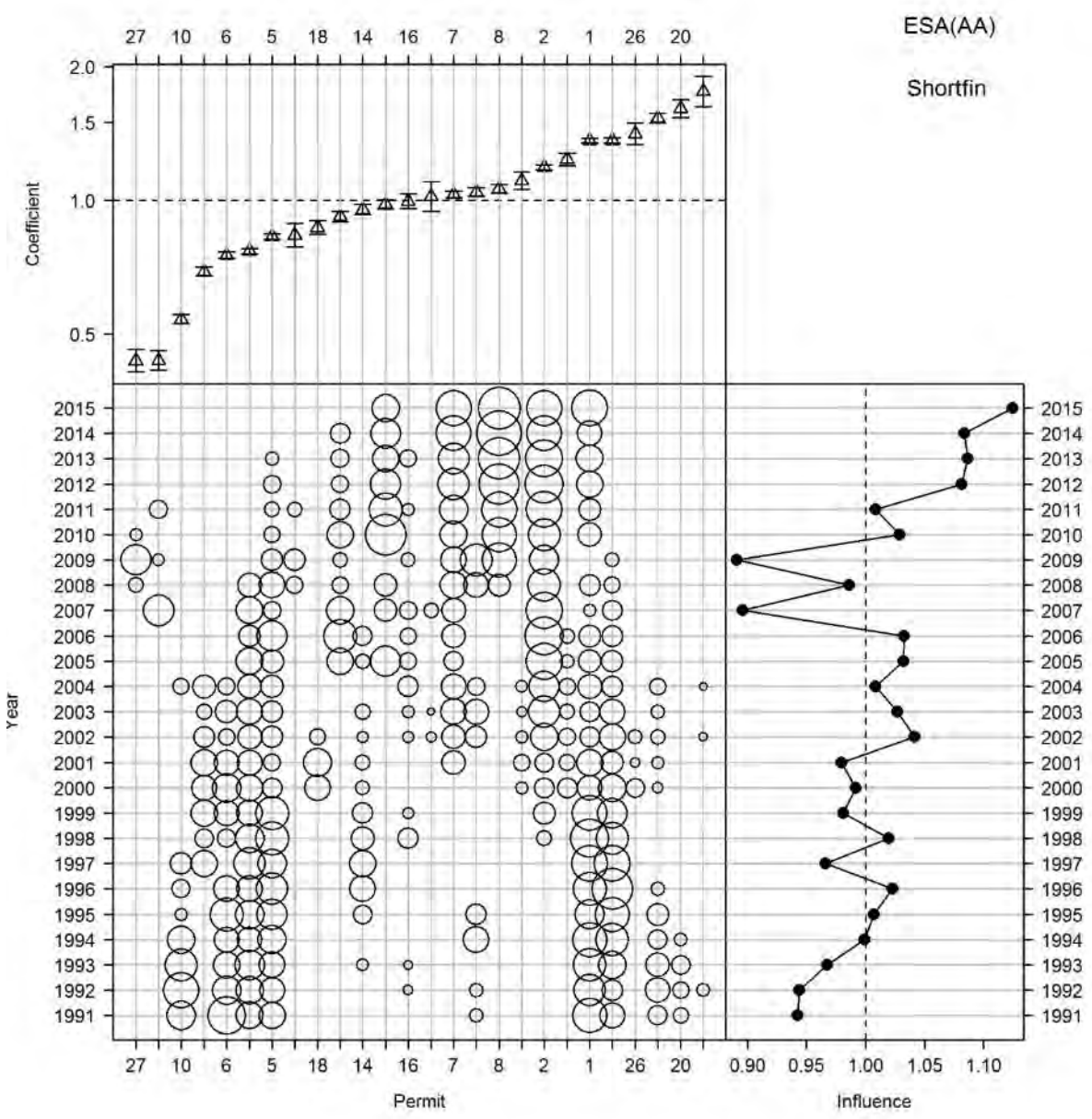


Figure A16: Influence of permit for the shortfin CPUE model for the years 1990–91 to 2014–15 (ESA AA).

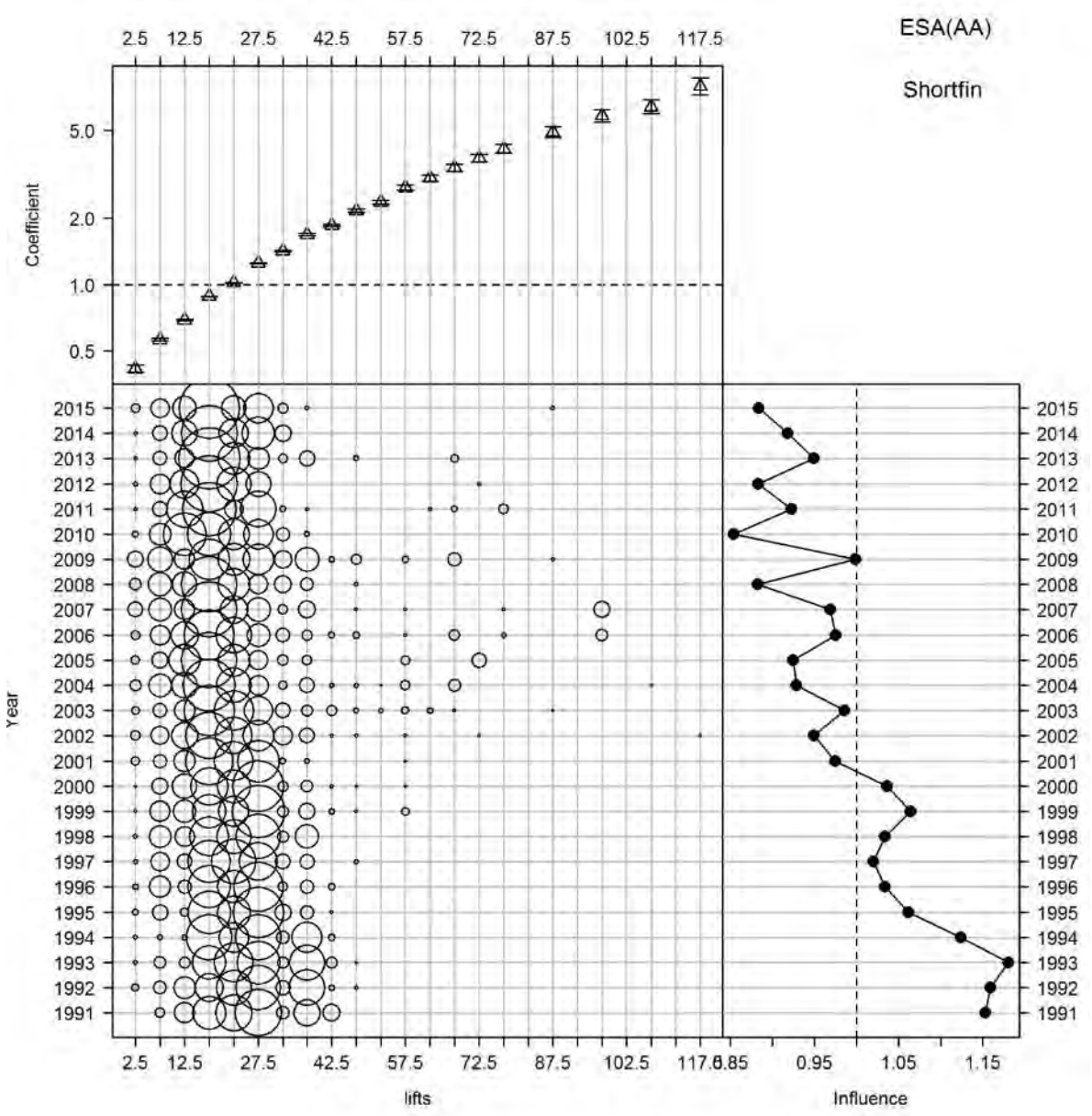


Figure A17: Influence of lifts for the shortfin CPUE model for the years 1990–91 to 2014–15 (ESA AA).

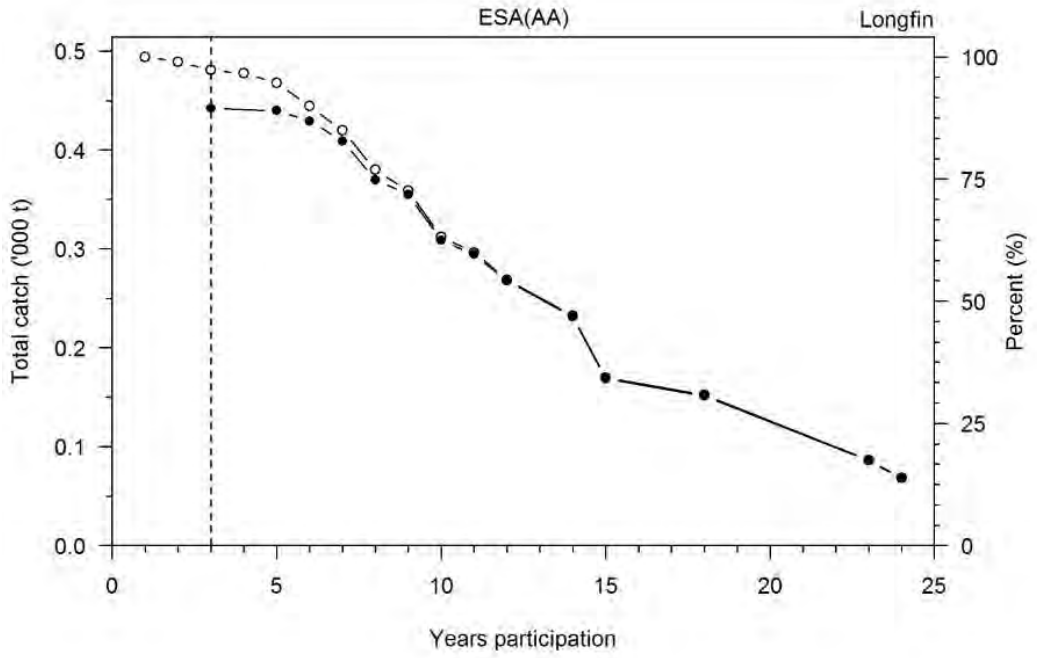


Figure A18: Relationship between years of participation in the fishery and longfin total catch. The open circles represent all longfin catch and the closed circles longfin catch data from fishers who 1) caught longfin in at least three years in each of which fishing took place in 10 days or more, and 2) caught more than 1000 kg over all years. Dotted vertical line represents 3 years participation and indicates the data included in the core longfin fisher analyses for the years 1990–91 to 2014–15 (ESA AA).

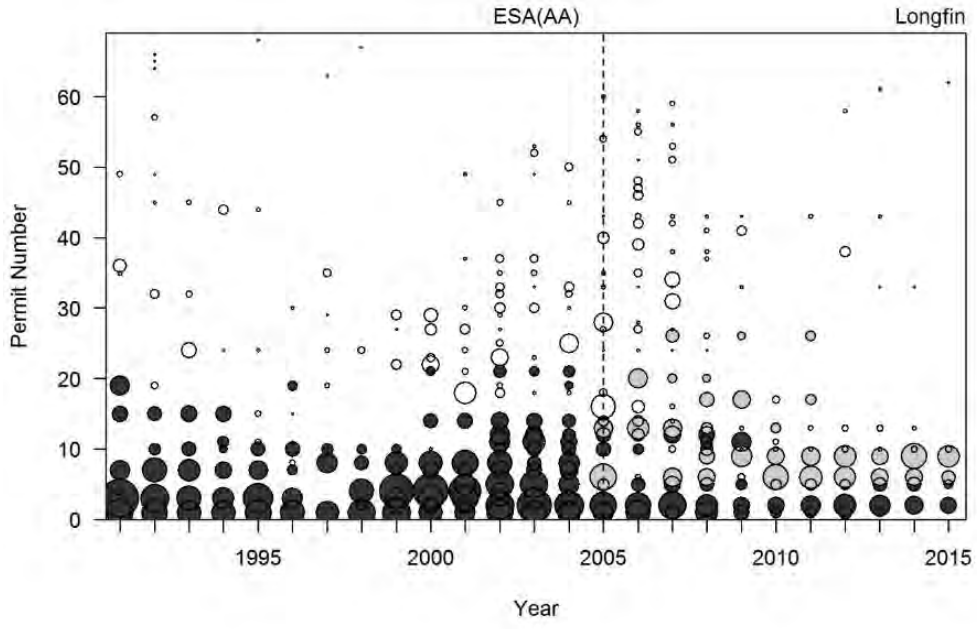


Figure A19: Relative catch of longfin from all fishers (all circles) for the years 1990–91 to 2014–15, and for core fishers (dark and grey shaded circles) included in the catch per unit effort analyses. The vertical dotted line demarks introduction of the QMS in 2004-05. The dark shaded circles post-QMS are existing fishers and the grey, new entrants (ESA AA).

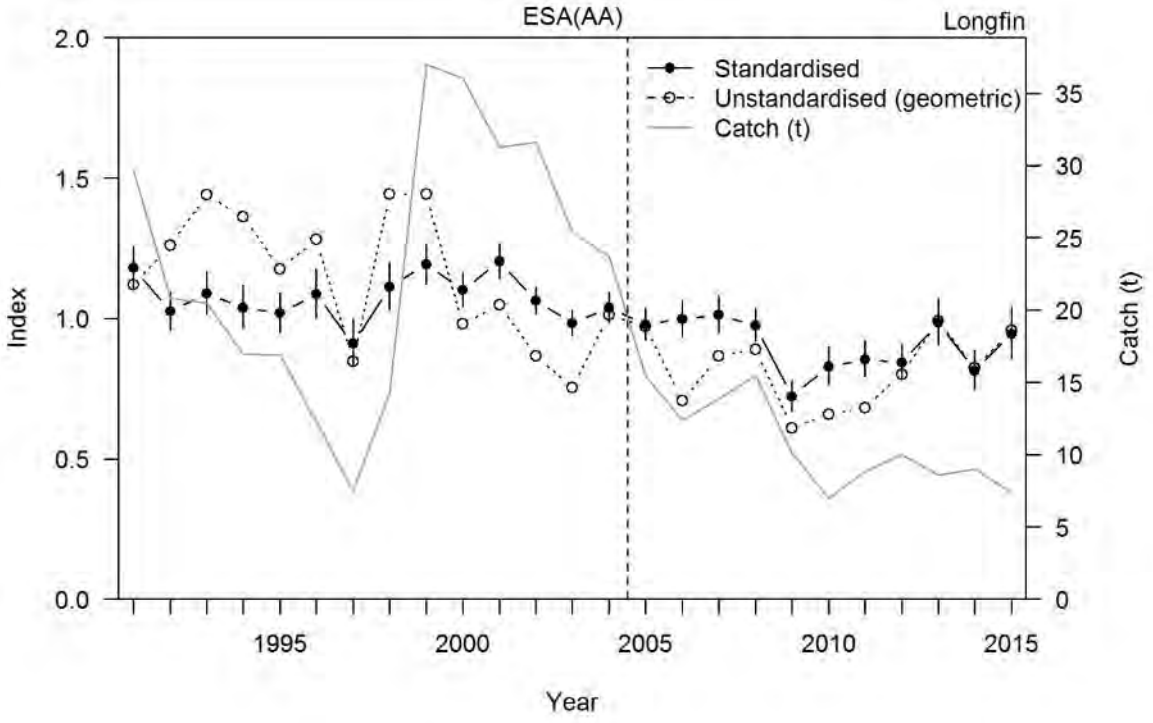


Figure A20: Indices of unstandardised (geometric mean of catch per lift) and standardised CPUE for longfin (core fishers) for the years 1990–91 to 2014–2015. The longfin catch by core fishers is also plotted (ESA AA).

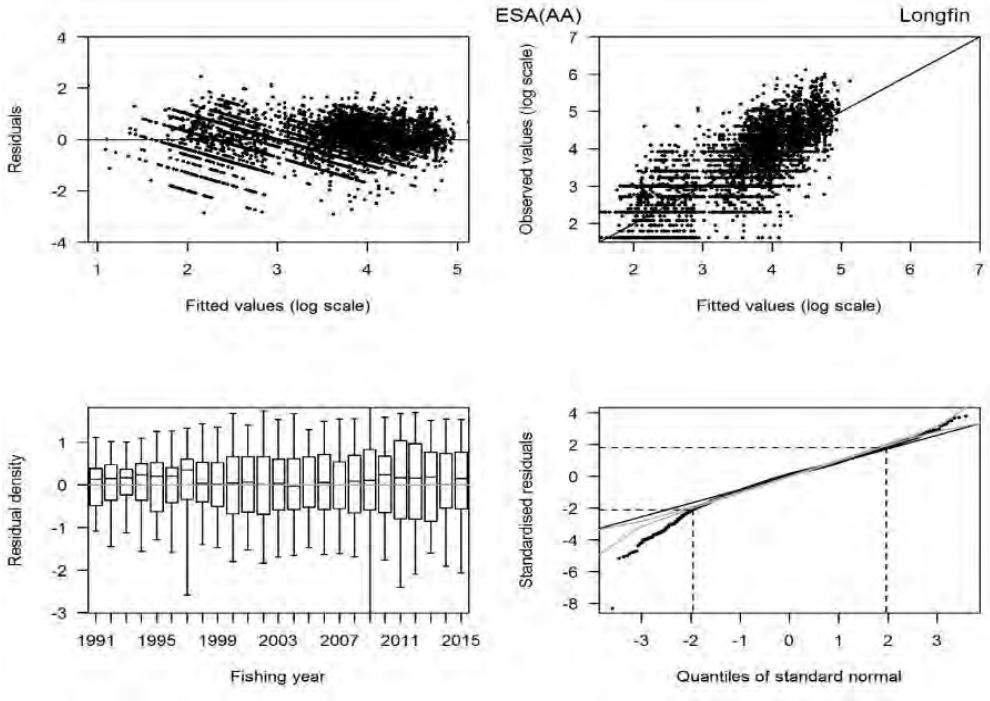


Figure A21: Residual diagnostic plots for the longfin eel CPUE model for the years 1990–91 to 2014–15. The grey lines on the quantile-quantile plot represent the 95% confidence envelopes of a standard normal distribution (ESA AA).

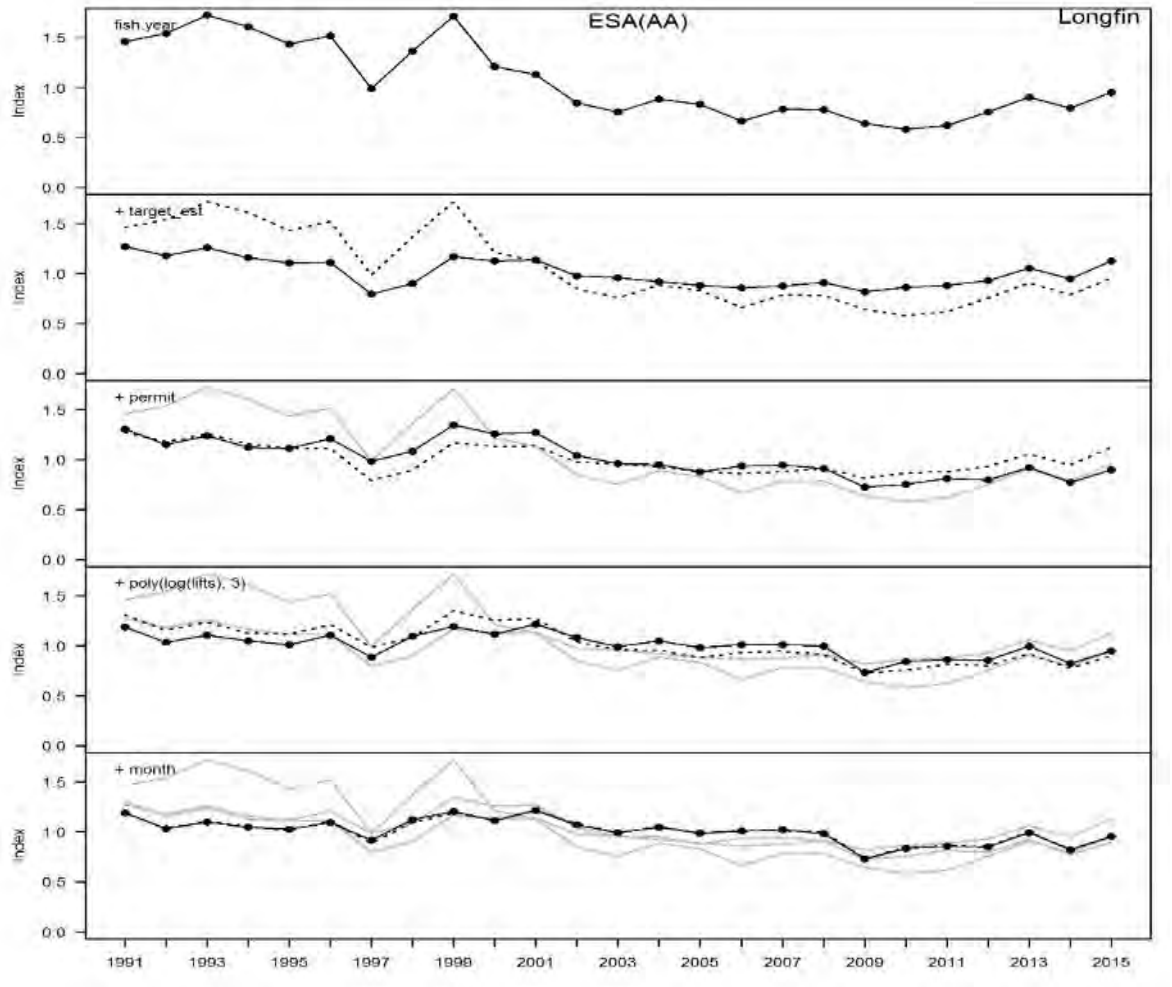


Figure A22: Step plot for the longfin eel CPUE model for the years 1990–91 to 2014–15. Each panel shows the standardised CPUE index as each explanatory variable is added to the model with the previous index shown by the dotted line and the grey lines for steps before that (ESA AA).

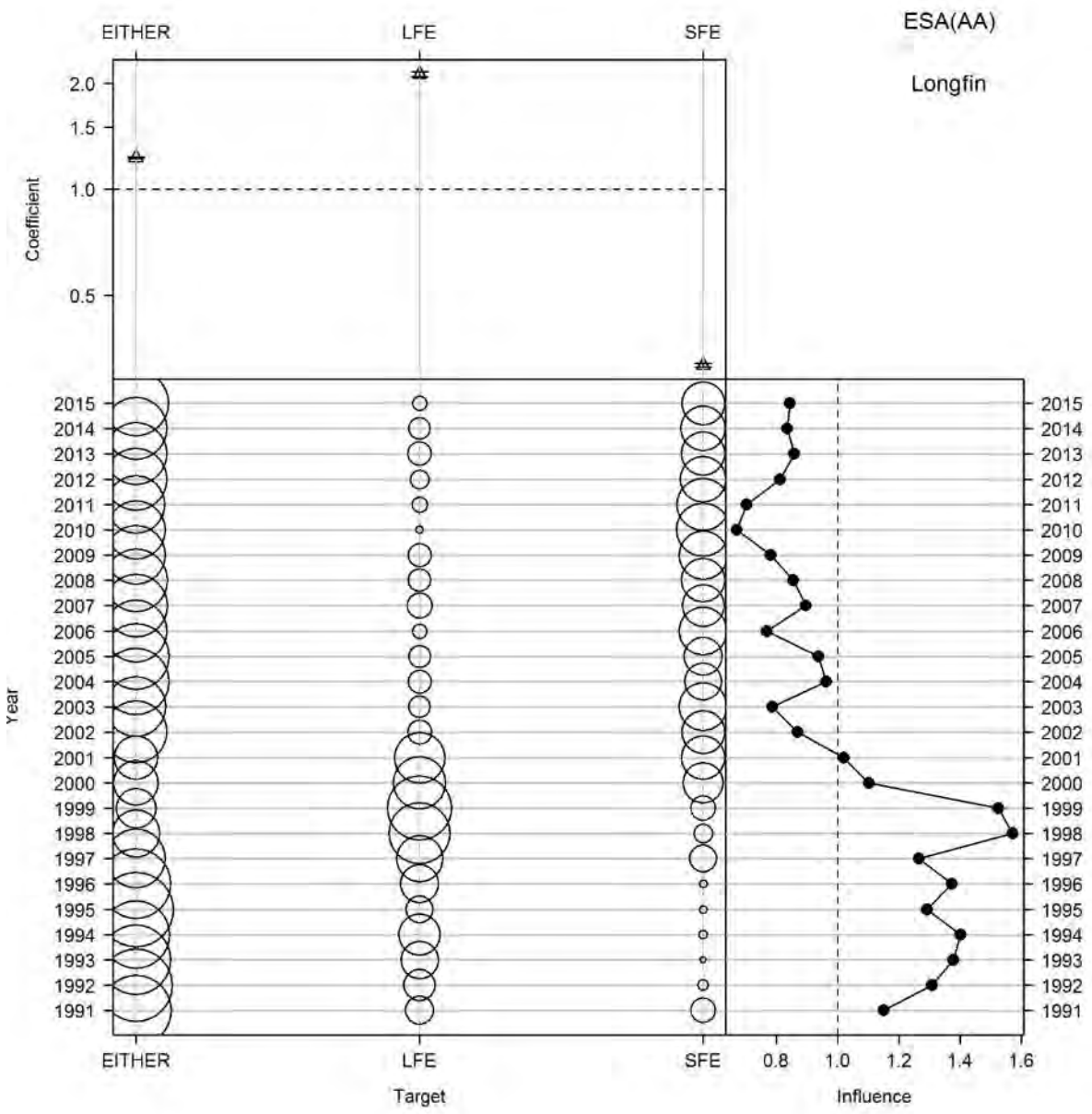


Figure A23: Influence of target for the longfin CPUE model for the years 1990–91 to 2014–15 (ESA AA).

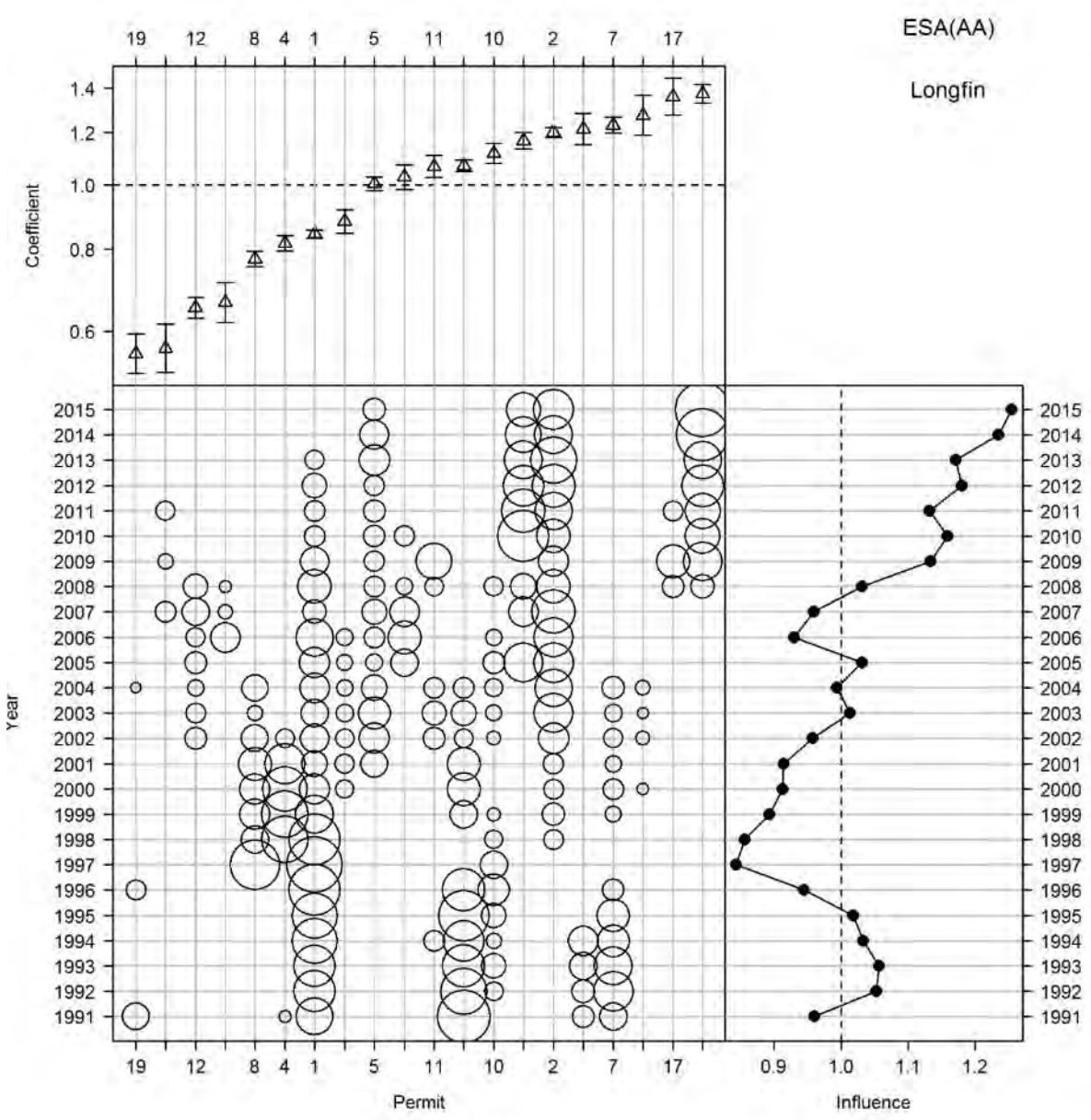


Figure A24: Influence of permit for the longfin CPUE model for the years 1990–91 to 2014–15 (ESA AA).

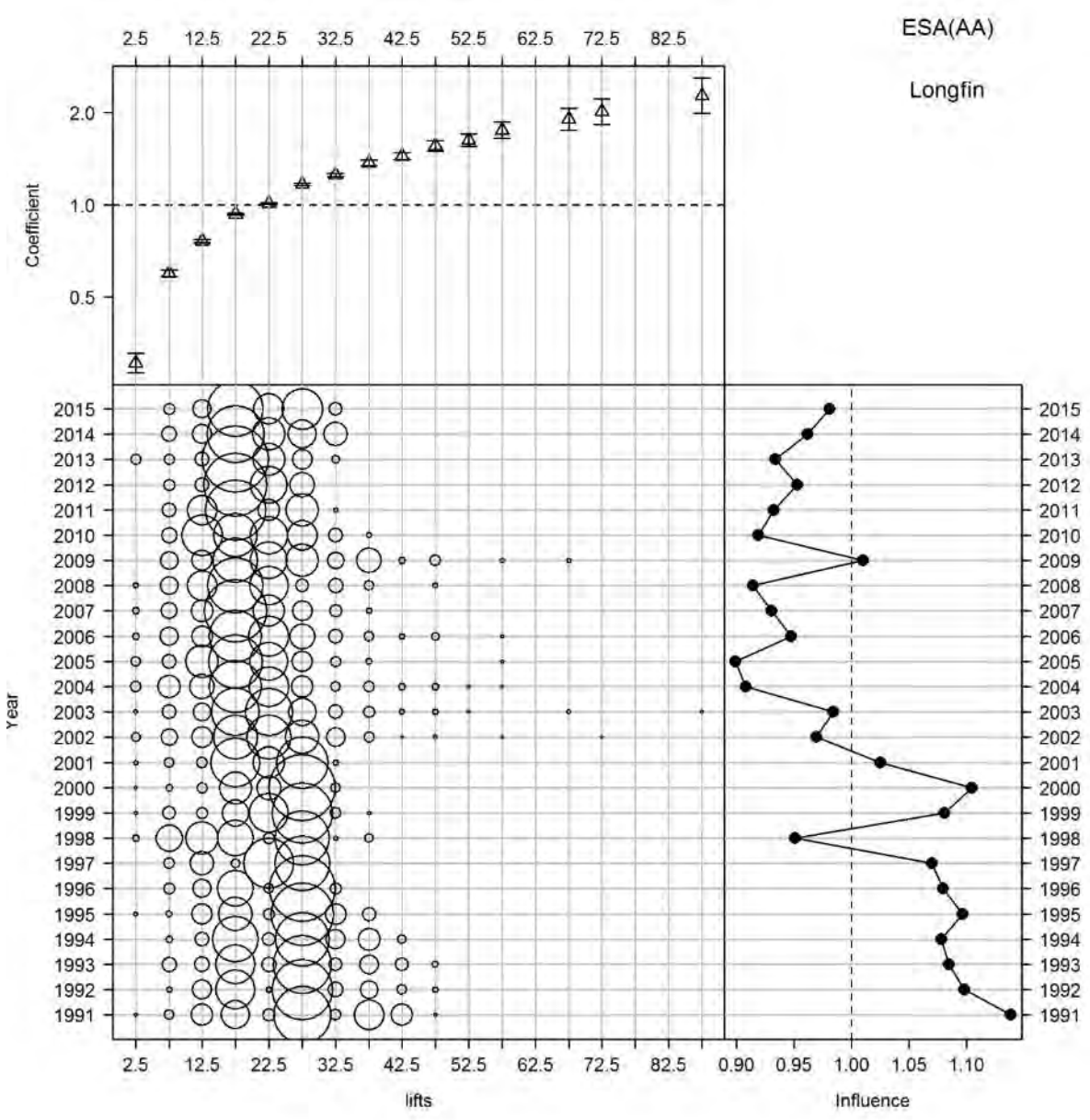


Figure A25: Influence of lifts for the longfin CPUE model for the years 1990–91 to 2014–15 (ESA AA).

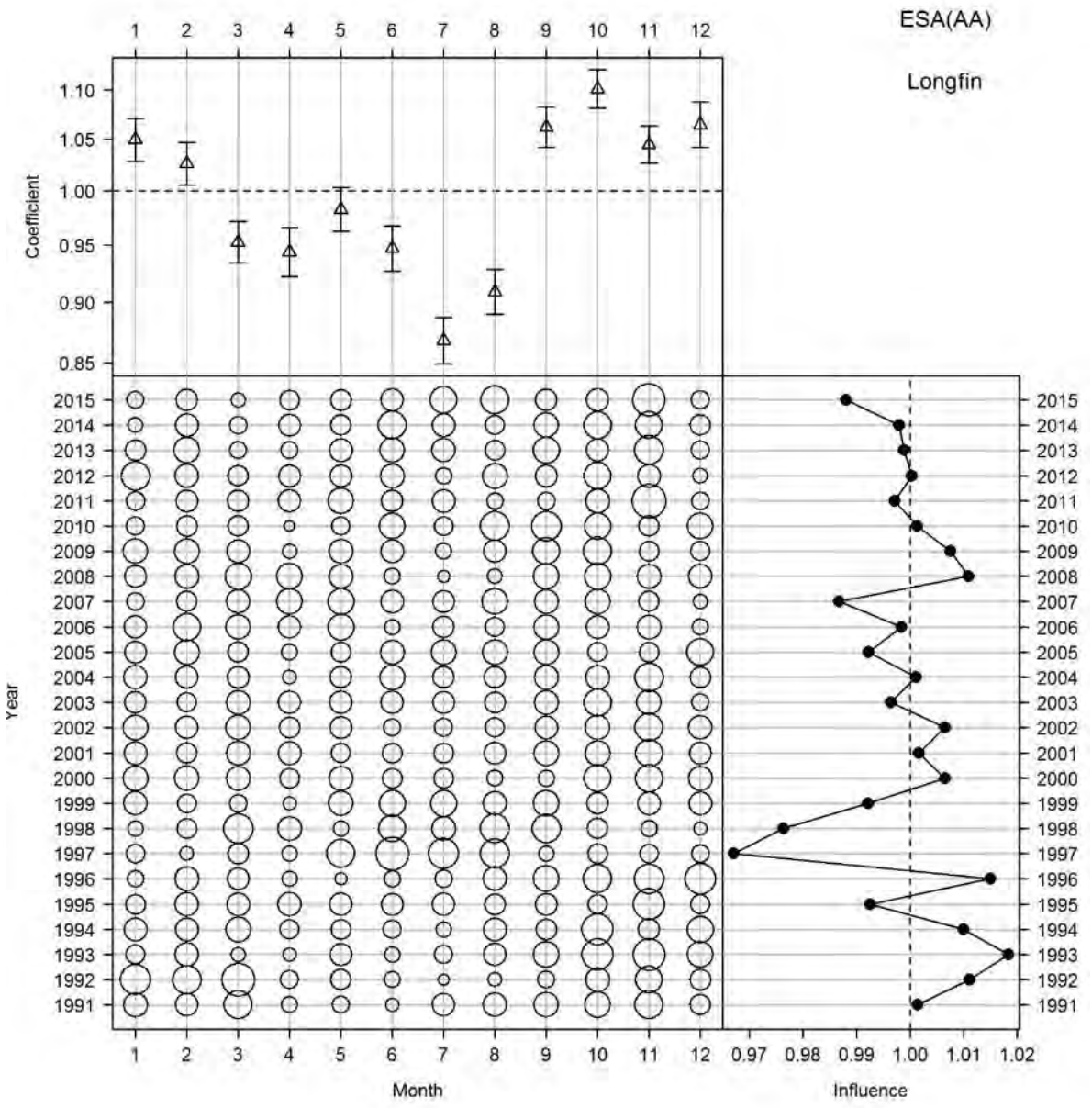


Figure A26: Influence of month for the longfin CPUE model for the years 1990–91 to 2014–15 (ESA AA).

APPENDIX B: AUCKLAND (ESA AB)

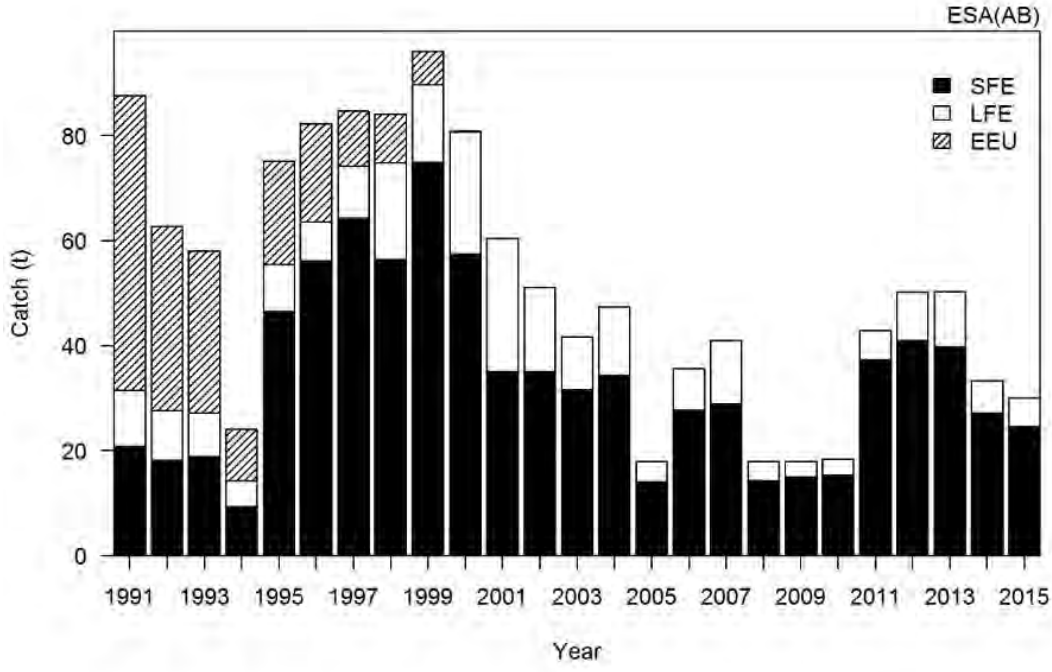


Figure B1: Total estimated commercial catch of shortfin (SFE), longfin (LFE), and unclassified eel catch (EEU) for the years 1990–91 to 2014–15 (ESA AB).

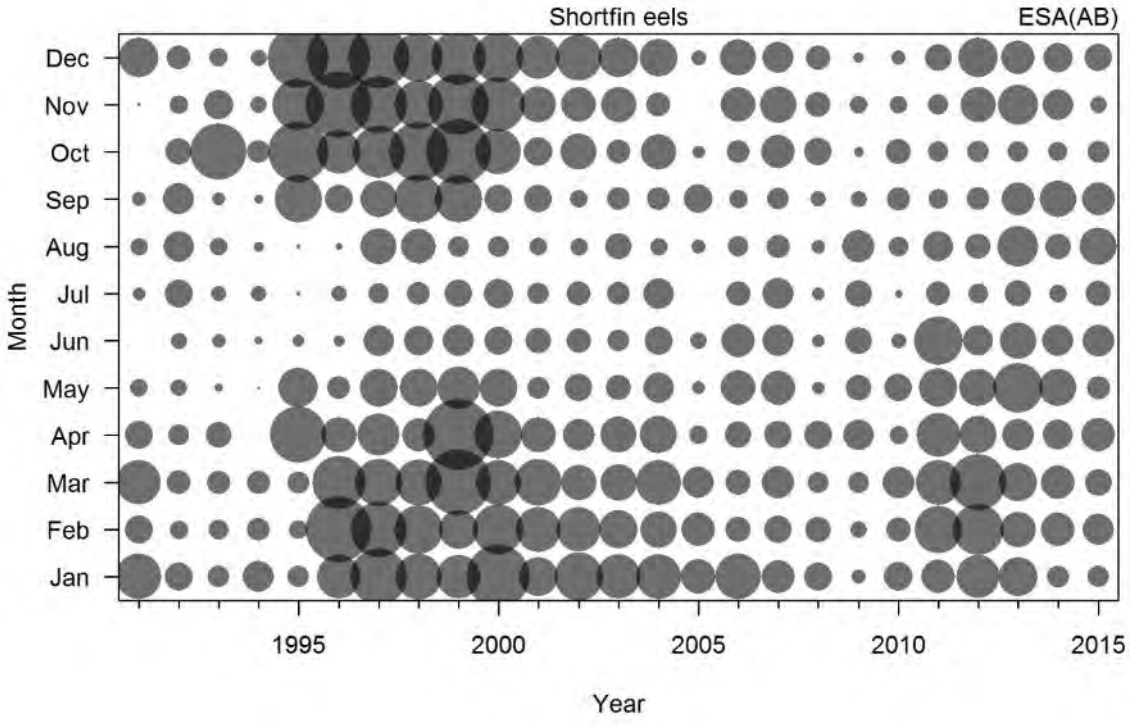


Figure B2: Shortfin eel catch by month for the years 1990–91 to 2014–15. The catch before 2001 is missing an unknown amount that was recorded as EEU (ESA AB).

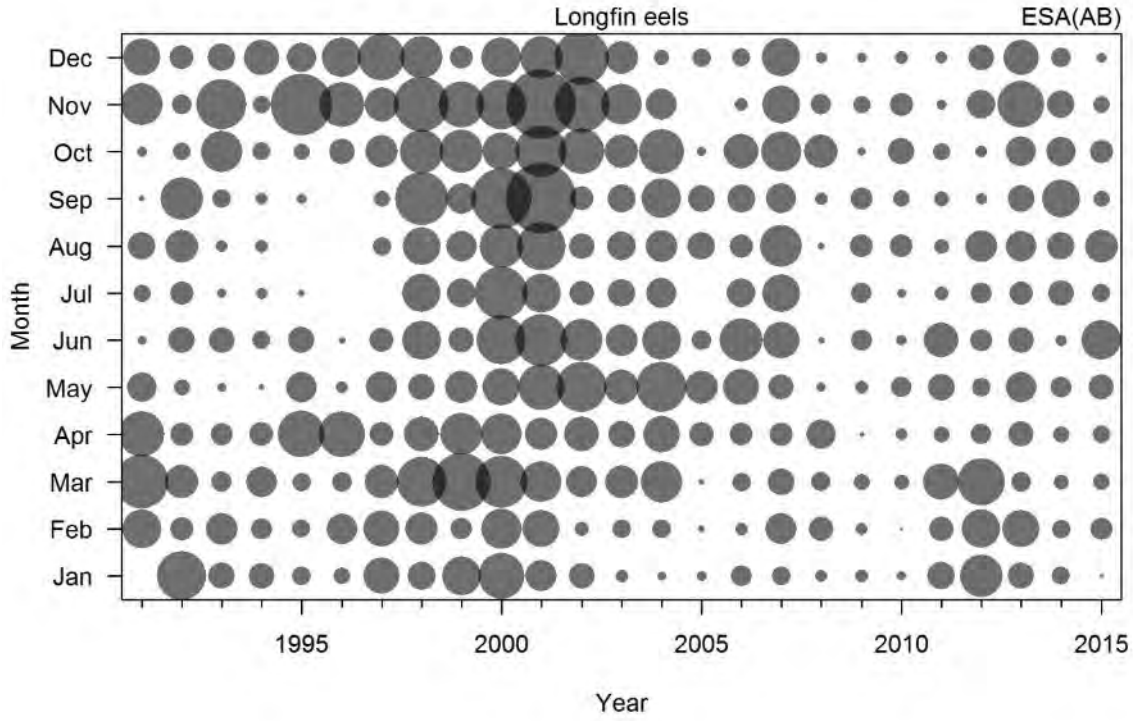


Figure B3: Longfin eel catch by month for the years 1990–91 to 2014–15. The catch before 2001 is missing an unknown amount that was recorded as EEU (ESA AB).

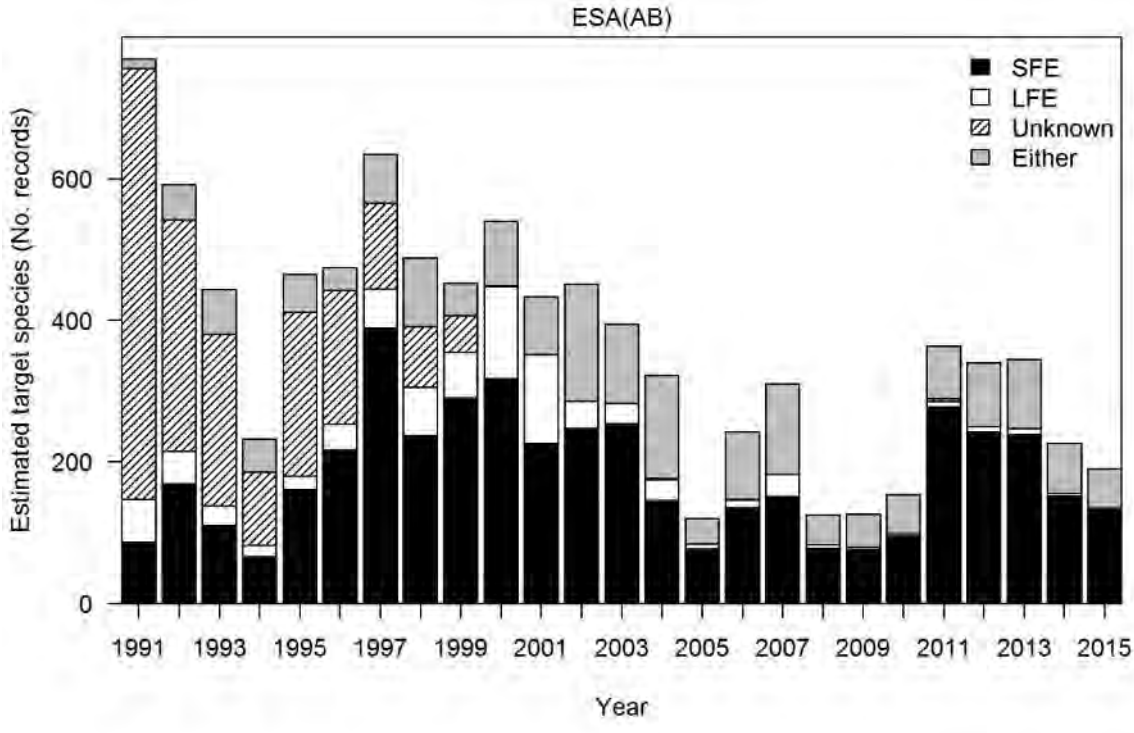


Figure B4: Reconstructed target species for the years 1990–91 to 2014–15 (ESA AB).

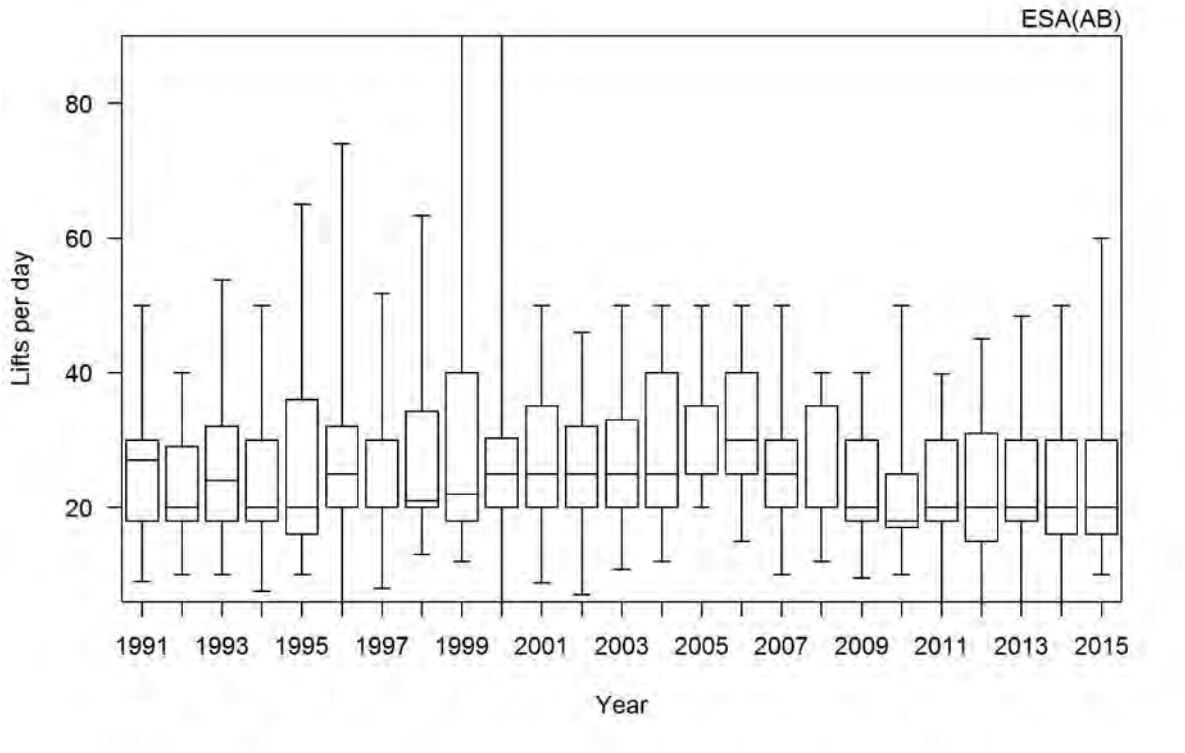


Figure B5: Total lifts per day for the years 1990–91 to 2014–15. The horizontal line is the median, the top and bottom of the box are the interquartiles (25th and 75th), and error bars are the 95th percentile range (ESA AB).

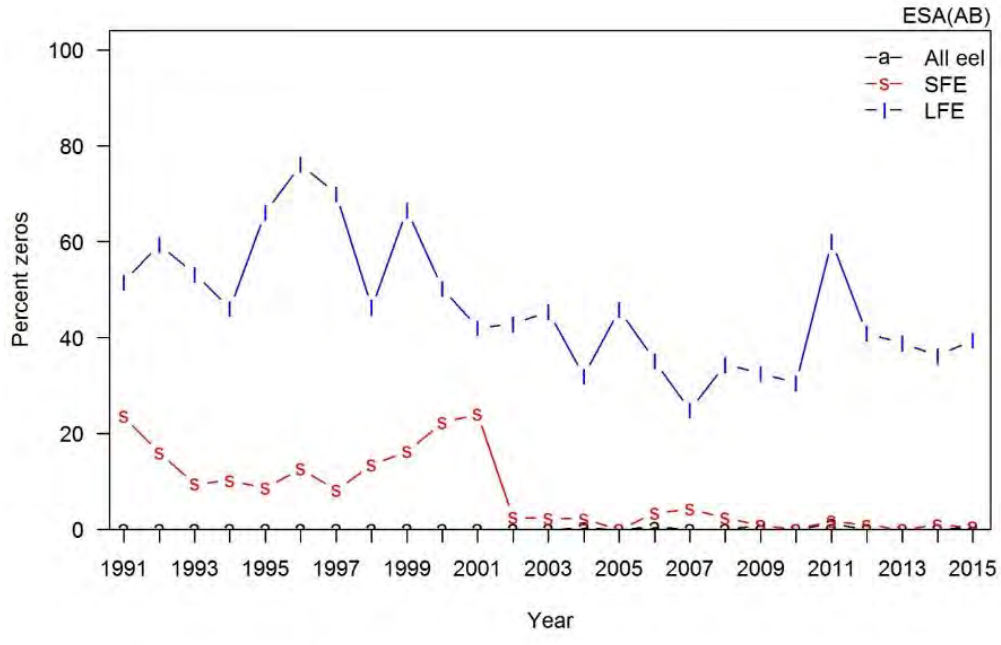


Figure B6: Proportion of valid zero records for all eels, shortfin (SFE) and longfin (LFE) for the years 1990–91 to 2014–15. Excludes zeros associated with reporting EEU (unclassified) (ESA AB).

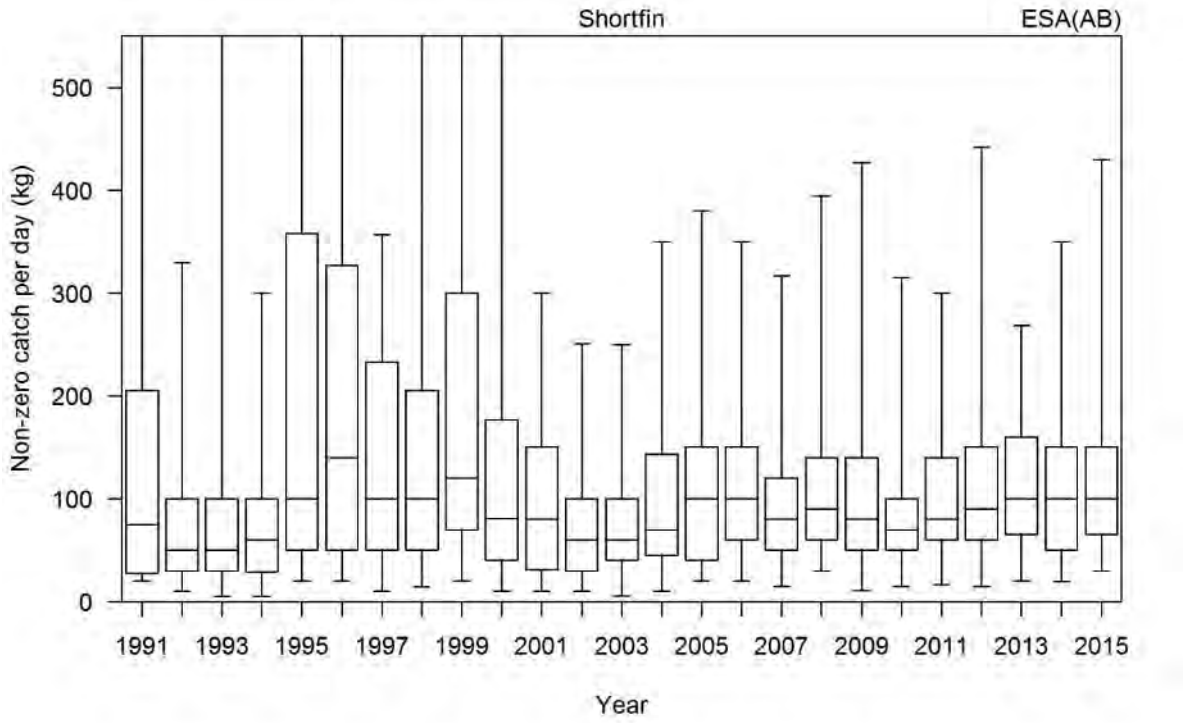


Figure B7: Shortfin non-zero catch per day for the years 1990–91 to 2014–15. The horizontal line is the median, the top and bottom of the box are the interquartiles (25th and 75th), and error bars are the 95th percentile range (ESA AB).

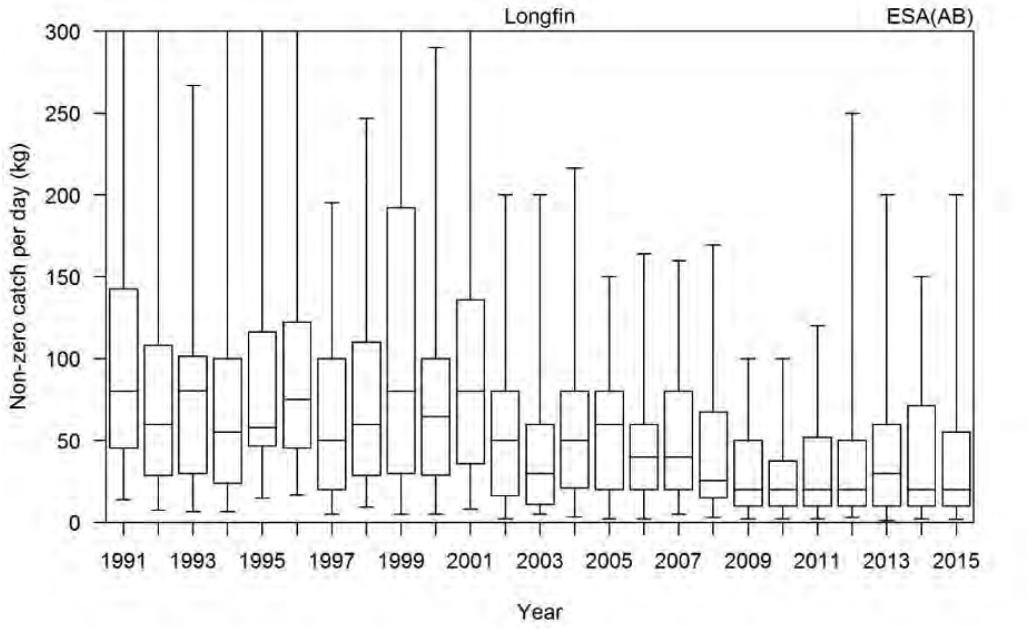


Figure B8: Longfin non-zero catch per day for the years 1990–91 to 2014–15. The horizontal line is the median, the top and bottom of the box are the interquartiles (25th and 75th), and error bars are the 95th percentile range (ESA AB).

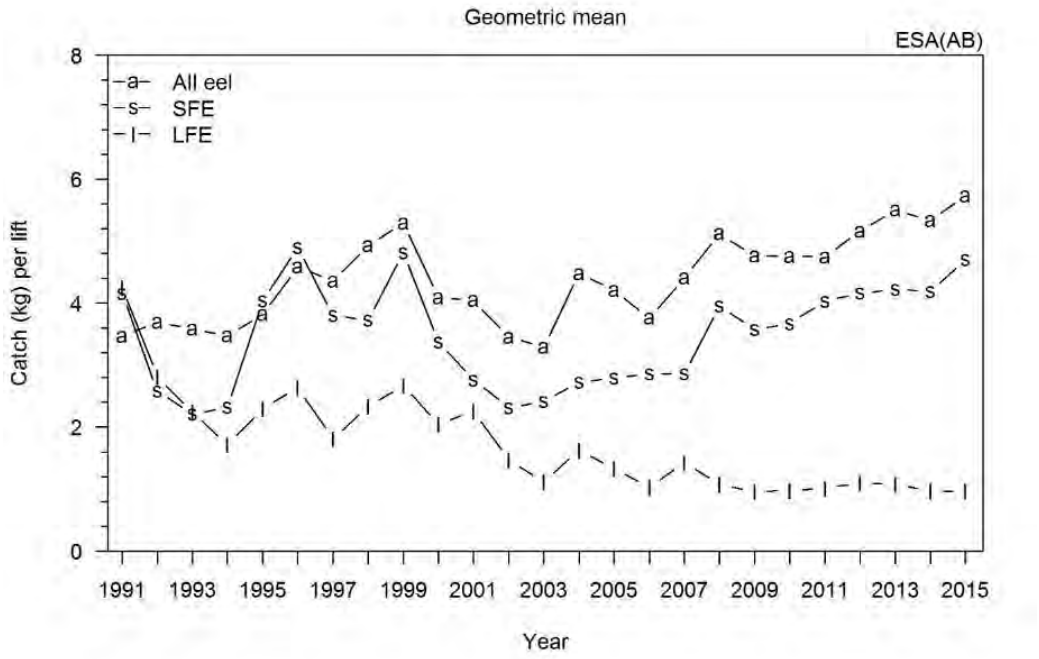


Figure B9: Unstandardised CPUE (geometric mean of catch per lift) for all eels, shortfin (SFE), and longfin (LFE) for the years 1990–91 to 2014–15 (ESA AB).

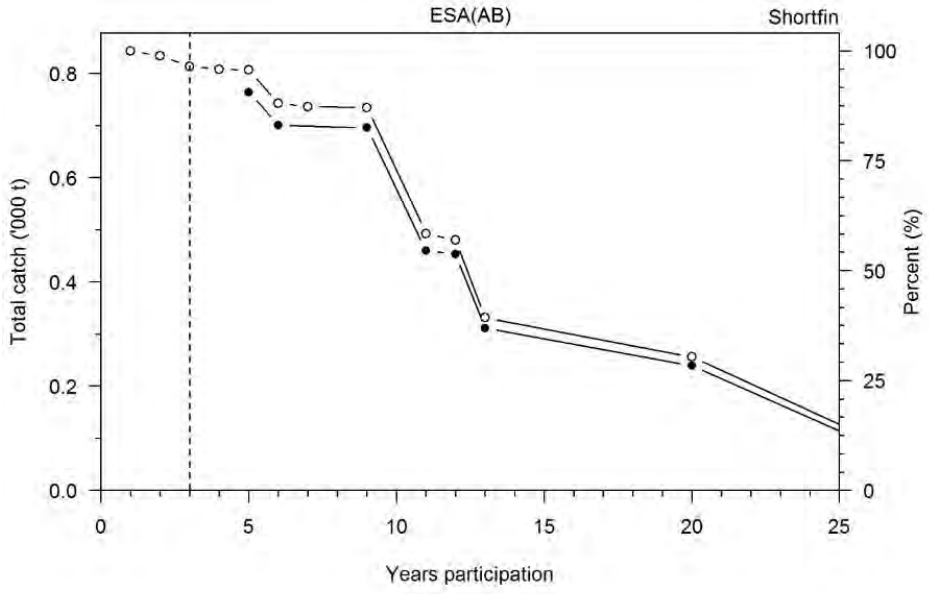


Figure B10: Relationship between years of participation in the fishery and shortfin total catch. The open circles represent all shortfin catch and the closed circles shortfin catch data from fishers who 1) caught shortfin in at least three years in each of which fishing took place in 10 days or more, and 2) caught more than 1000 kg over all years. Dotted vertical line represents 3 years participation and indicates the data included in the core shortfin fisher analyses for the years 1990–91 to 2014–15 (ESA AB).

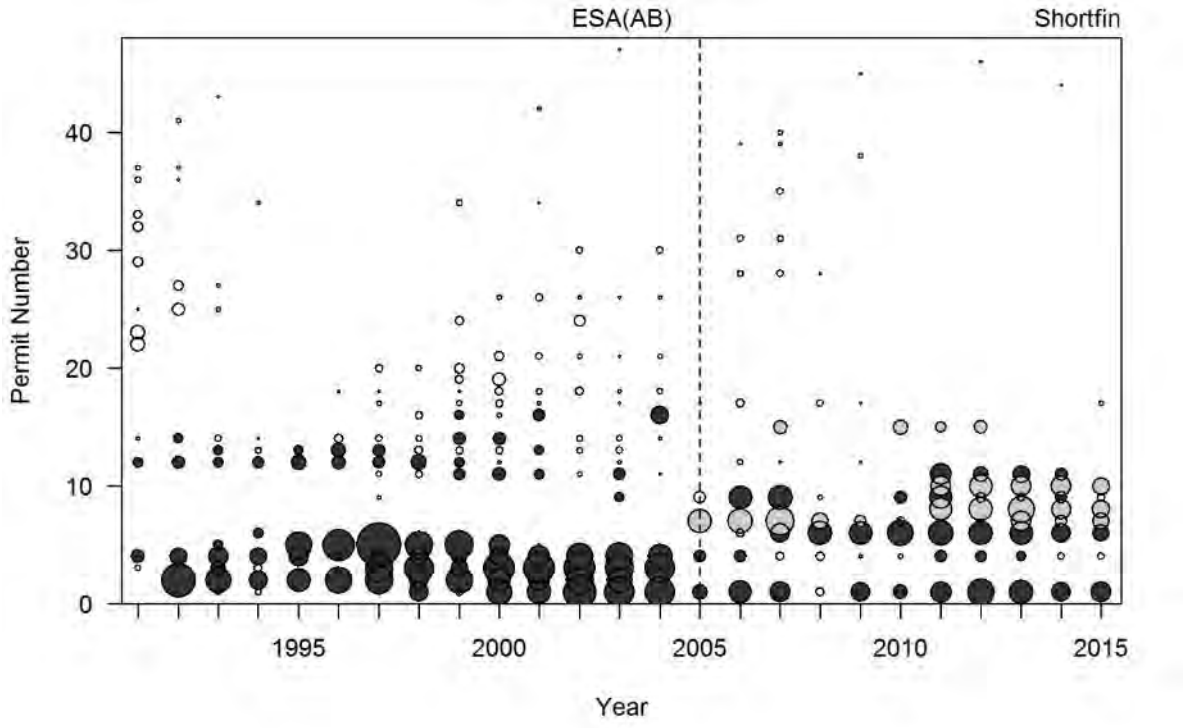


Figure B11: Relative catch of shortfin from all fishers (all circles) for the years 1990–91 to 2014–15, and for core fishers (dark and grey shaded circles) included in the catch per unit effort analyses. The vertical dotted line demarks introduction of the QMS in 2004-05. The dark shaded circles post-QMS are existing fishers and the grey, new entrants (ESA AB).

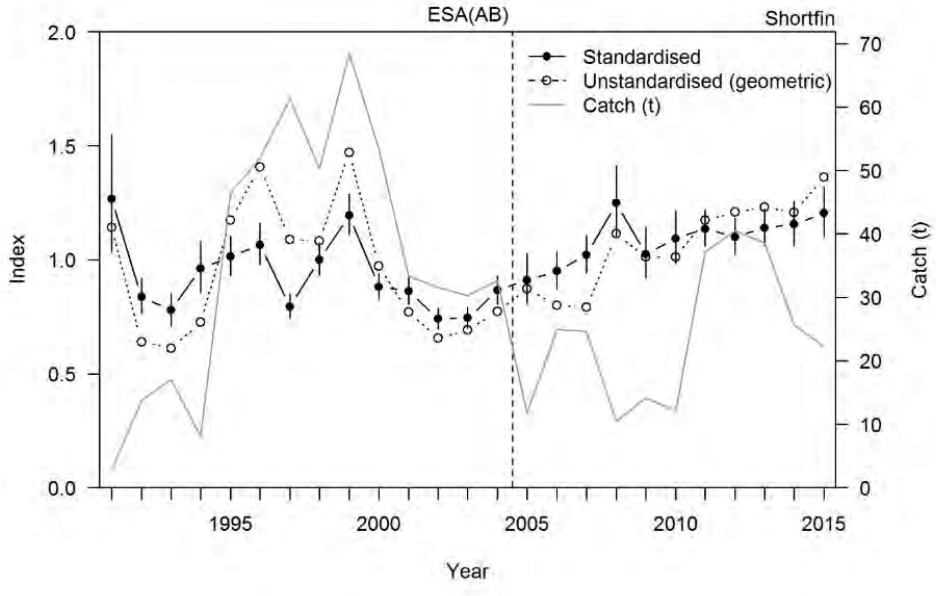


Figure B12: Indices of unstandardised (geometric mean of catch per lift) and standardised CPUE for shortfin core fishers for the years 1990–91 to 2014–15. The shortfin catch by core fishers is also plotted (ESA AB).

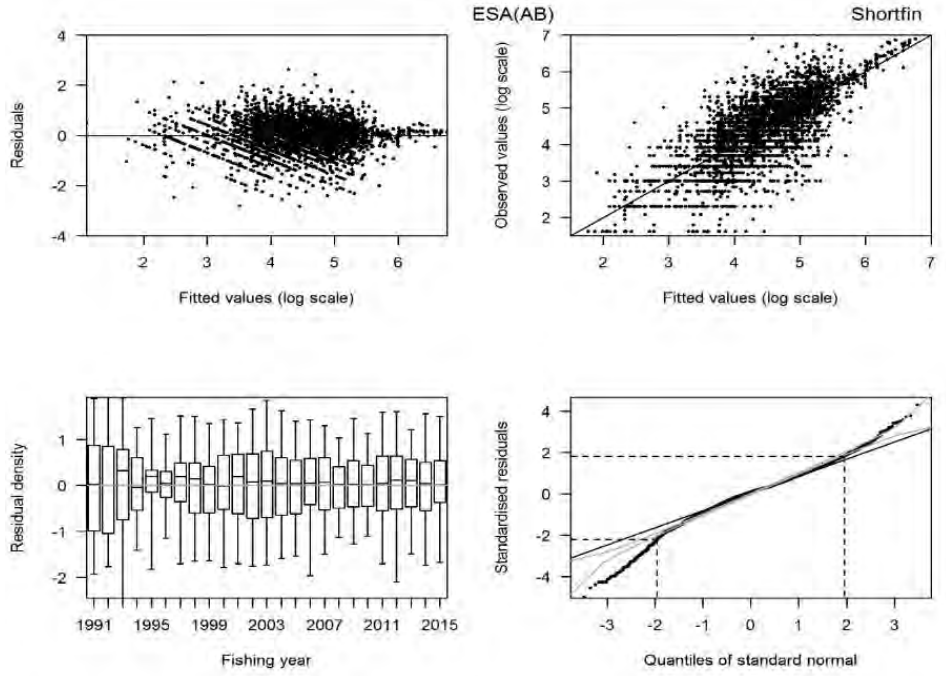


Figure B13: Residual diagnostic plots for the shortfin eel CPUE model for the years 1990–91 to 2014–15. The grey lines on the quantile-quantile plot represent the 95% confidence envelopes of a standard normal distribution (ESA AB).

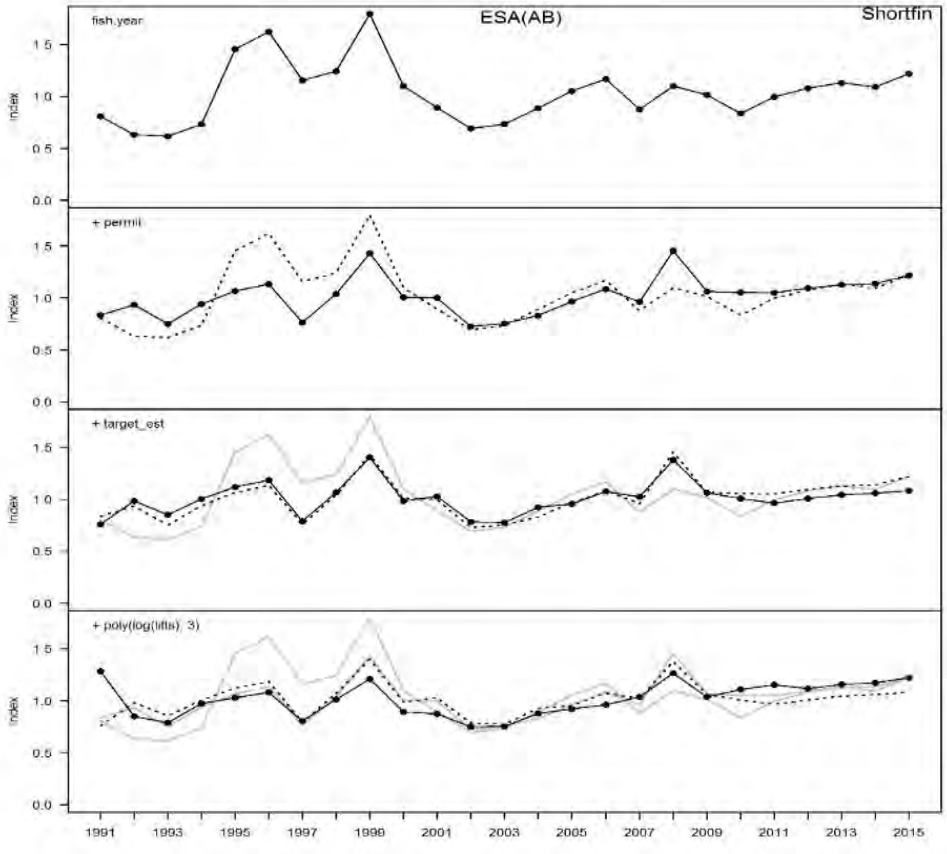


Figure B14: Step plot for the shortfin eel CPUE model for the years 1990–91 to 2014–15. Each panel shows the standardised CPUE index as each explanatory variable is added to the model with the previous index shown by the dotted line and the grey lines for steps before that (ESA AB).

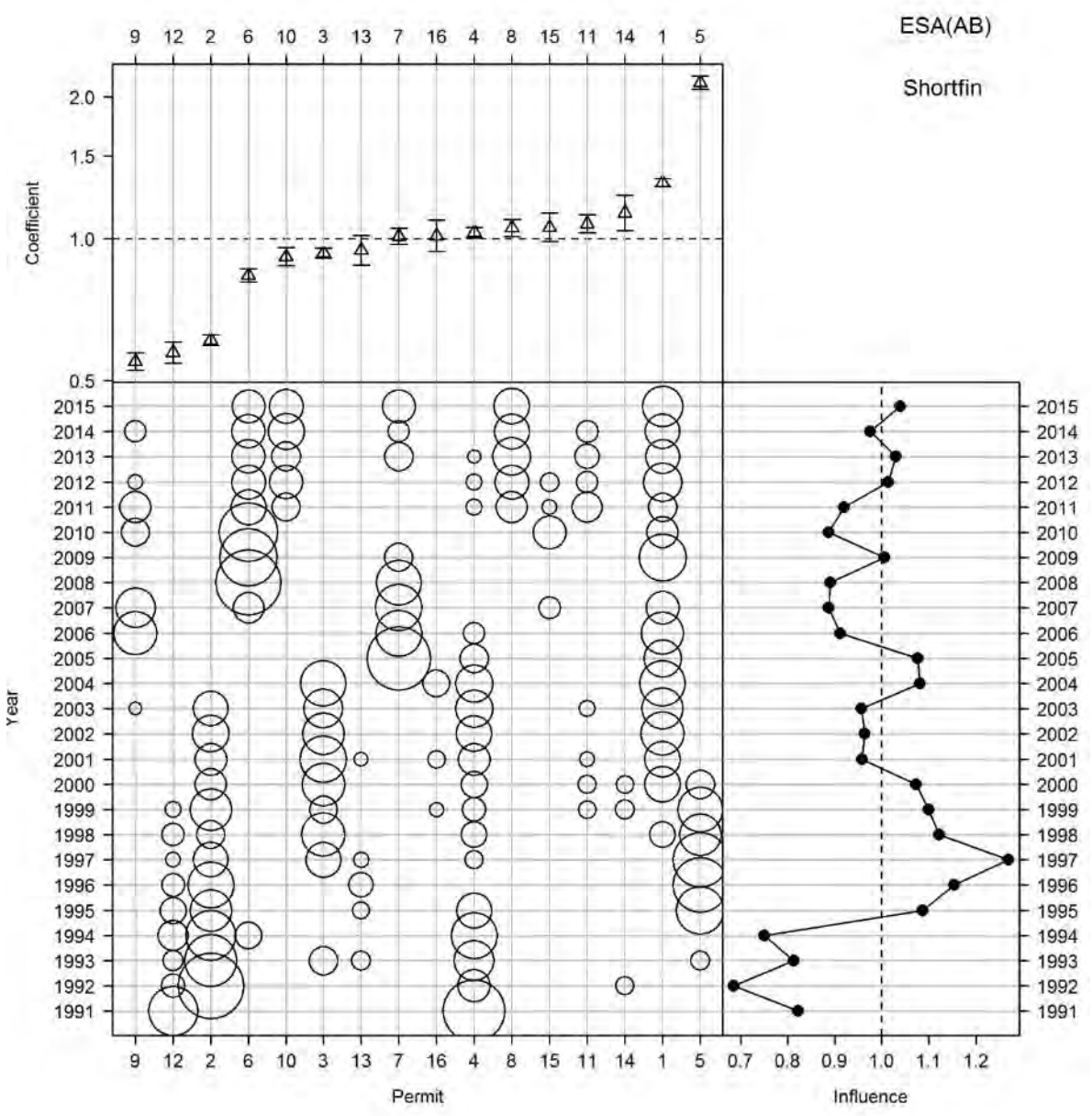


Figure B15: Influence of permit for the shortfin CPUE model for the years 1990–91 to 2014–15 (ESA AB).

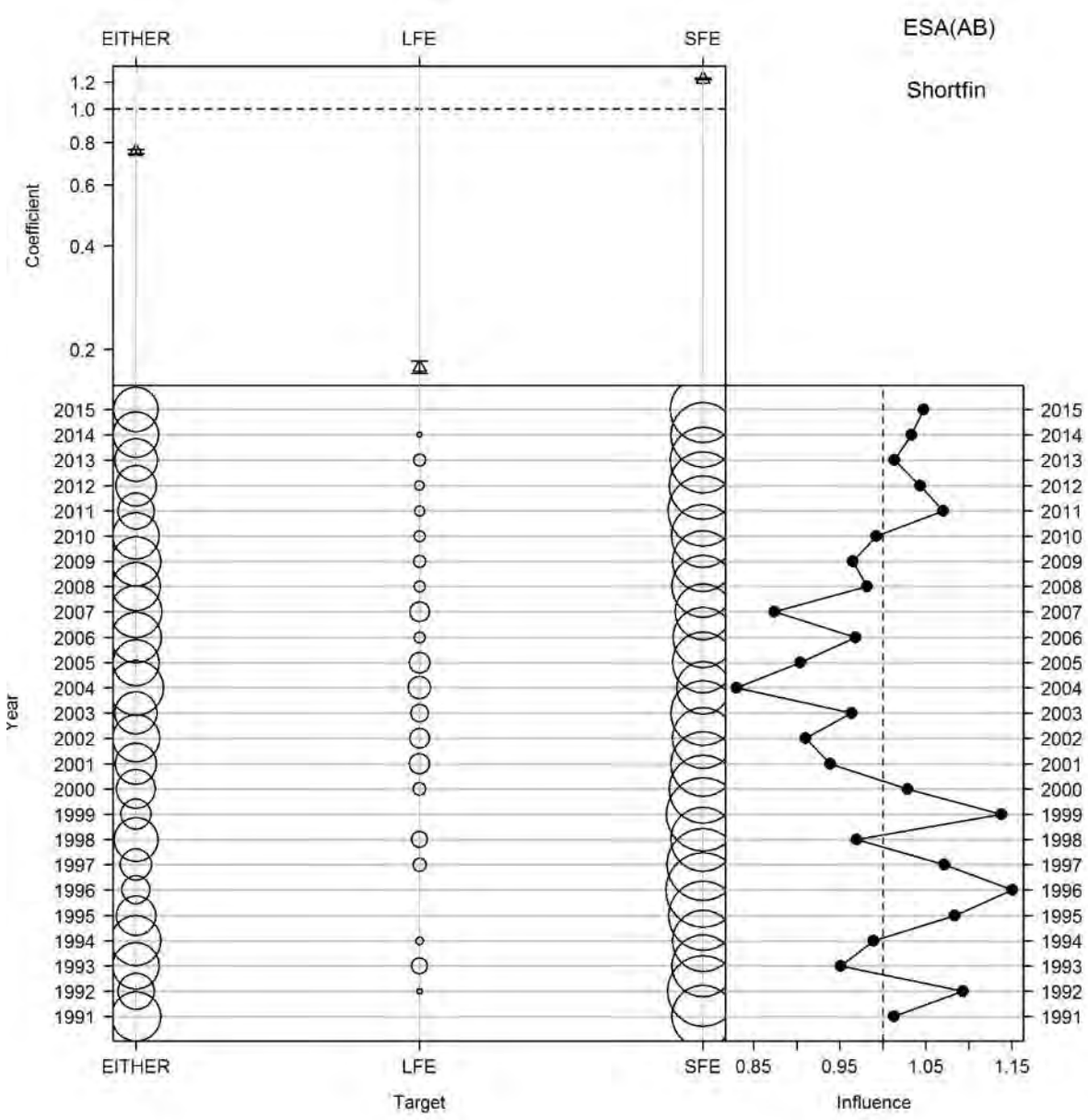


Figure B16: Influence of target for the shortfin CPUE model for the years 1990–91 to 2014–15 (ESA AB).

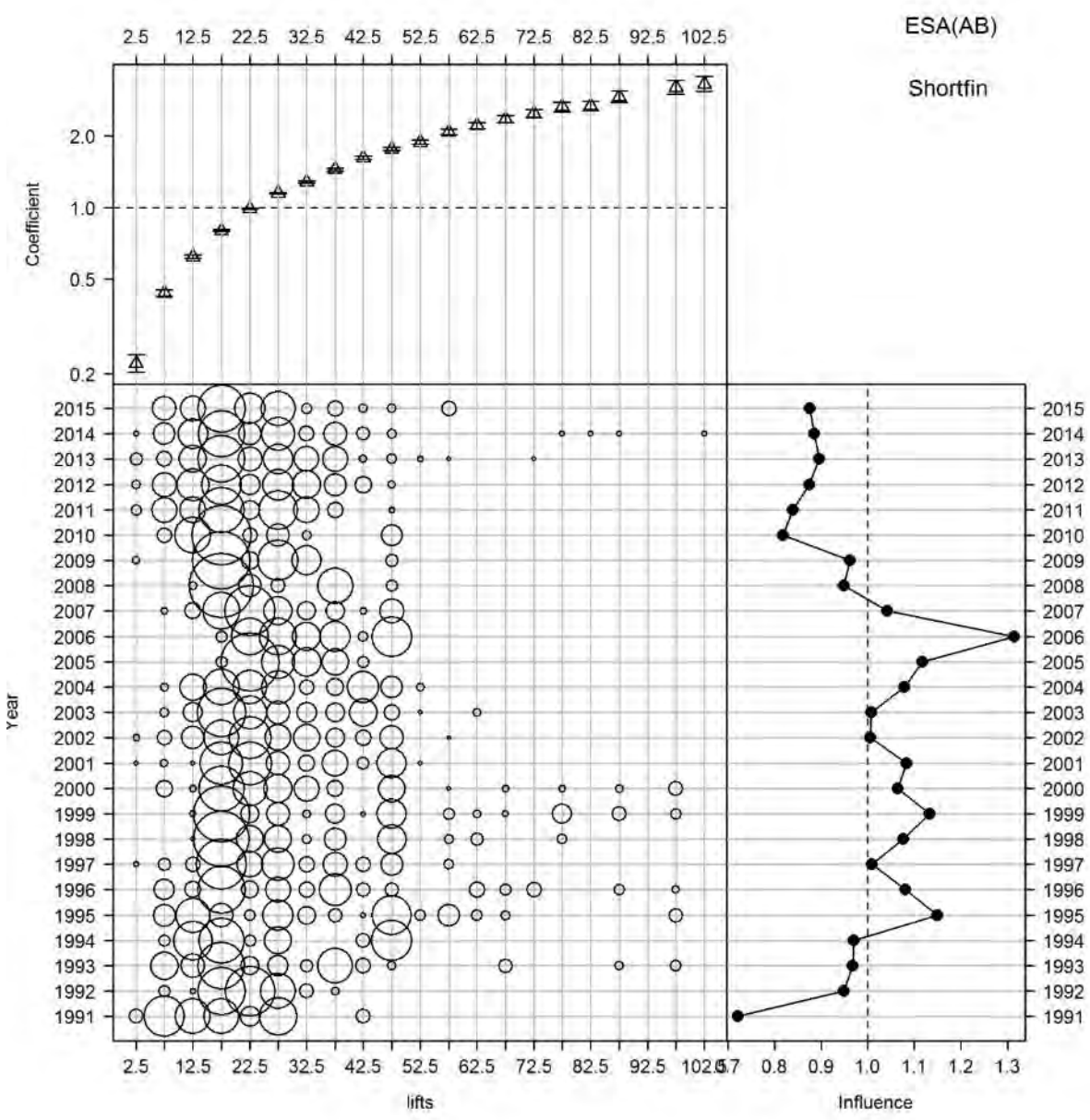


Figure B17: Influence of lifts for the shortfin CPUE model for the years 1990–91 to 2014–15 (ESA AB).

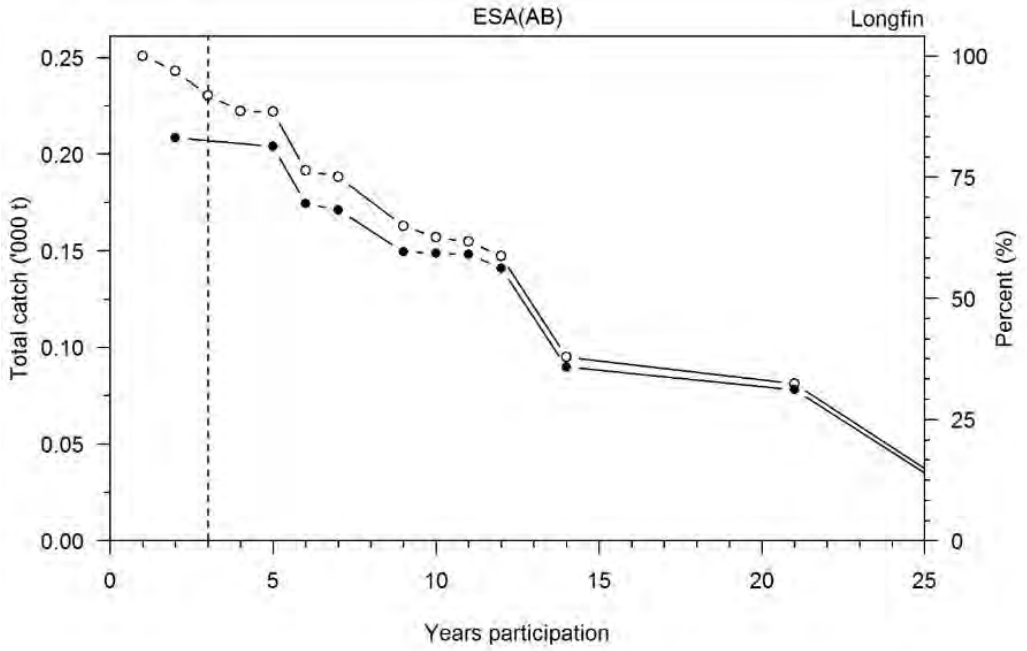


Figure B18: Relationship between years of participation in the fishery and longfin total catch. The open circles represent all longfin catch and the closed circles longfin catch data from fishers who 1) caught longfin in at least three years in each of which fishing took place in 10 days or more, and 2) caught more than 1000 kg over all years. Dotted vertical line represents 3 years participation and indicates the data included in the core longfin fisher analyses for the years 1990–91 to 2014–15 (ESA AB).

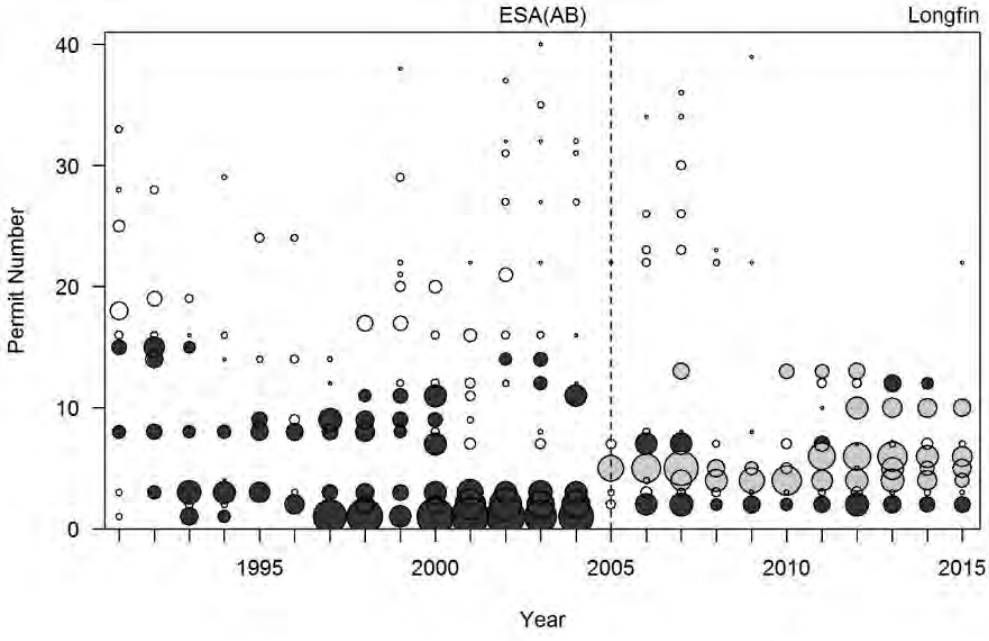


Figure B19: Relative catch of longfin from all fishers (all circles) for the years 1990–91 to 2014–15, and for core fishers (dark and grey shaded circles) included in the catch per unit effort analyses. The vertical dotted line demarks introduction of the QMS in 2004-05. The dark shaded circles post-QMS are existing fishers and the grey, new entrants (ESA AB).

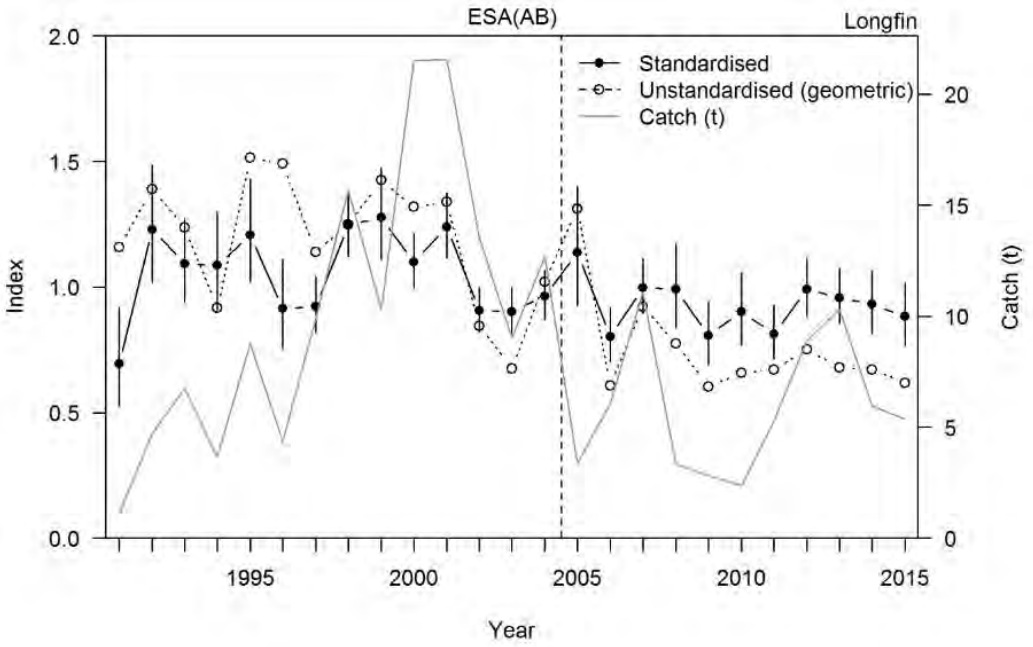


Figure B20: Indices of unstandardised (geometric mean of catch per lift) and standardised CPUE for longfin core fishers for the years 1990–91 to 2014–15. The longfin catch by core fishers is also plotted (ESA AB).

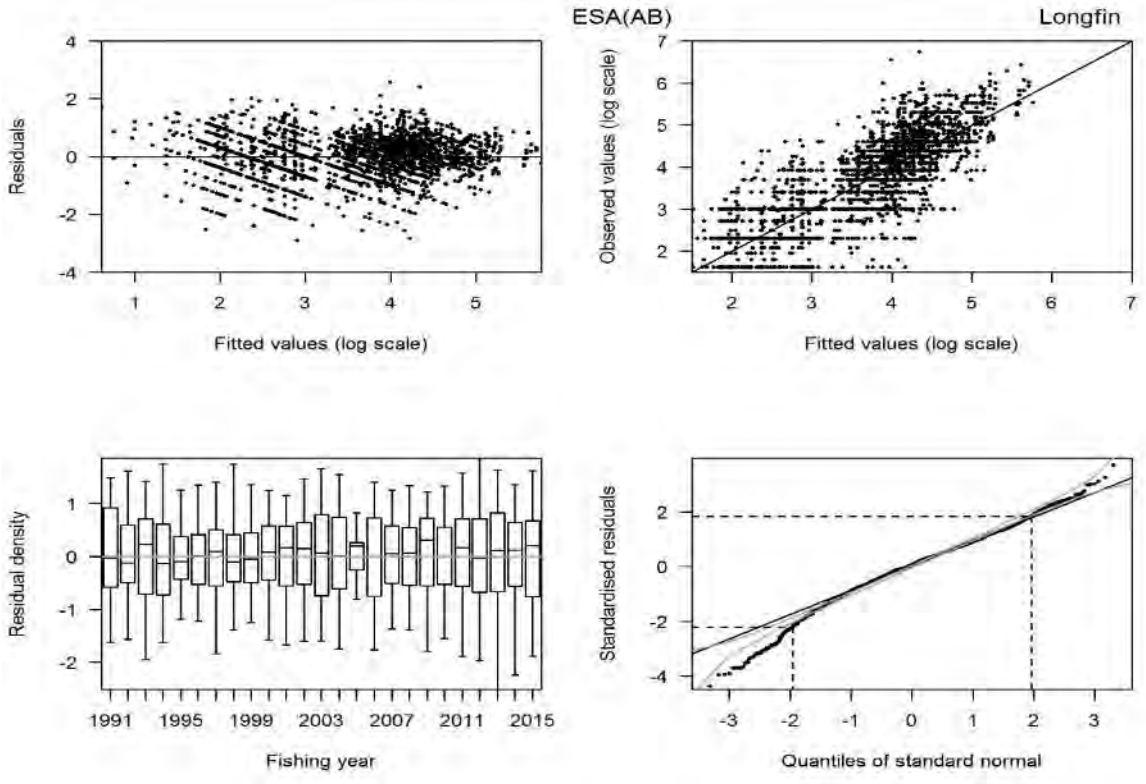


Figure B21: Residual diagnostic plots for the longfin eel CPUE model for the years 1990–91 to 2014–15. The grey lines on the quantile-quantile plot represent the 95% confidence envelopes of a standard normal distribution (ESA AB).

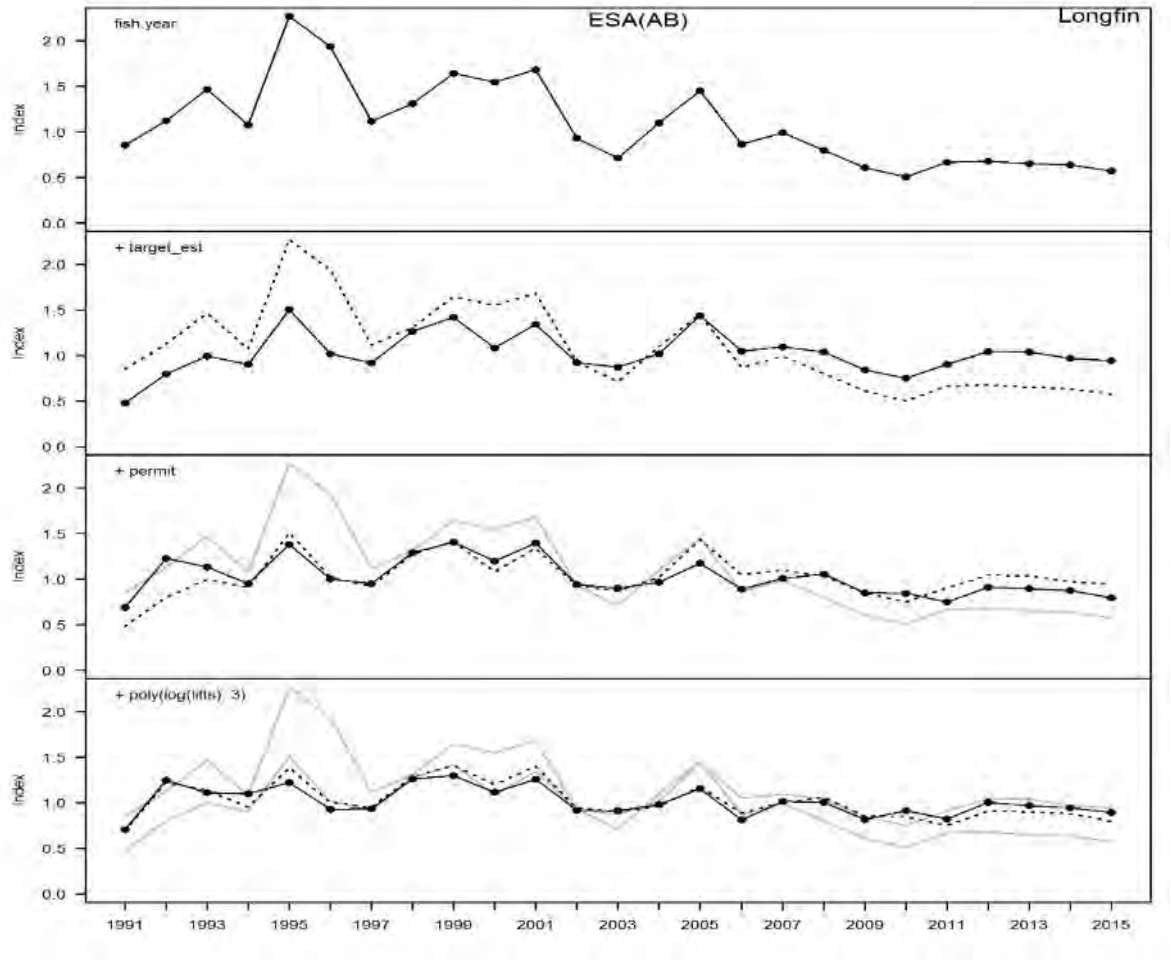


Figure B22: Step plot for the longfin eel CPUE model for the years 1990–91 to 2014–15. Each panel shows the standardised CPUE index as each explanatory variable is added to the model with the previous index shown by the dotted line and the grey lines for steps before that (ESA AB).

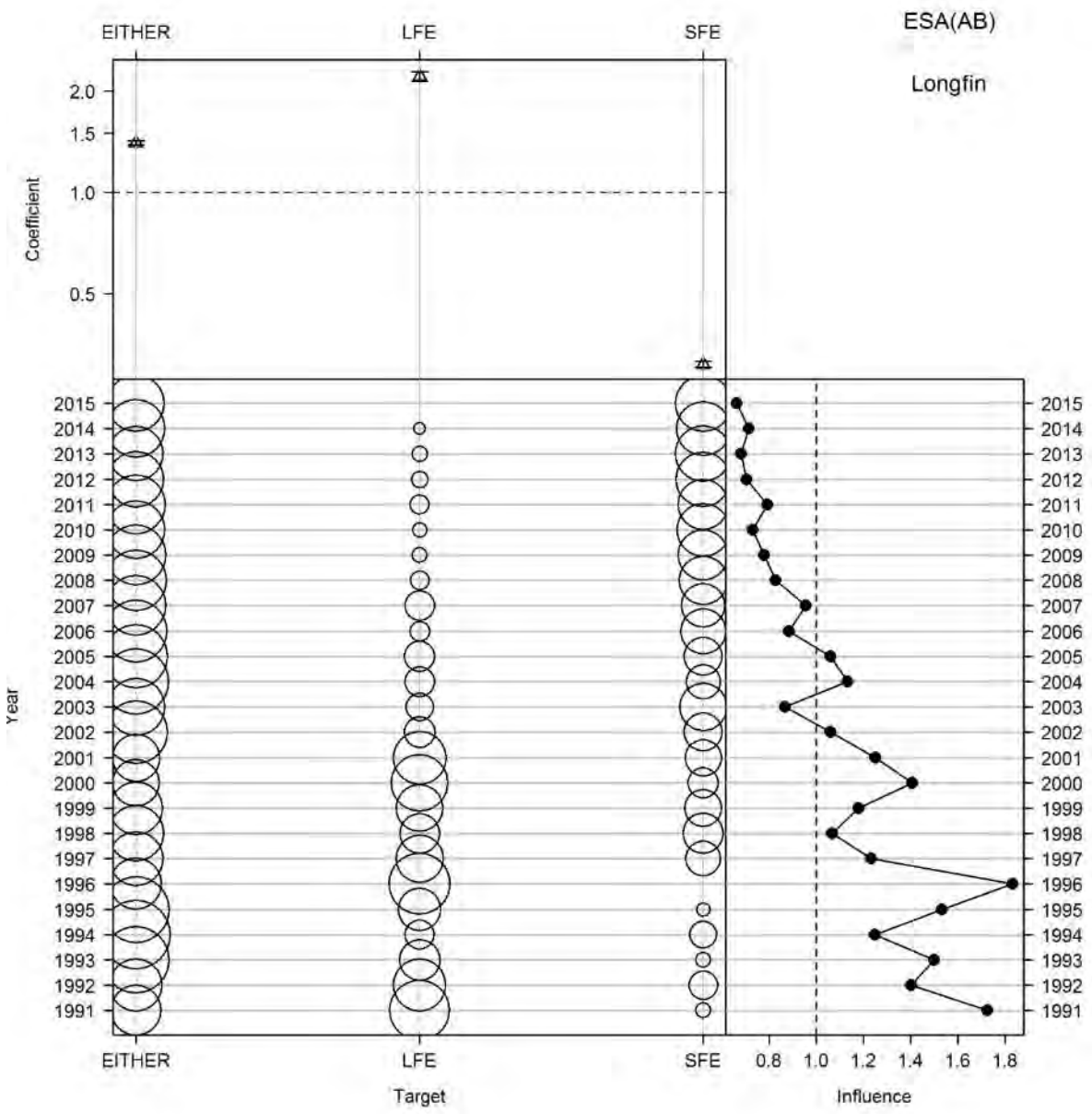


Figure B23: Influence of target for the longfin CPUE model for the years 1990–91 to 2014–15 (ESA AB).

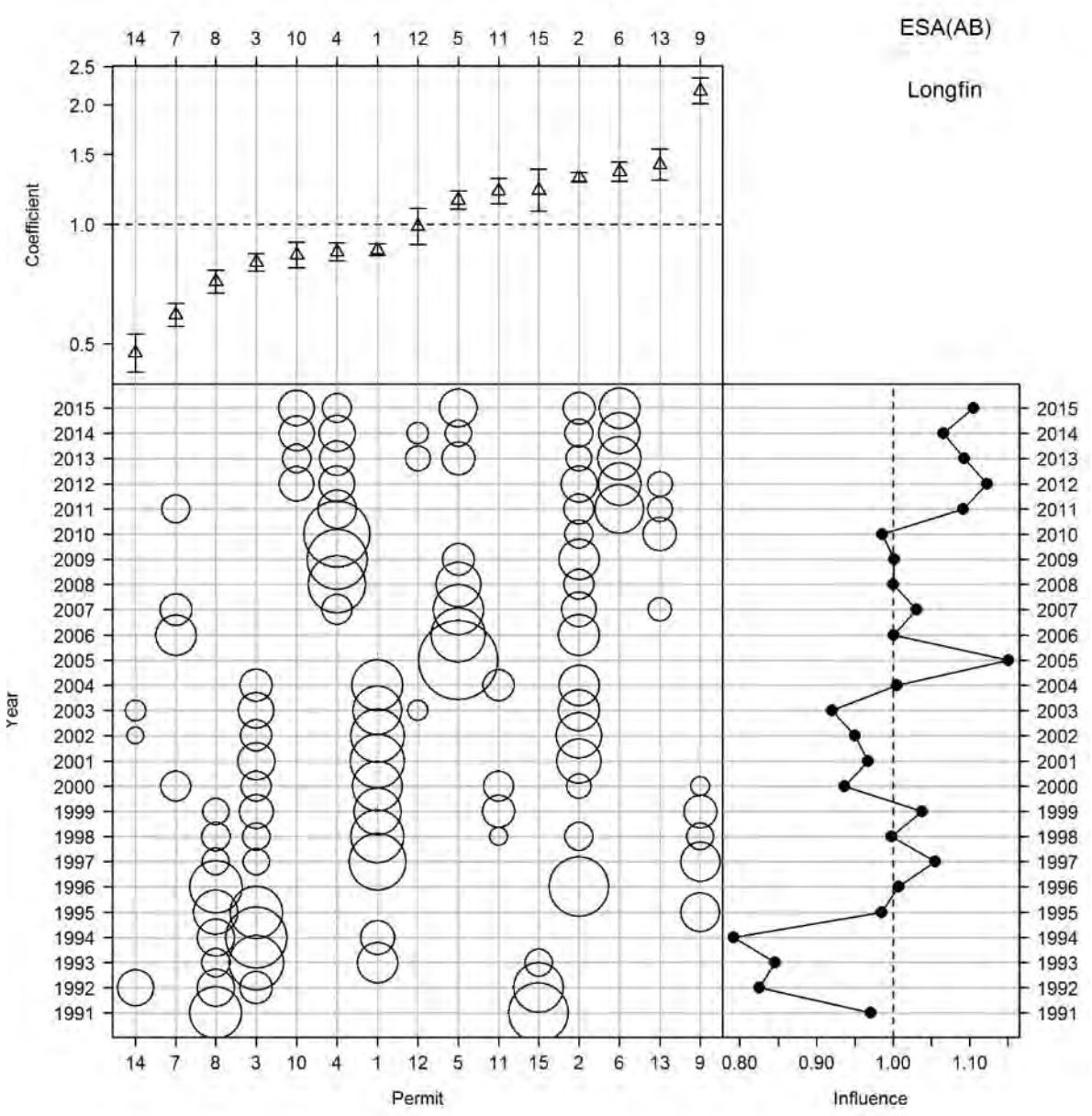


Figure B24: Influence of permit for the longfin CPUE model for the years 1990–91 to 2014–15 (ESA AB).

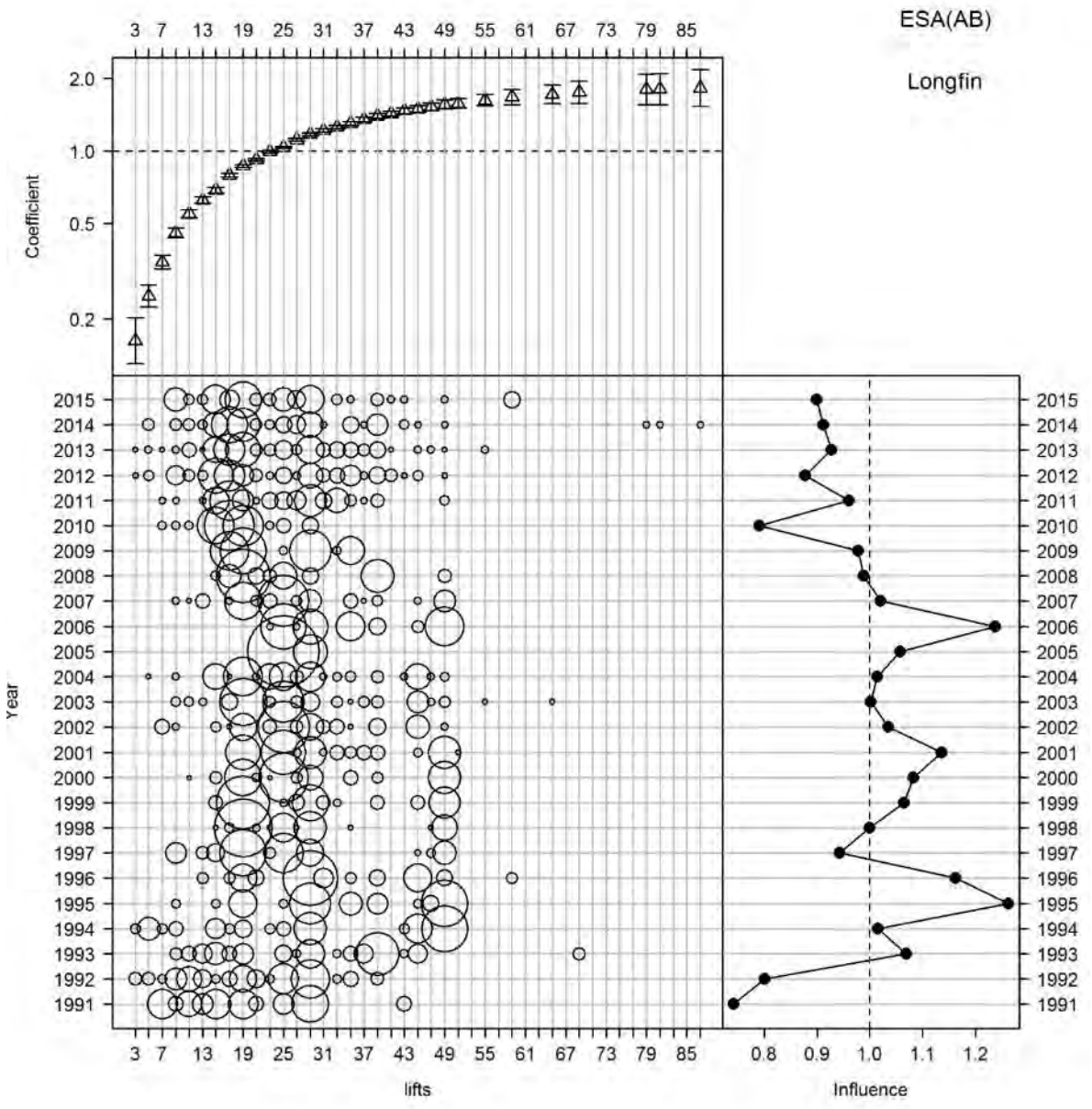


Figure B25: Influence of lifts for the longfin CPUE model for the years 1990–91 to 2014–15 (ESA AB).

APPENDIX C: HAURAKI (ESA AC)

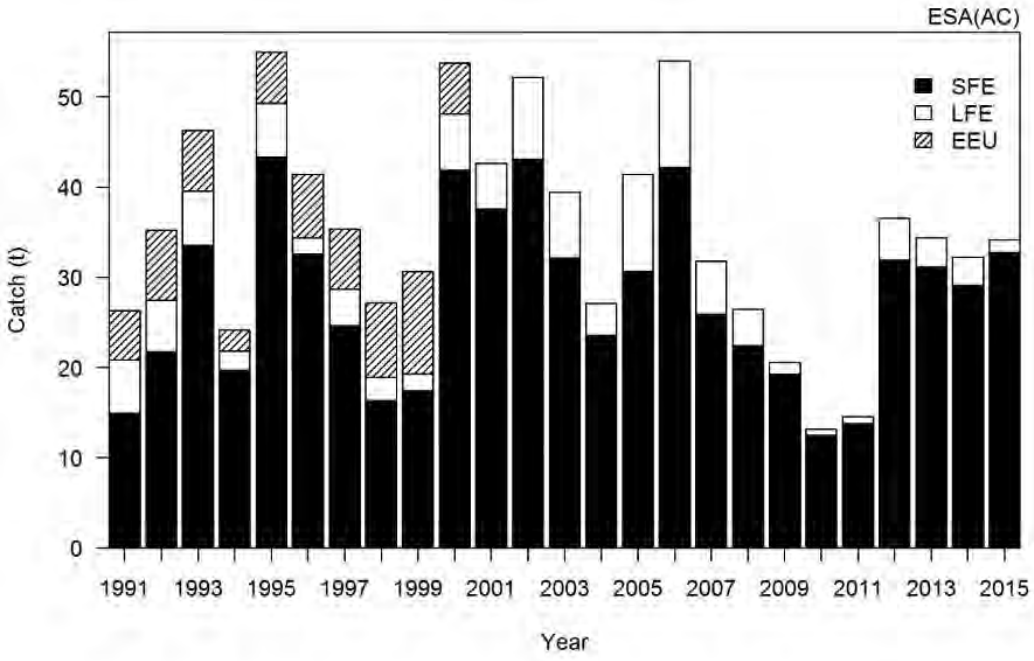


Figure C1: Total estimated commercial catch of shortfin (SFE), longfin (LFE), and unclassified eel catch (EEU) for the years 1990–91 to 2014–15 (ESA AC).

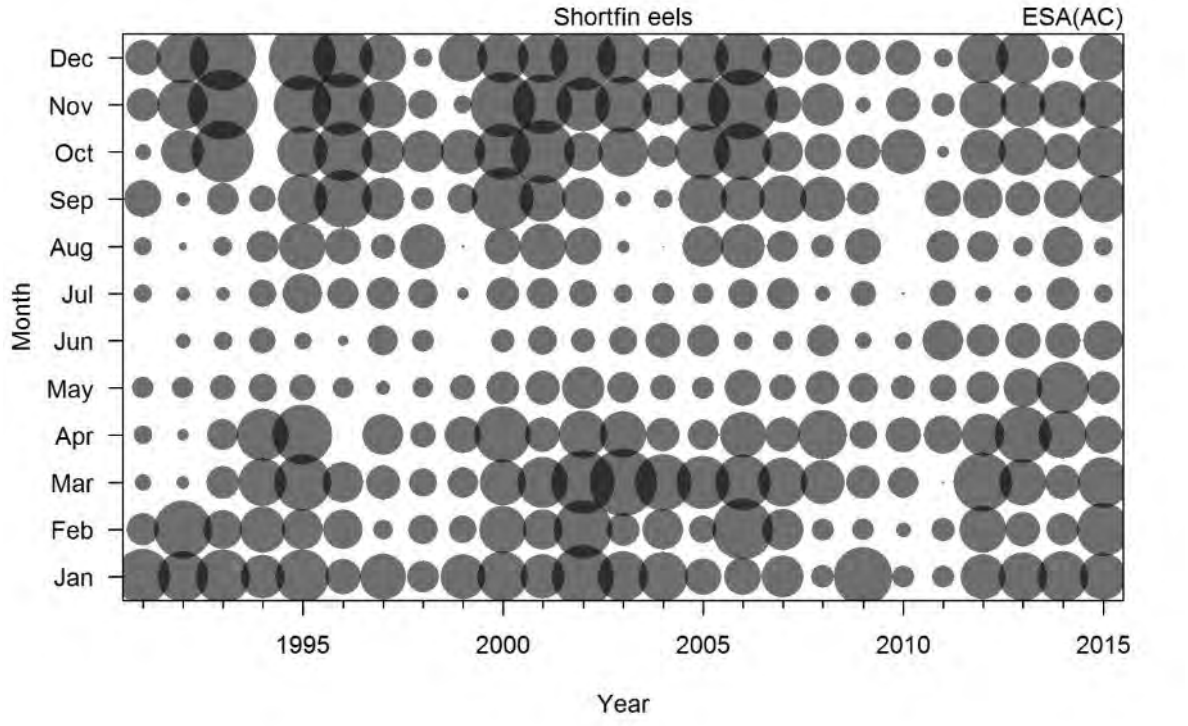


Figure C2: Shortfin eel catch by month for the years 1990–91 to 2014–15. The catch before 2002 is missing an unknown amount that was recorded as EEU (ESA AC).

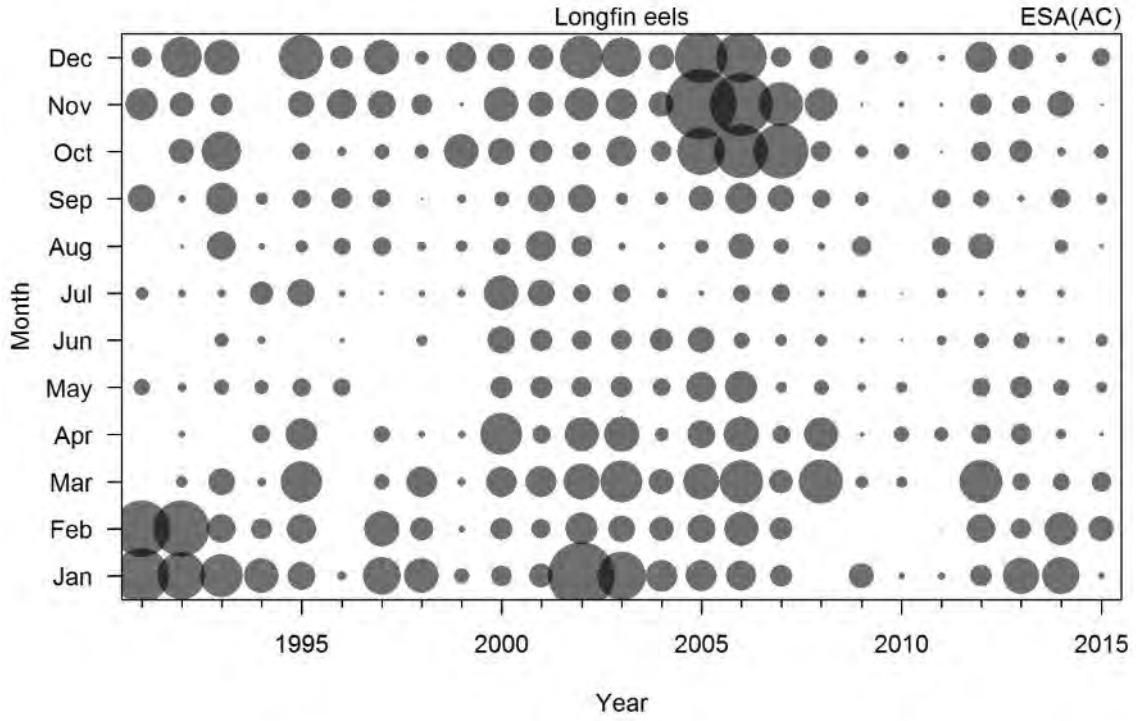


Figure C3: Longfin eel catch by month for the years 1990–91 to 2014–15. The catch before 2002 is missing an unknown amount that was recorded as EEU (ESA AC).

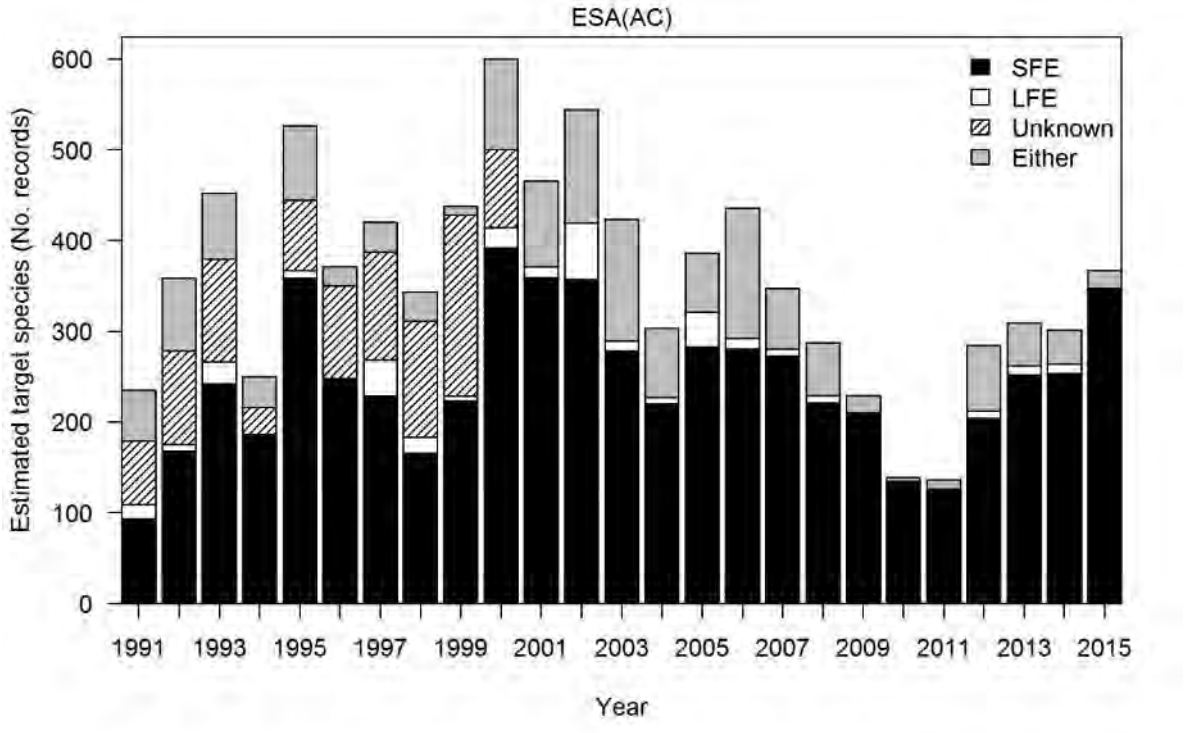


Figure C4: Reconstructed target species for the years 1990–91 to 2014–15 (ESA AC).

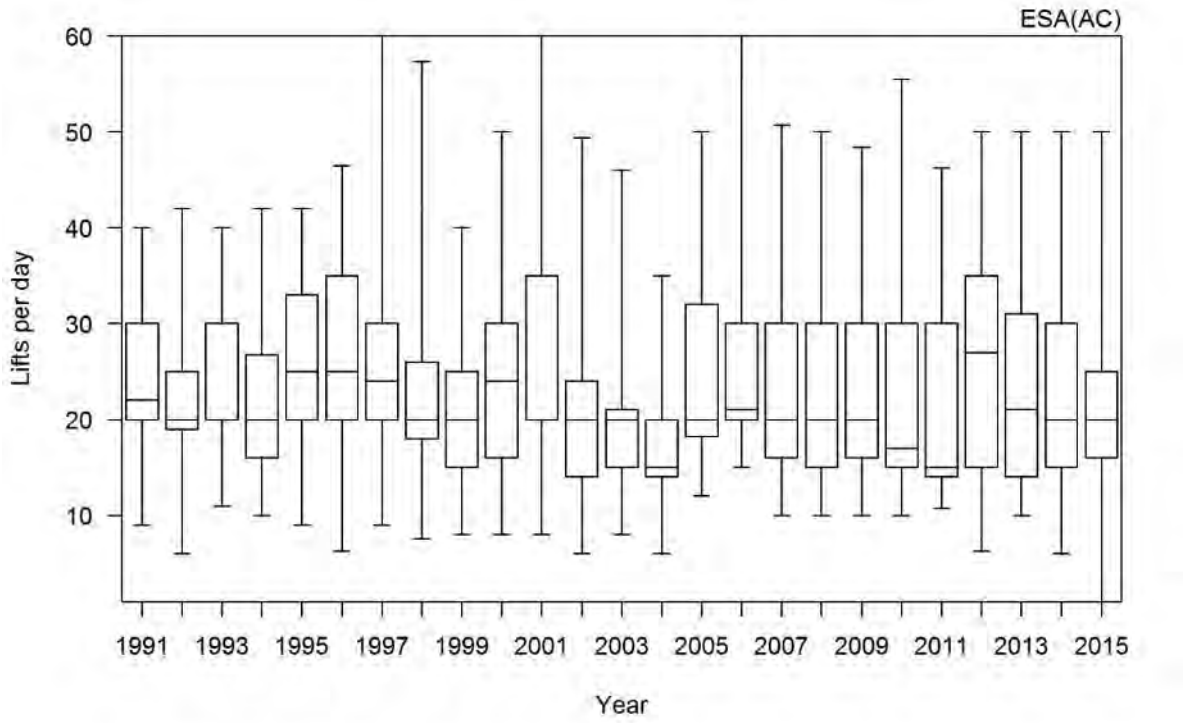


Figure C5: Total lifts per day for the years 1990–91 to 2014–15. The horizontal line is the median, the top and bottom of the box are the interquartiles (25th and 75th), and error bars are the 95th percentile range (ESA AC).

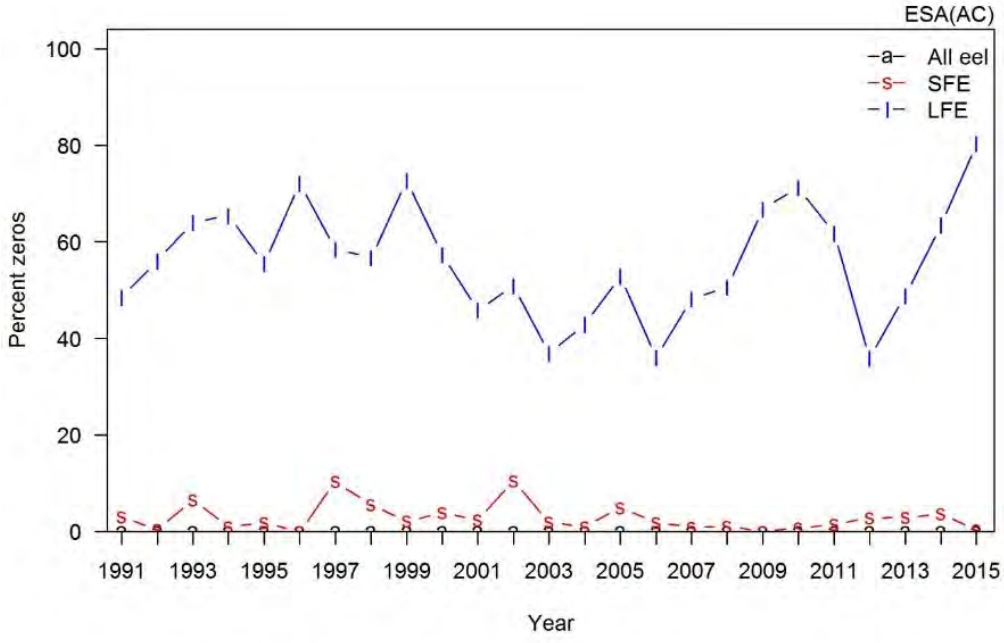


Figure C6: Proportion of valid zero records for all eels, shortfin (SFE), and longfin (LFE) for the years 1990–91 to 2014–15. Excludes zeros associated with reporting EEU (unclassified) (ESA AC).

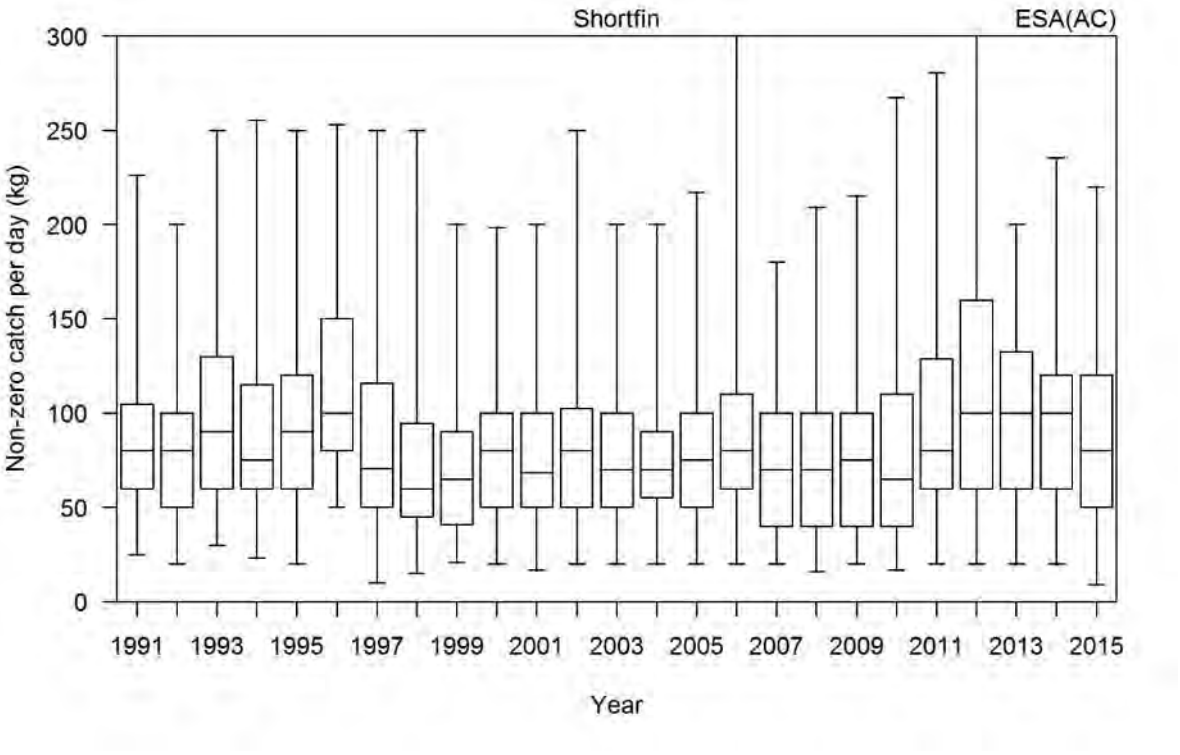


Figure C7: Shortfin non-zero catch per day for the years 1990–91 to 2014–15. The horizontal line is the median, the top and bottom of the box are the interquartiles (25th and 75th), and error bars are the 95th percentile range (ESA AC).

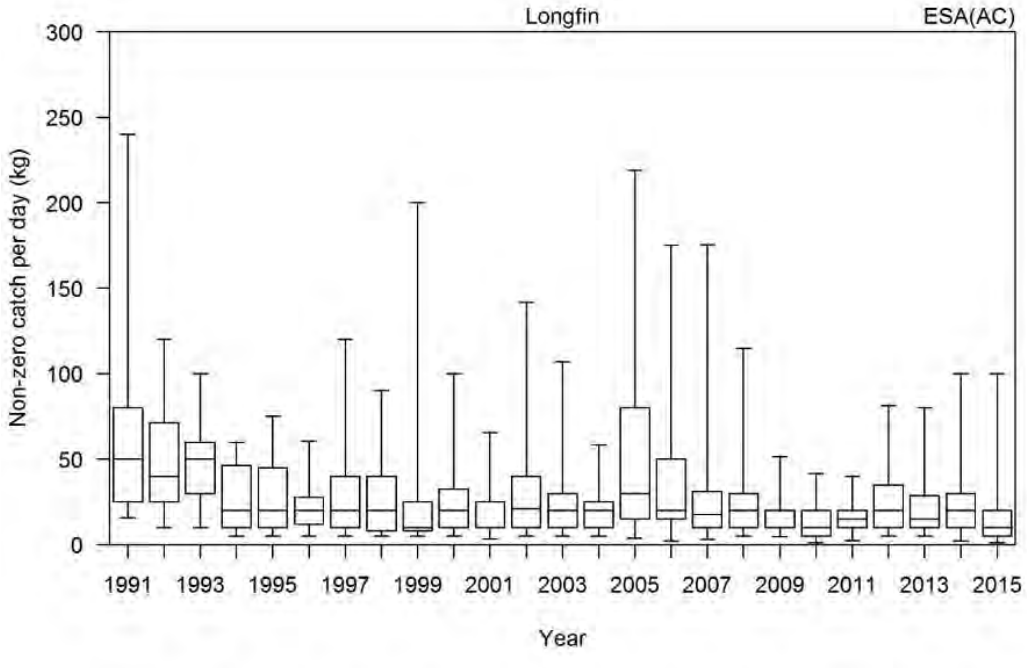


Figure C8: Longfin non-zero catch per day for the years 1990–91 to 2014–15. The horizontal line is the median, the top and bottom of the box are the interquartiles (25th and 75th), and error bars are the 95th percentile range (ESA AC).

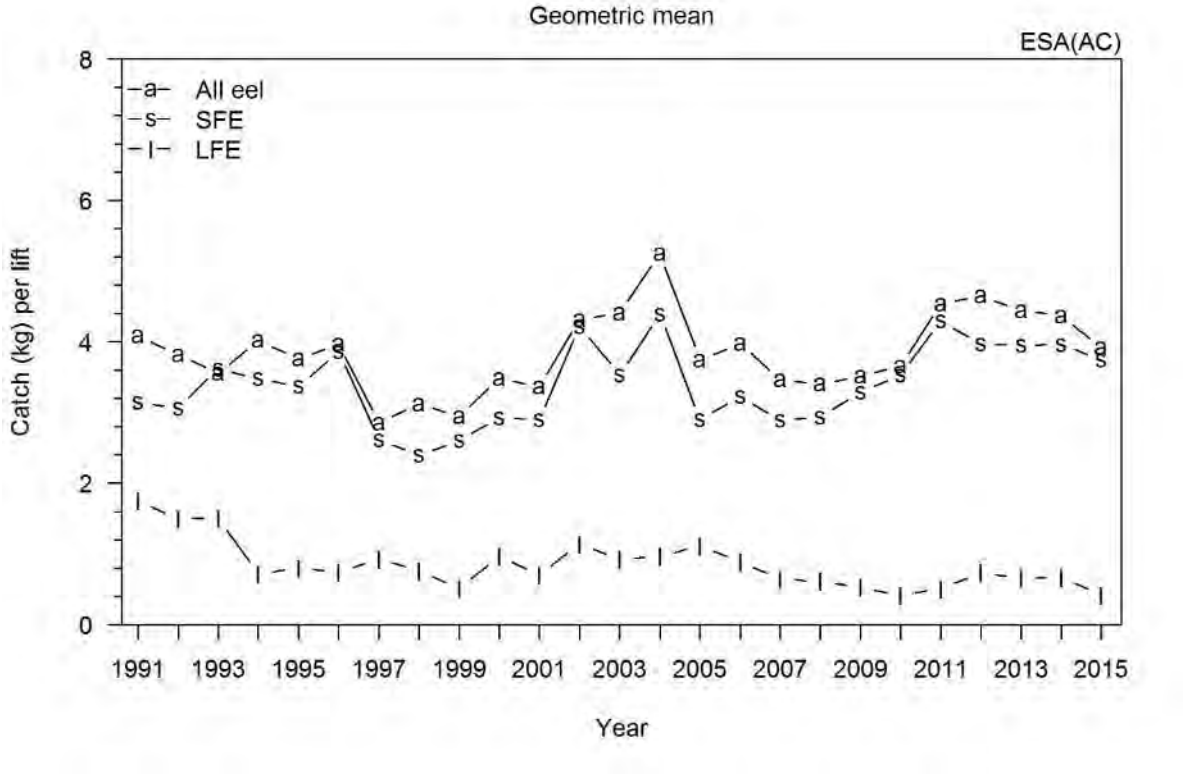


Figure C9: Unstandardised CPUE (geometric mean of catch per lift) for all eels, shortfin (SFE), and longfin (LFE) for the years 1990–91 to 2014–15 (ESA AC).

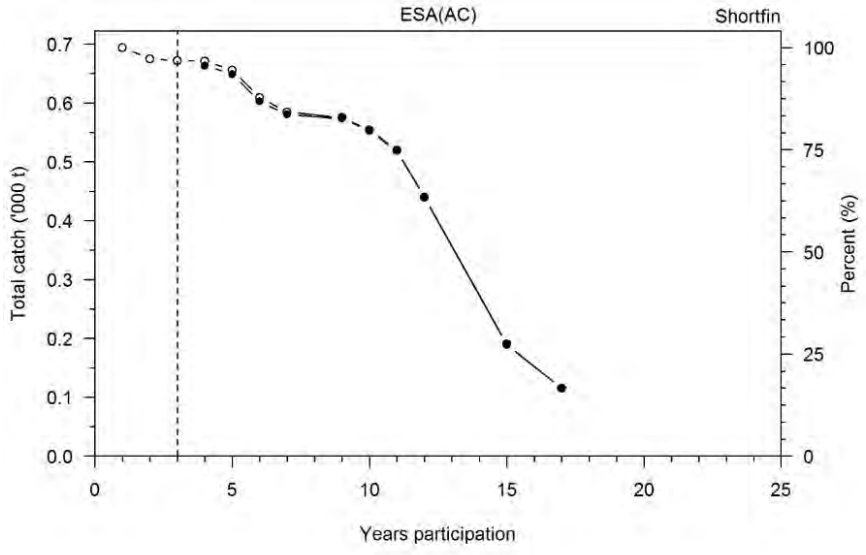


Figure C10: Relationship between years of participation in the fishery and shortfin total catch. The open circles represent all shortfin catch and the closed circles shortfin catch data from fishers who 1) caught shortfin in at least three years in each of which fishing took place in 10 days or more, and 2) caught more than 1000 kg over all years. Dotted vertical line represents 3 years participation and indicates the data included in the core shortfin fisher analyses for the years 1990–91 to 2014–15 (ESA AC).

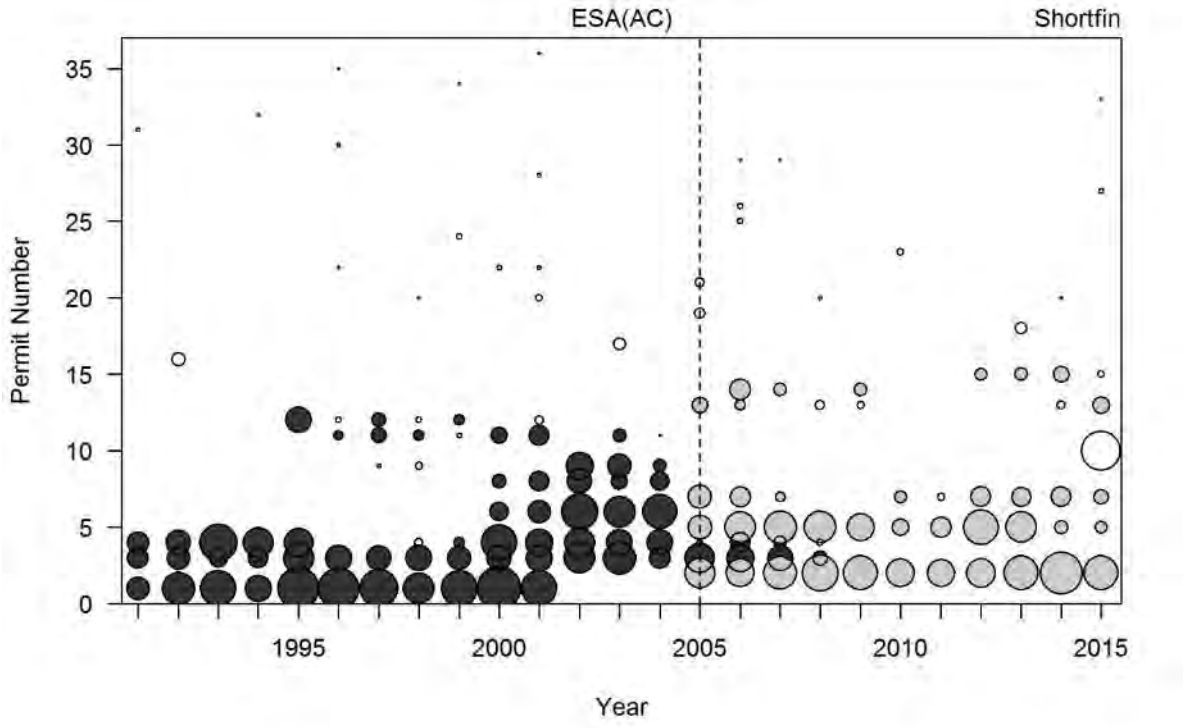


Figure C11: Relative catch of shortfin from all fishers (all circles) for the years 1990–91 to 2014–15, and for core fishers (dark and grey shaded circles) included in the catch per unit effort analyses. The vertical dotted line demarks introduction of the QMS in 2004-05. The dark shaded circles post-QMS are existing fishers and the grey, new entrants (ESA AC).

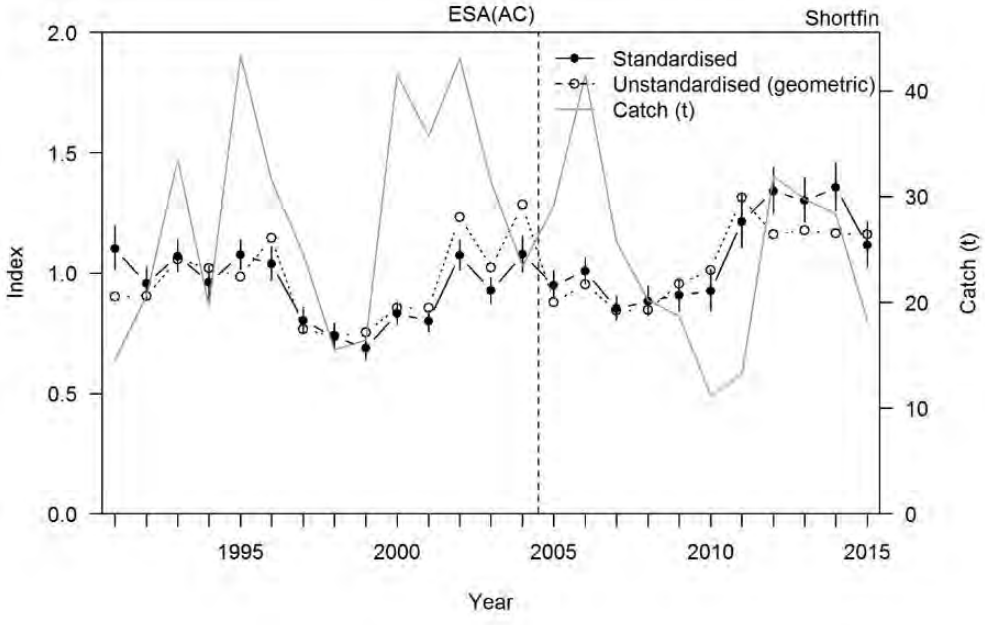


Figure C12: Indices of unstandardised (geometric mean of catch per lift) and standardised CPUE for shortfin core fishers for the years 1990–91 to 2014–15. The shortfin catch by core fishers is also plotted (ESA AC).

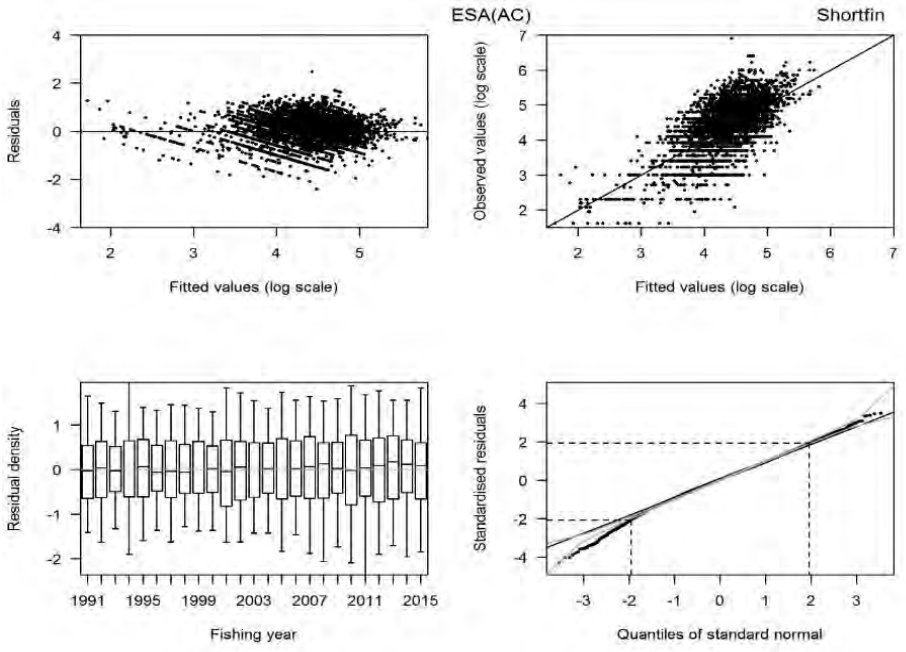


Figure C13: Residual diagnostic plots for the shortfin eel CPUE model for the years 1990–91 to 2014–15. The grey lines on the quantile-quantile plot represent the 95% confidence envelopes of a standard normal distribution (ESA AC).

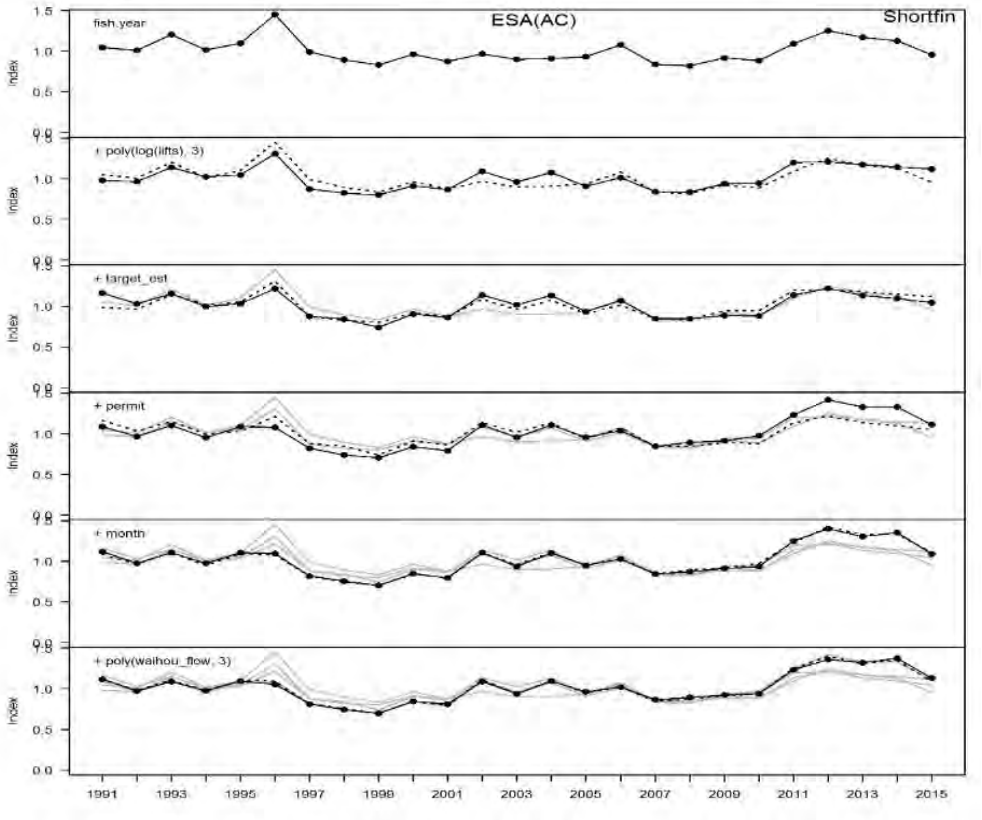


Figure C14: Step plot for the shortfin eel CPUE model for the years 1990–91 to 2014–15. Each panel shows the standardised CPUE index as each explanatory variable is added to the model with the previous index shown by the dotted line and the grey lines for steps before that (ESA AC).

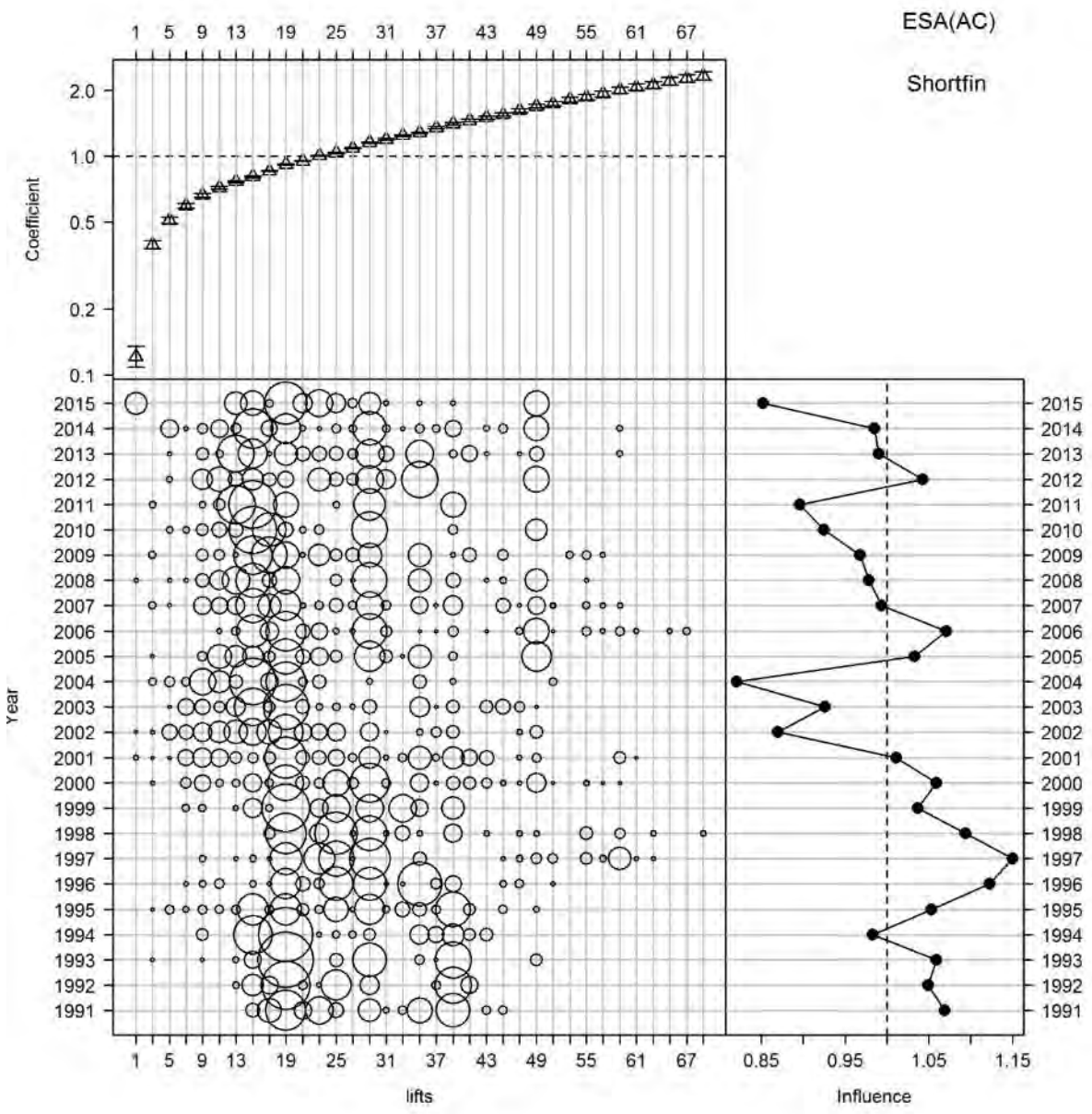


Figure C15: Influence of lifts for the shortfin CPUE model for the years 1990–91 to 2014–15 (ESA AC).

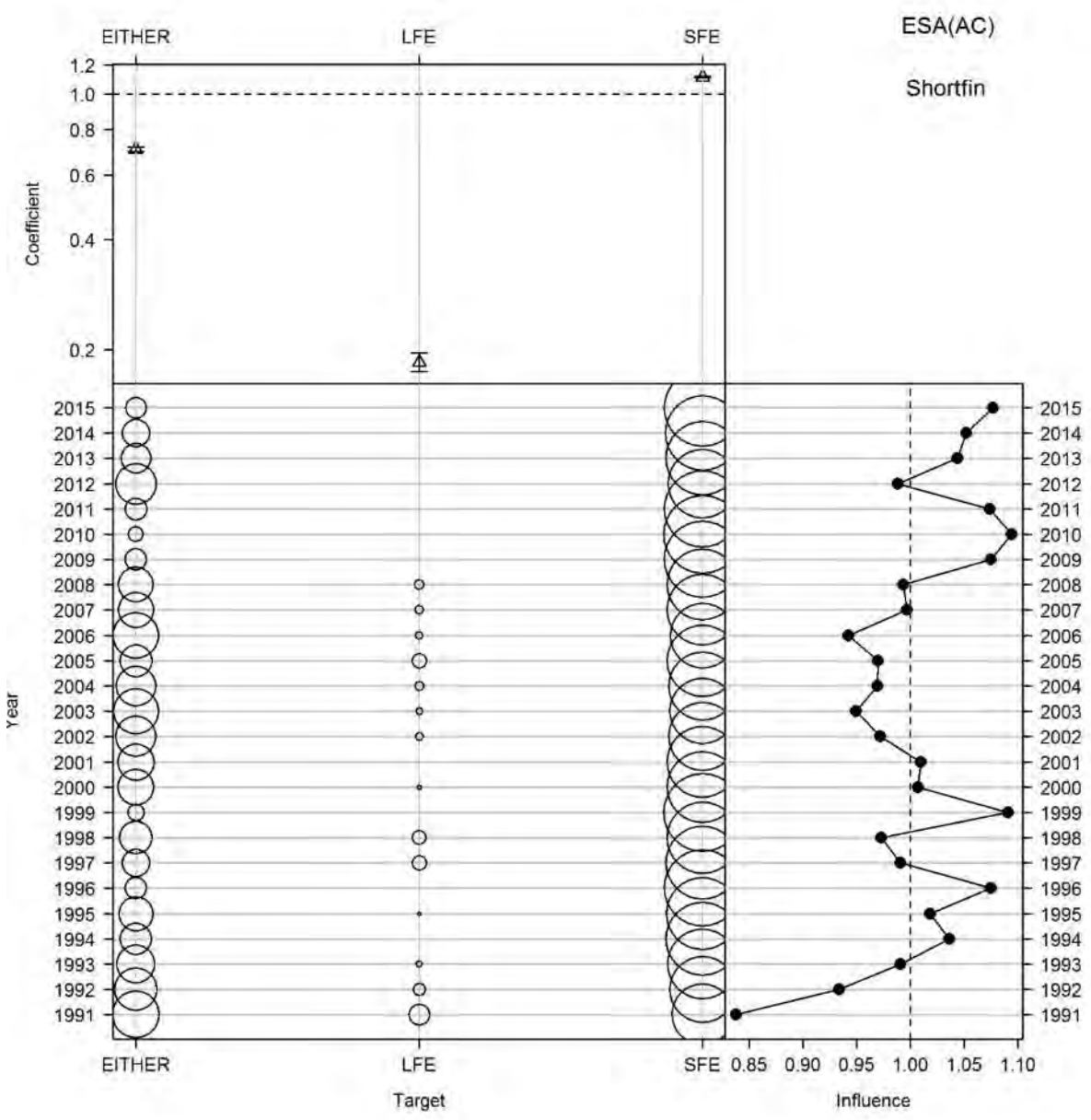


Figure C16: Influence of target for the shortfin CPUE model for the years 1990–91 to 2014–15 (ESA AC).

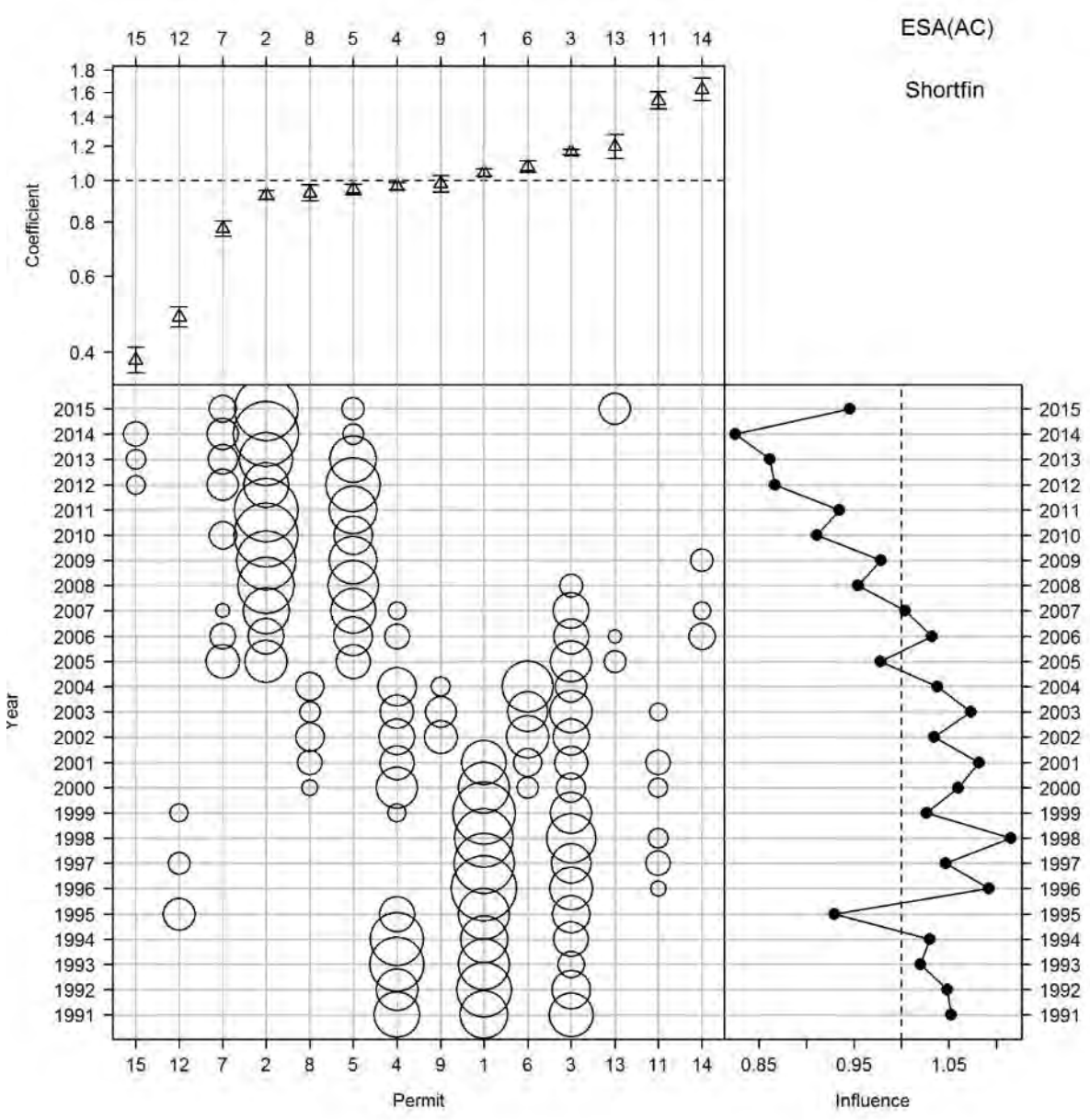


Figure C17: Influence of permit for the shortfin CPUE model for the years 1990–91 to 2014–15 (ESA AC).

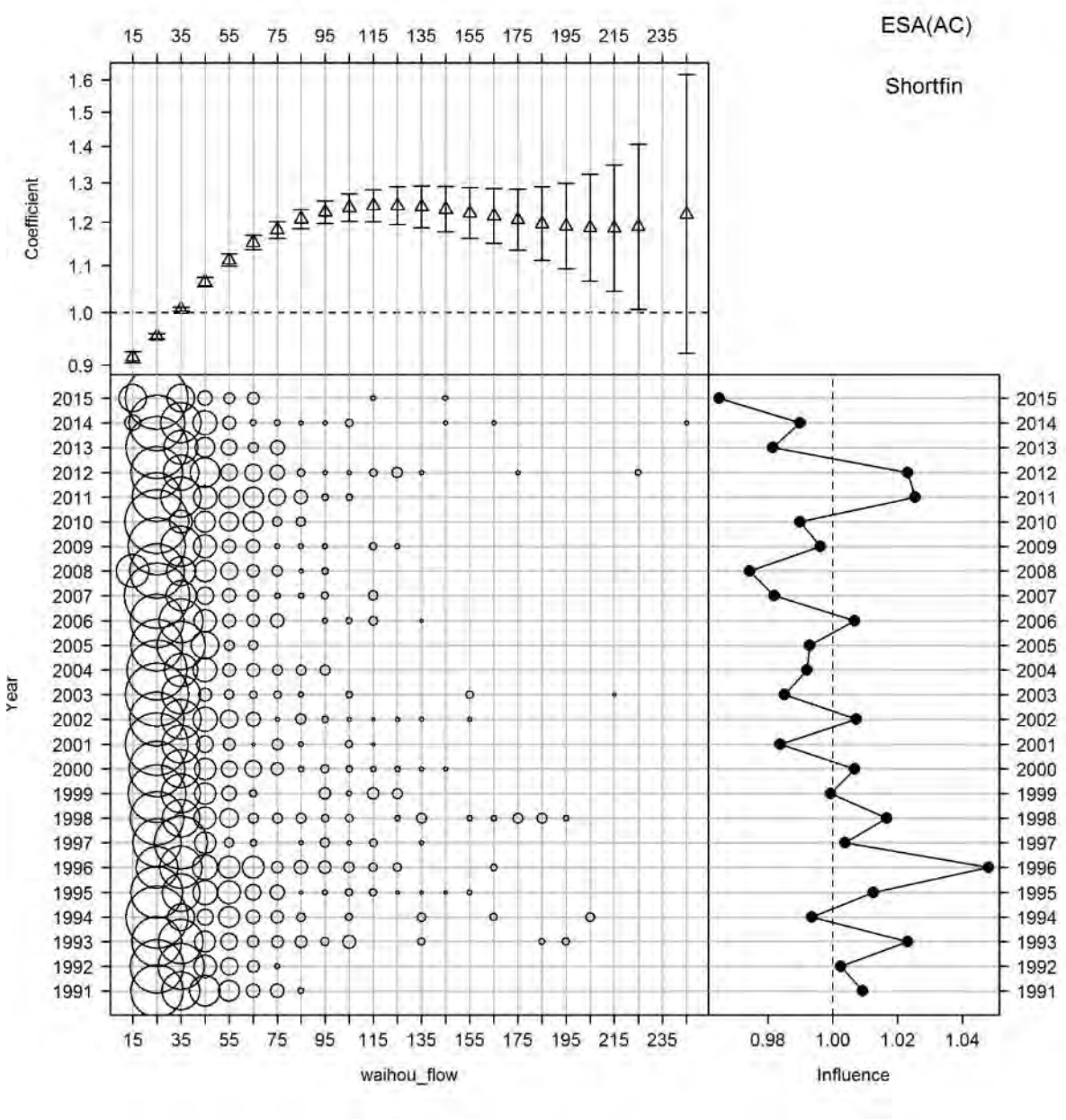


Figure C18: Influence of Waihou River flow for the shortfin CPUE model for the years 1990–91 to 2014–15 (ESA AC).

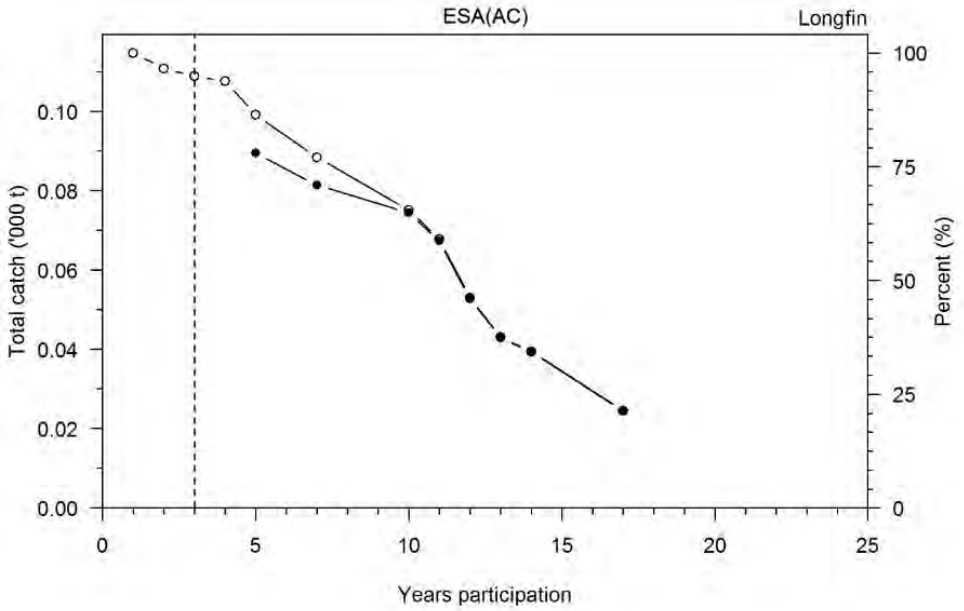


Figure C19: Relationship between years of participation in the fishery and longfin total catch. The open circles represent all longfin catch and the closed circles longfin catch data from fishers who 1) caught longfin in at least three years in each of which fishing took place in 10 days or more, and 2) caught more than 1000 kg over all years. Dotted vertical line represents 3 years participation and indicates the data included in the core longfin fisher analyses for the years 1990–91 to 2014–15 (ESA AC).

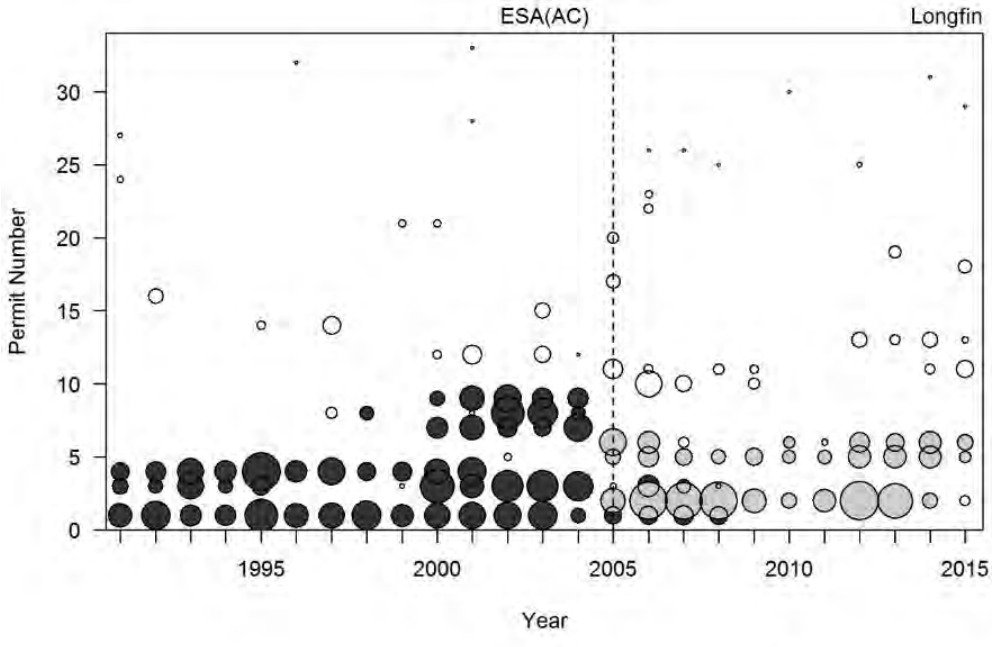


Figure C20: Relative catch of longfin from all fishers (all circles) for the years 1990–91 to 2014–15, and for core fishers (dark and grey shaded circles) included in the catch per unit effort analyses. The vertical dotted line demarks introduction of the QMS in 2004-05. The dark shaded circles post-QMS are existing fishers and the grey, new entrants (ESA AC).

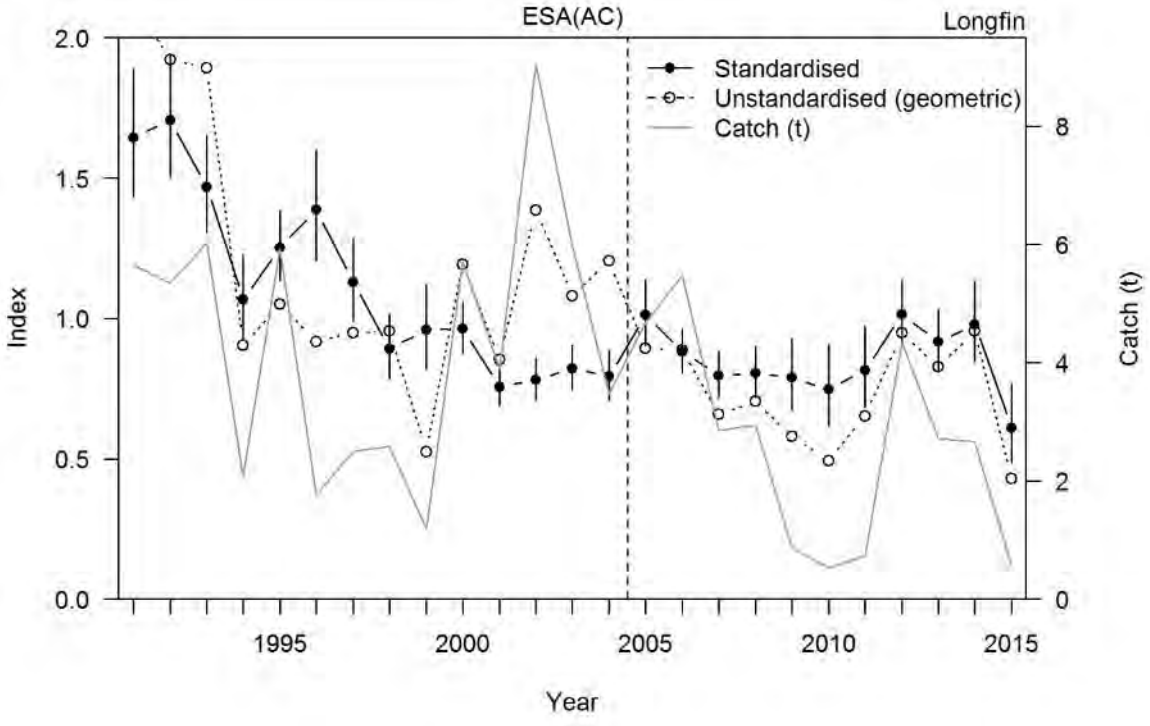


Figure C21: Indices of unstandardised (geometric mean of catch per lift) and standardised CPUE for longfin core fishers for the years 1990–91 to 2014–15. The longfin catch by core fishers is also plotted (ESA AC).

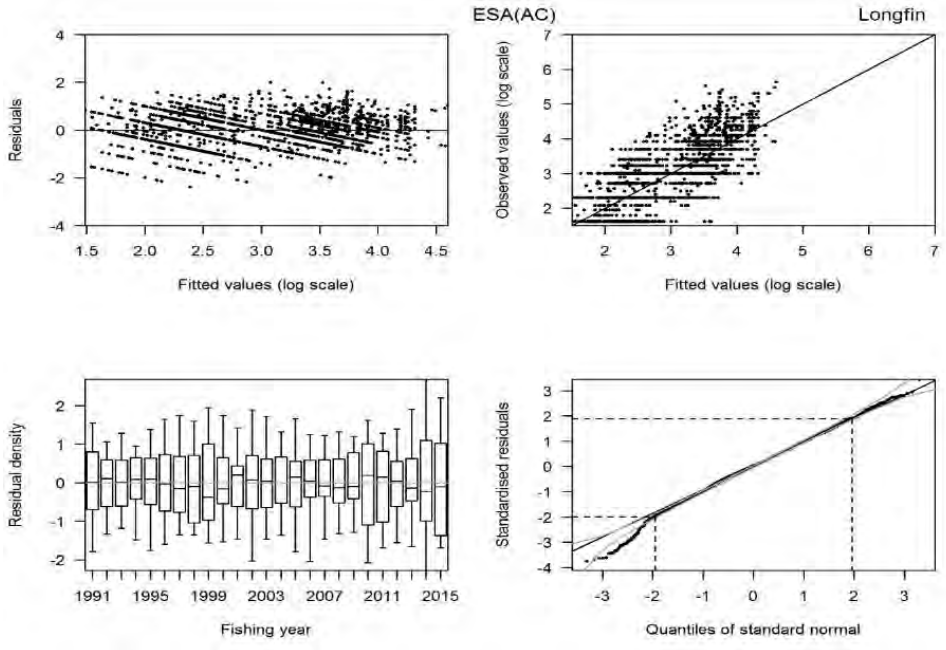


Figure C22: Residual diagnostic plots for the longfin eel CPUE model for the years 1990–91 to 2014–15. The grey lines on the quantile-quantile plot represent the 95% confidence envelopes of a standard normal distribution (ESA AC).

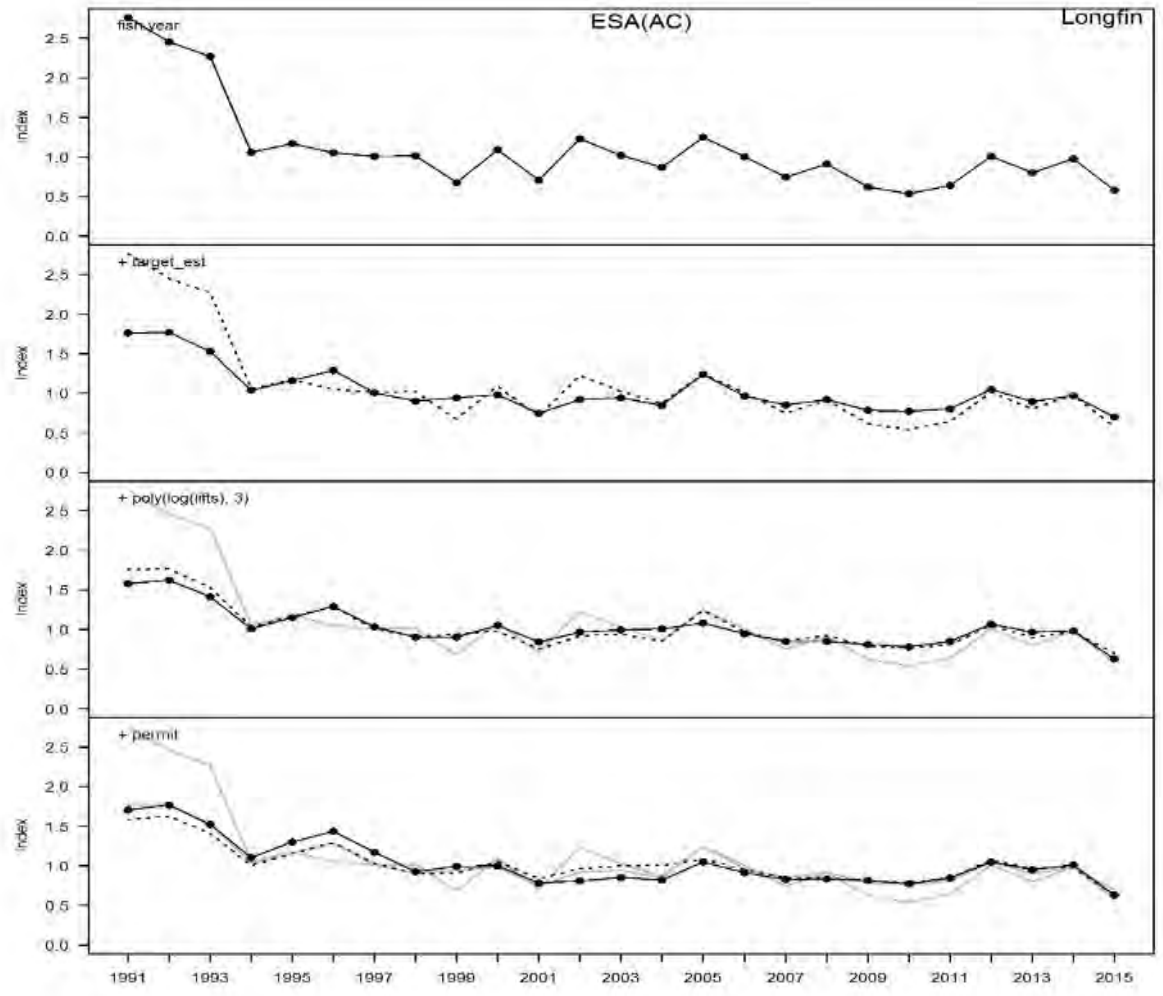


Figure C23: Step plot for the longfin eel CPUE model for the years 1990–91 to 2014–15. Each panel shows the standardised CPUE index as each explanatory variable is added to the model with the previous index shown by the dotted line and the grey lines for steps before that (ESA AC).

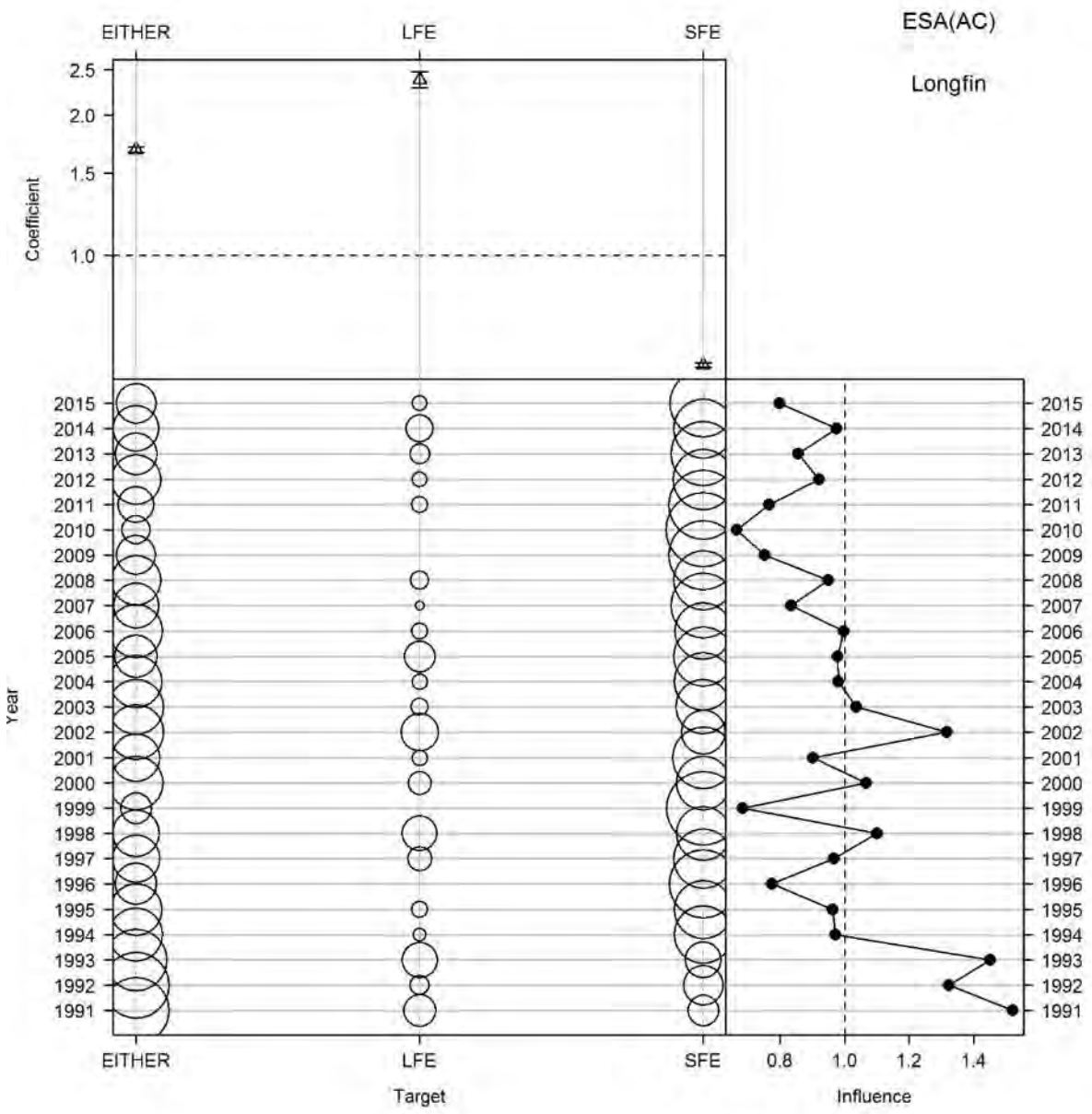


Figure C24: Influence of target for the longfin CPUE model for the years 1990–91 to 2014–15 (ESA AC).

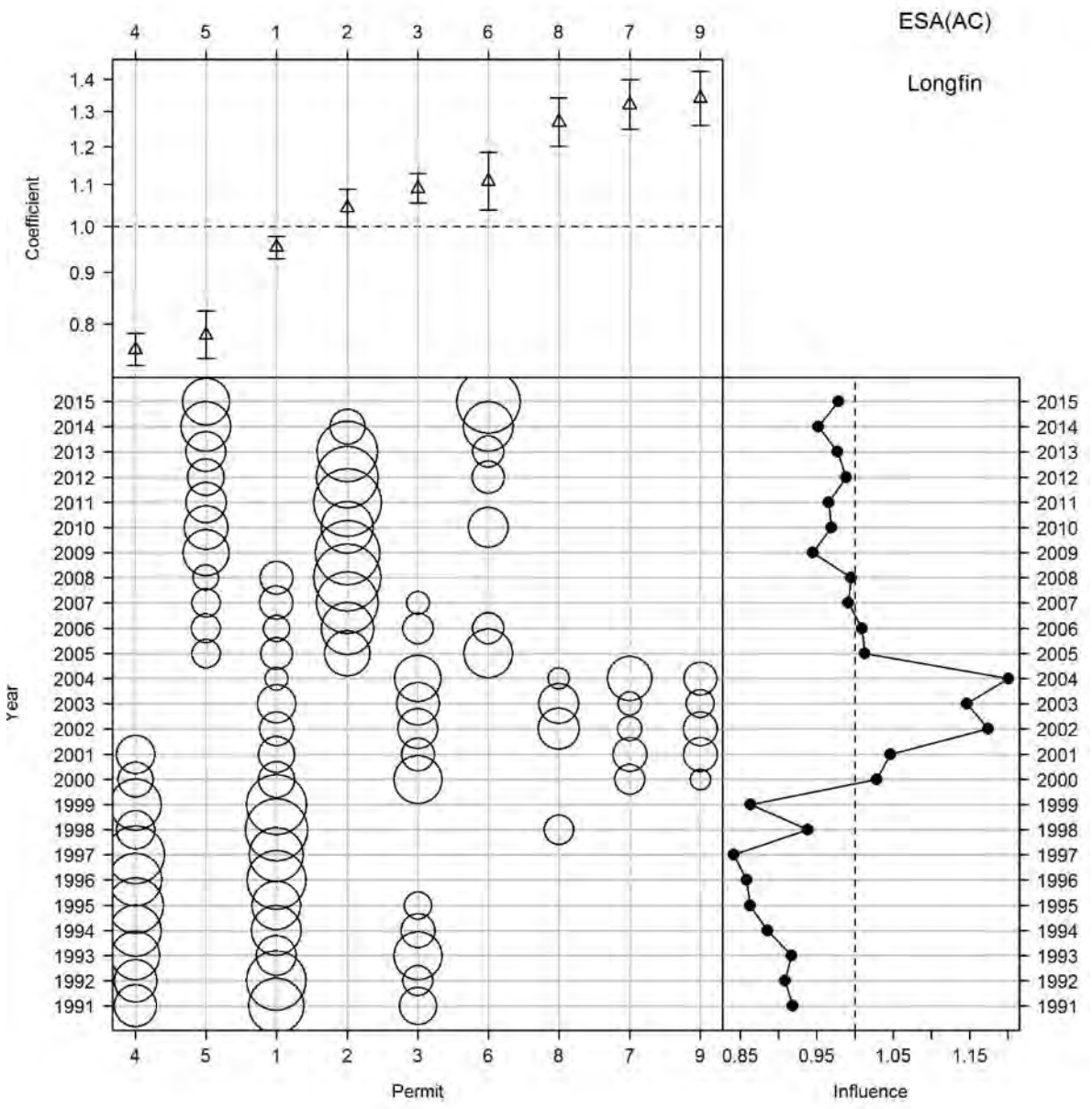


Figure C25: Influence of permit for the longfin CPUE model for the years 1990–91 to 2014–15 (ESA AC).

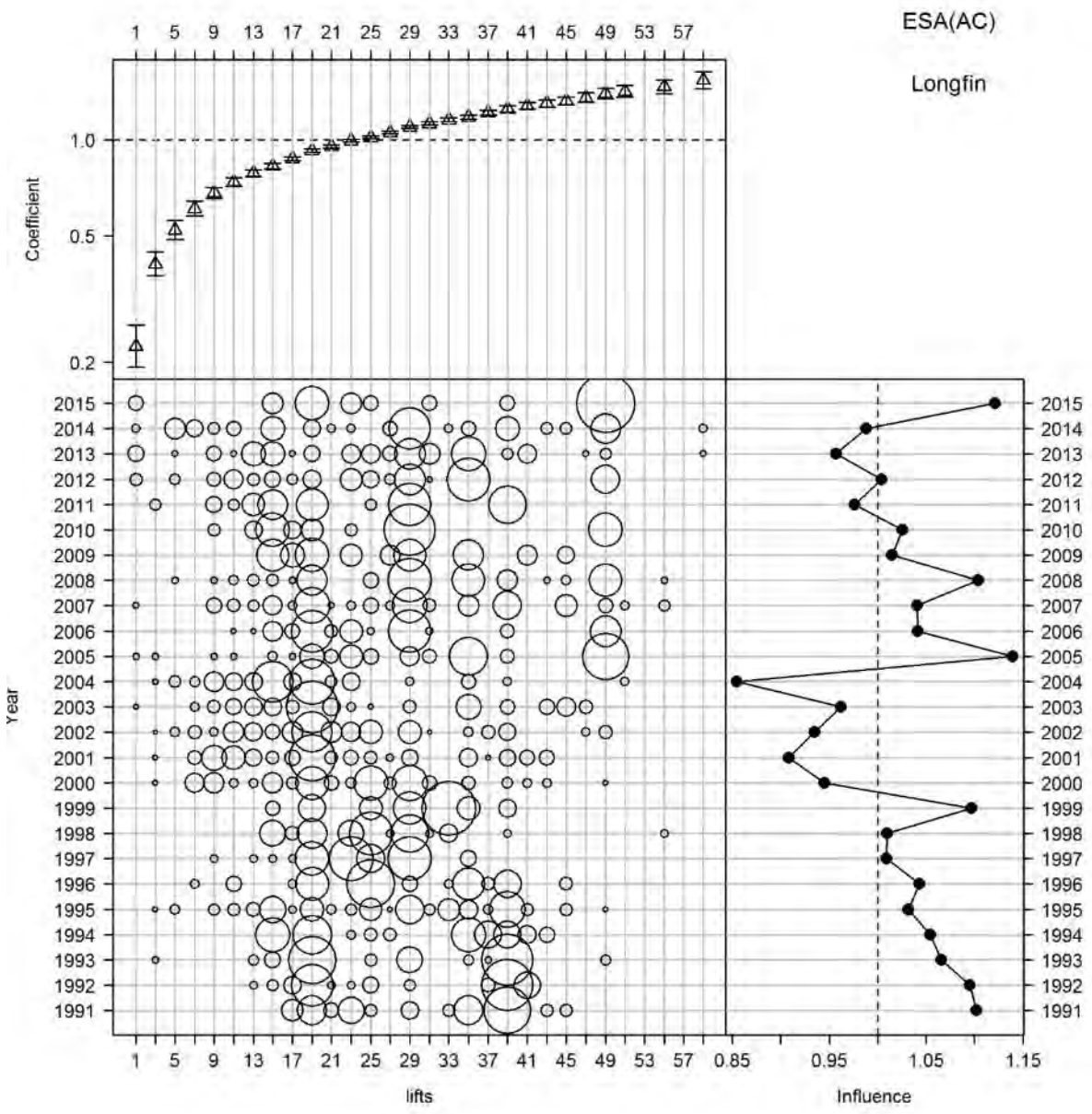


Figure C26: Influence of lifts for the longfin CPUE model for the years 1990–91 to 2014–15 (ESA AC).

APPENDIX D: WAIKATO (ESA AD)

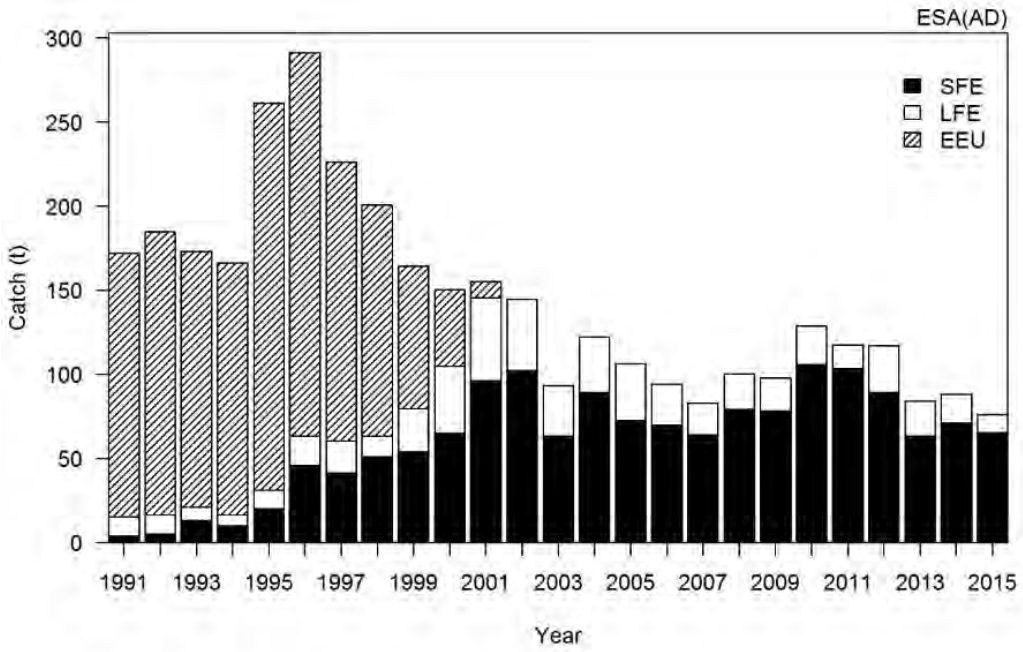


Figure D1: Total estimated commercial catch of shortfin (SFE), longfin (LFE), and unclassified eel catch (EEU) for the years 1990–91 to 2014–15 (ESA AD).

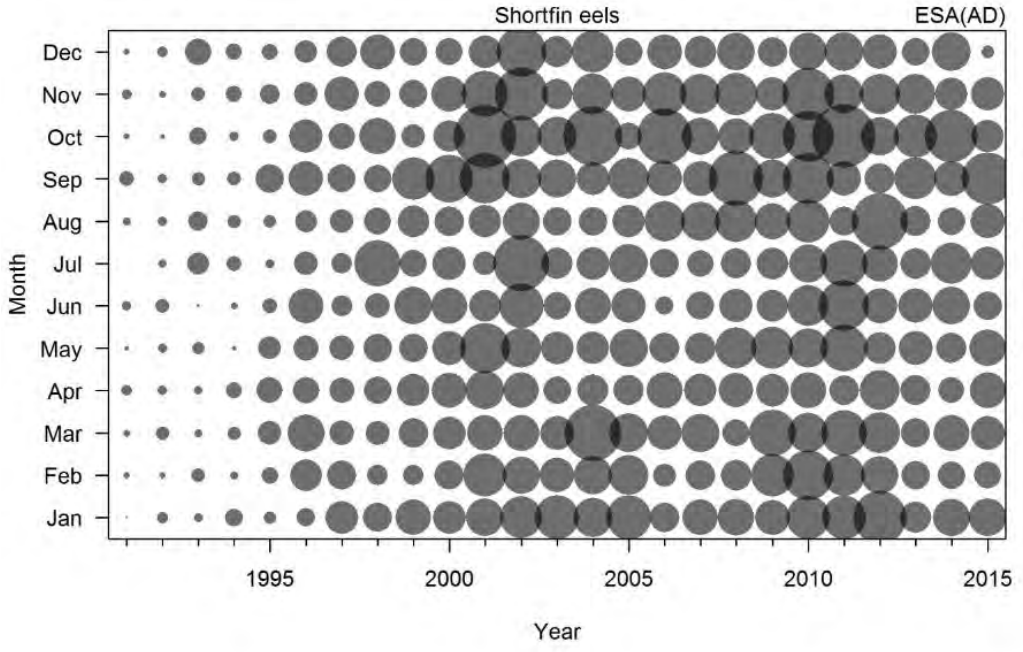


Figure D2: Shortfin eel catch by month for the years 1990–91 to 2014–15. The catch before 2002 is missing an unknown amount that was recorded as EEU (ESA AD).

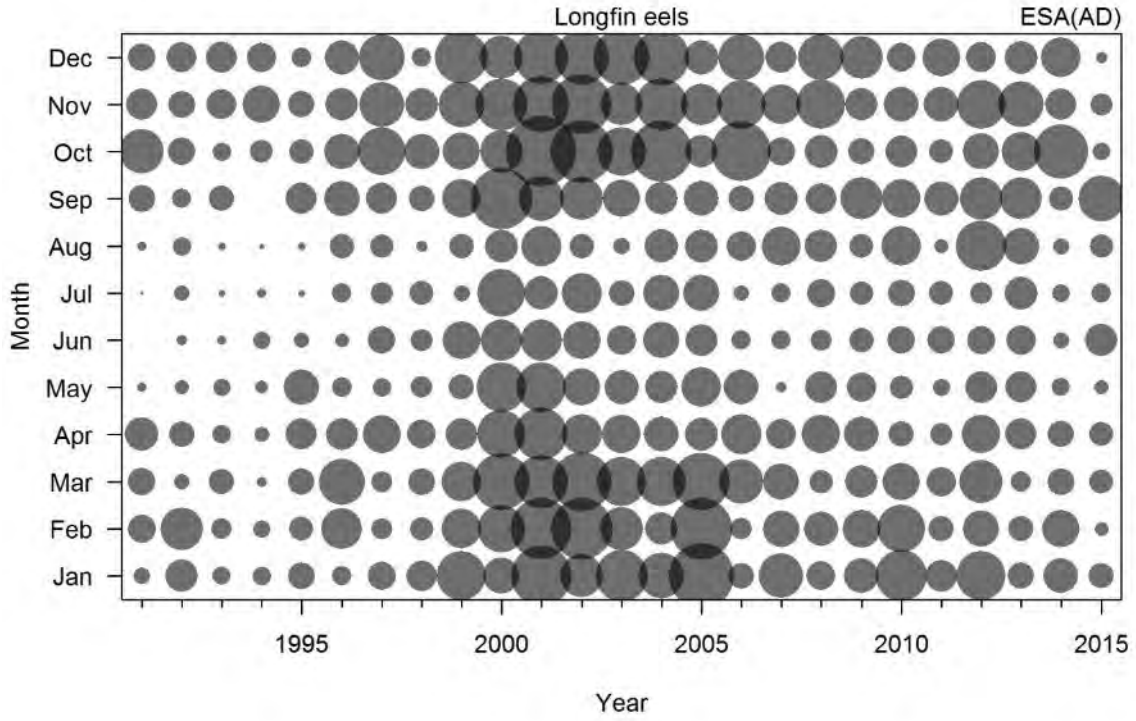


Figure D3: Longfin eel catch by month for the years 1990–91 to 2014–15. The catch before 2002 is missing an unknown amount that was recorded as EEU (ESA AD).

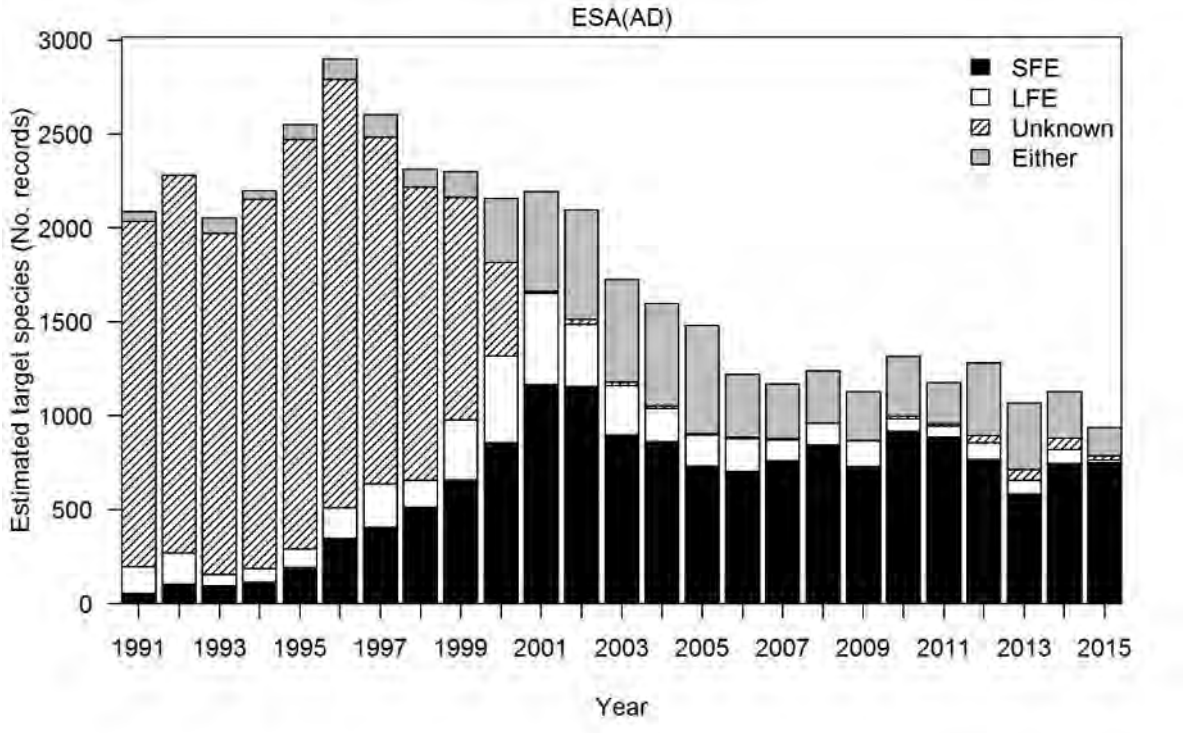


Figure D4: Reconstructed target species for the years 1990–91 to 2014–15 (ESA AD).

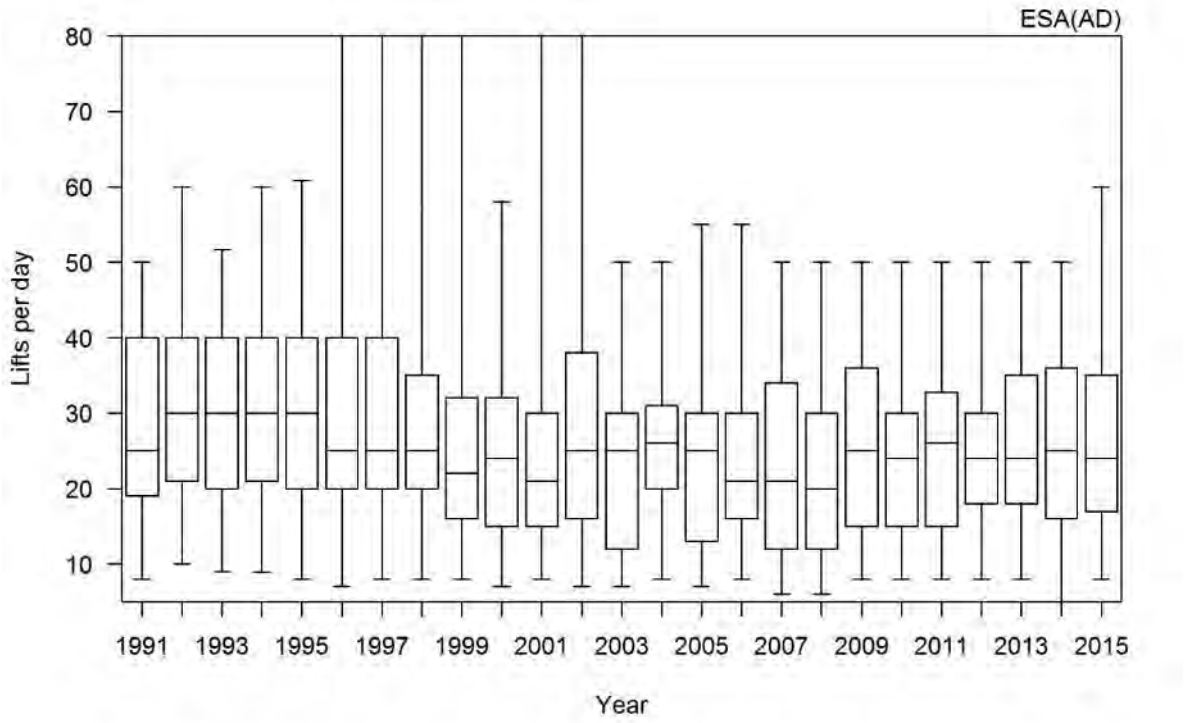


Figure D5: Total lifts per day for the years 1990–91 to 2014–15. The horizontal line is the median, the top and bottom of the box are the interquartiles (25th and 75th), and error bars are the 95th percentile range (ESA AD).

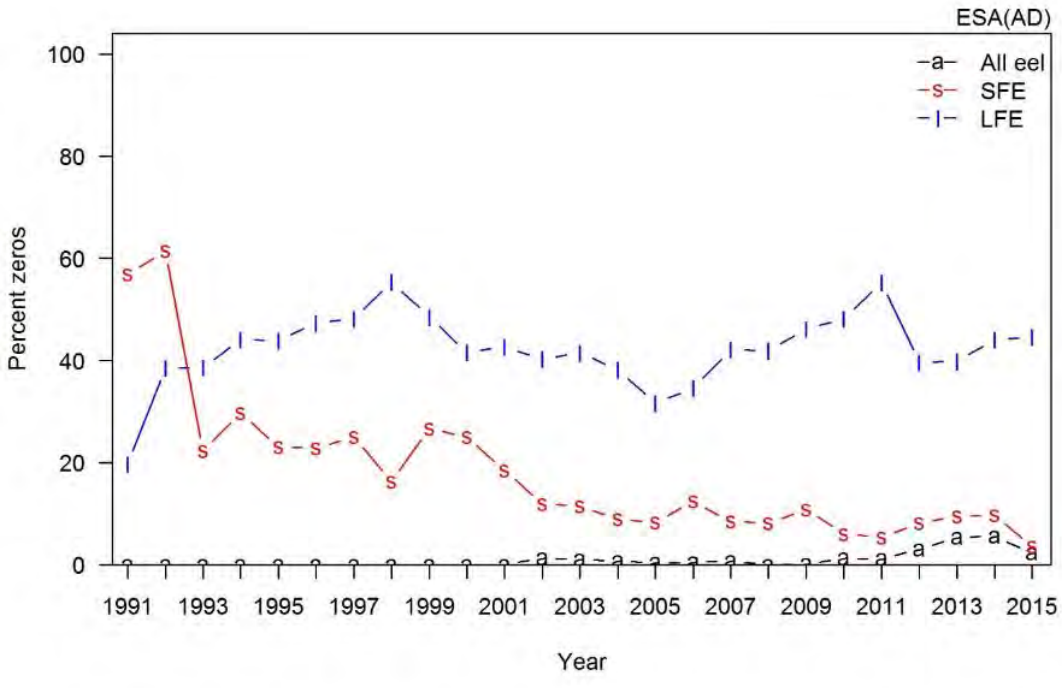


Figure D6: Proportion of valid zero records for all eels, shortfin (SFE), and longfin (LFE) for the years 1990–91 to 2014–15. Excludes zeros associated with reporting EEU (unclassified) (ESA AD).

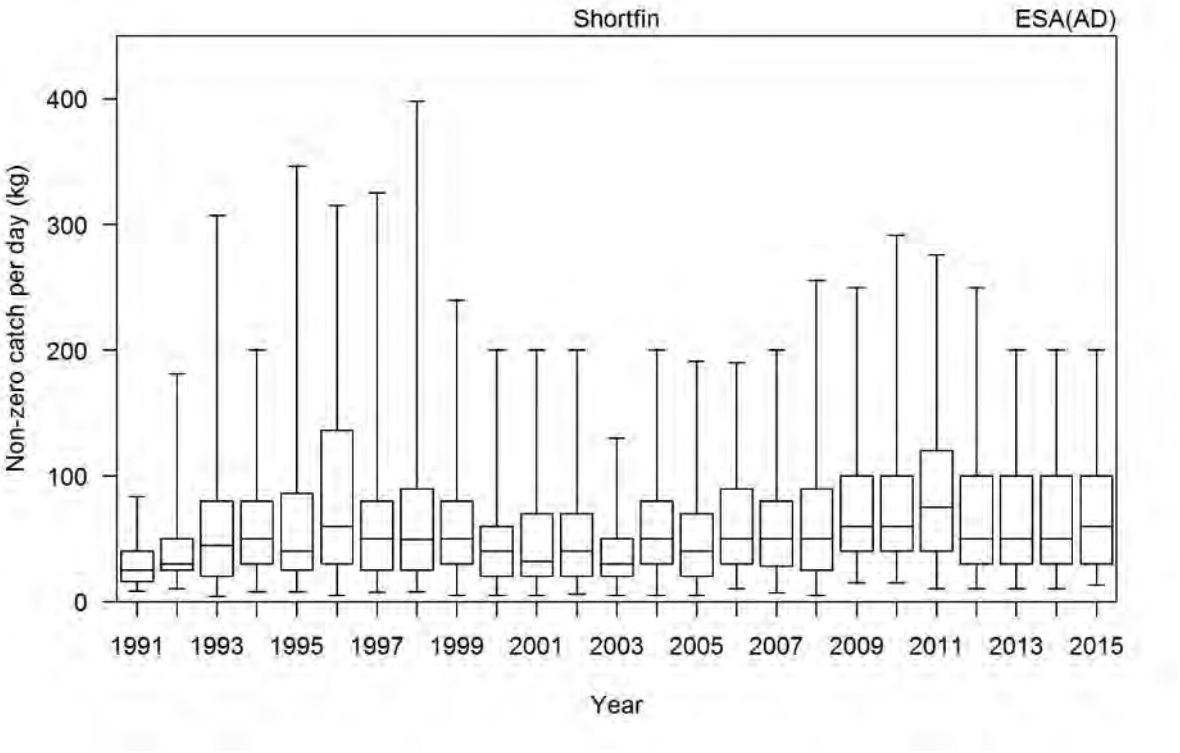


Figure D7: Shortfin non-zero catch per day for the years 1990–91 to 2014–15. The horizontal line is the median, the top and bottom of the box are the interquartiles (25th and 75th), and error bars are the 95th percentile range (ESA AD).

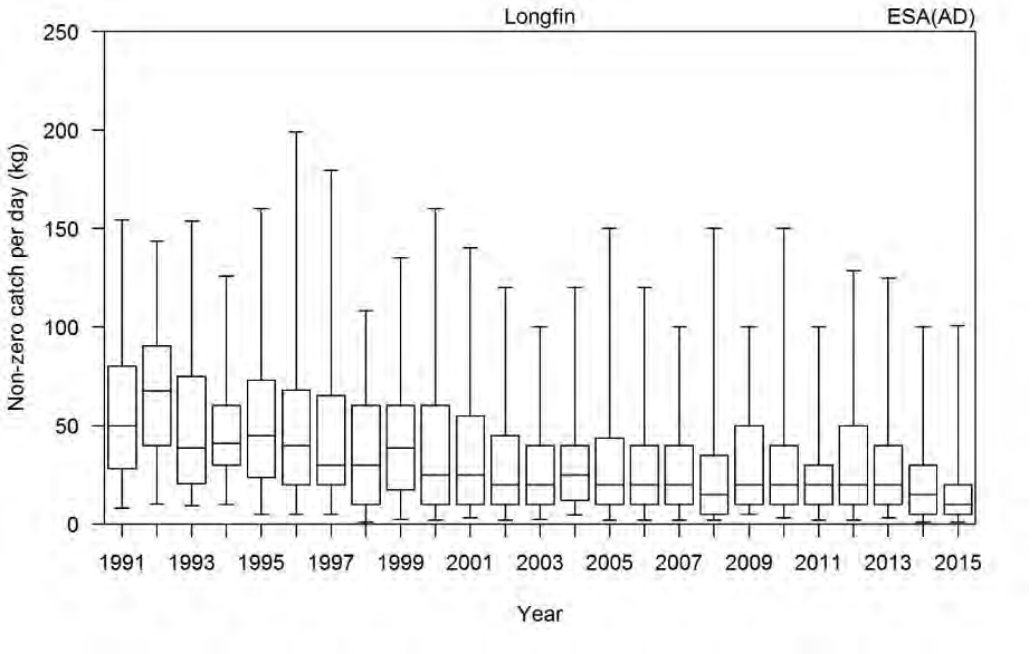


Figure D8: Longfin non-zero catch per day for the years 1990–91 to 2014–15. The horizontal line is the median, the top and bottom of the box are the interquartiles (25th and 75th), and error bars are the 95th percentile range (ESA AD).

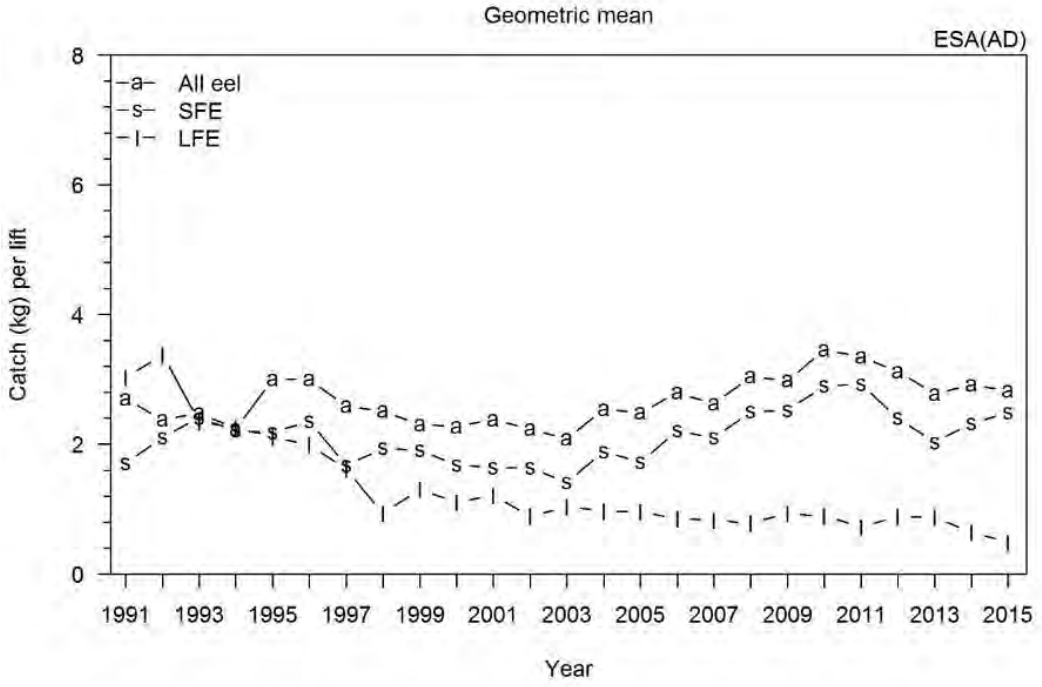


Figure D9: Unstandardised CPUE (geometric mean of catch per lift) for all eels, shortfin (SFE), and longfin (LFE) for the years 1990–91 to 2014–15 (ESA AD).

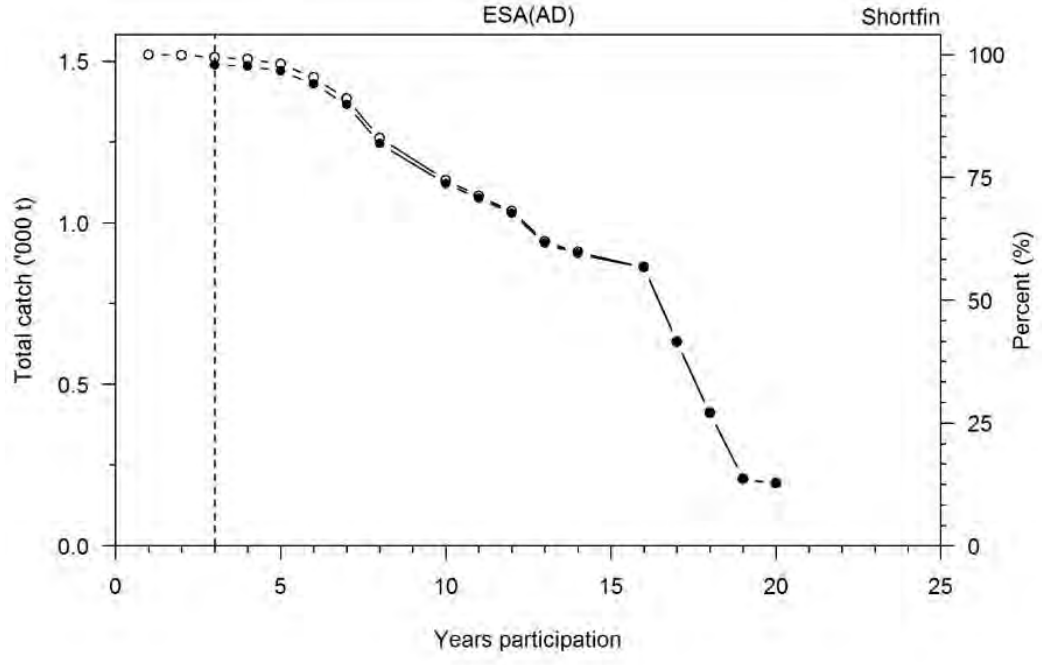


Figure D10: Relationship between years of participation in the fishery and shortfin total catch. The open circles represent all shortfin catch and the closed circles shortfin catch data from fishers who 1) caught shortfin in at least three years in each of which fishing took place in 10 days or more, and 2) caught more than 1000 kg over all years. Dotted vertical line represents 3 years participation and indicates the data included in the core shortfin fisher analyses for the years 1990–91 to 2014–15 (ESA AD).

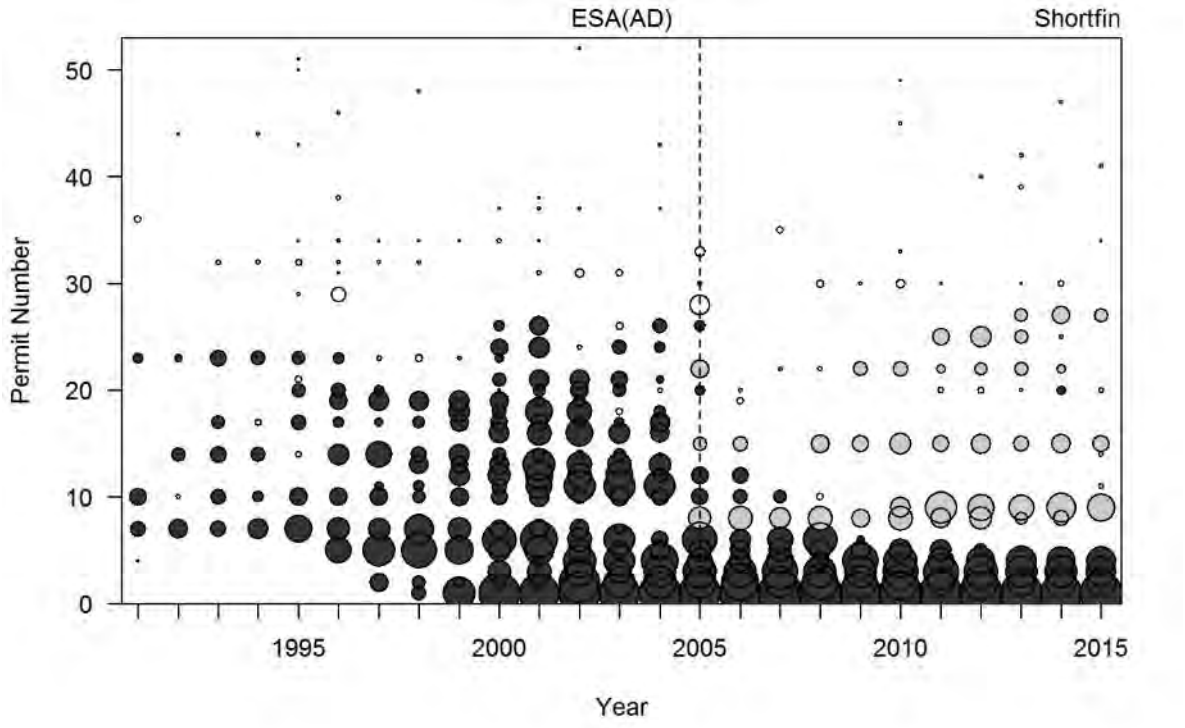


Figure D11: Relative catch of shortfin from all fishers (all circles) for the years 1990–91 to 2014–15, and for core fishers (dark and grey shaded circles) included in the catch per unit effort analyses. The vertical dotted line demarks introduction of the QMS in 2004-05. The dark shaded circles post-QMS are existing fishers and the grey, new entrants (ESA AD).

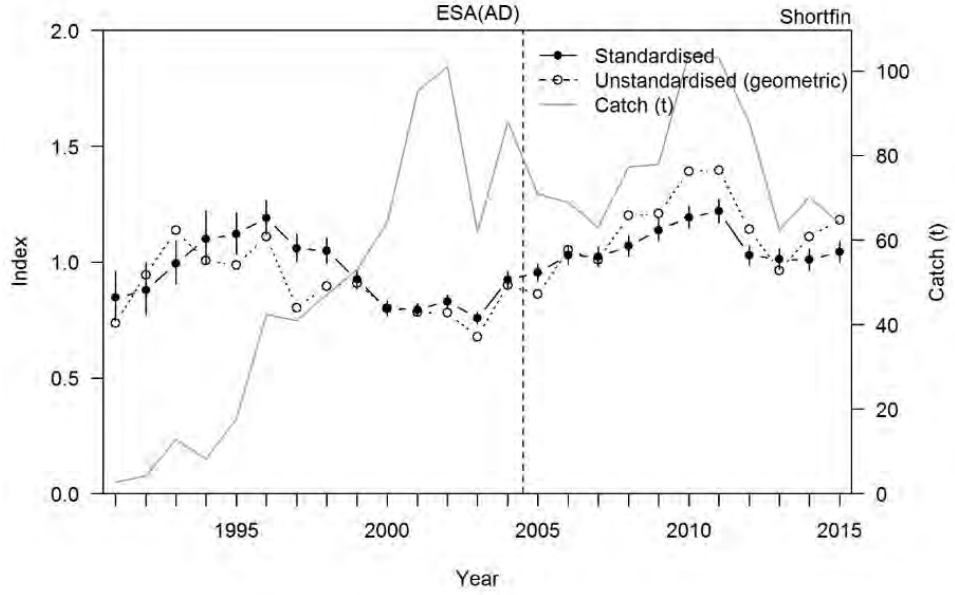


Figure D12: Indices of unstandardised (geometric mean of catch per lift) and standardised CPUE for shortfin core fishers for the years 1990–91 to 2014–15. The shortfin catch by core fishers is also plotted (ESA AD).

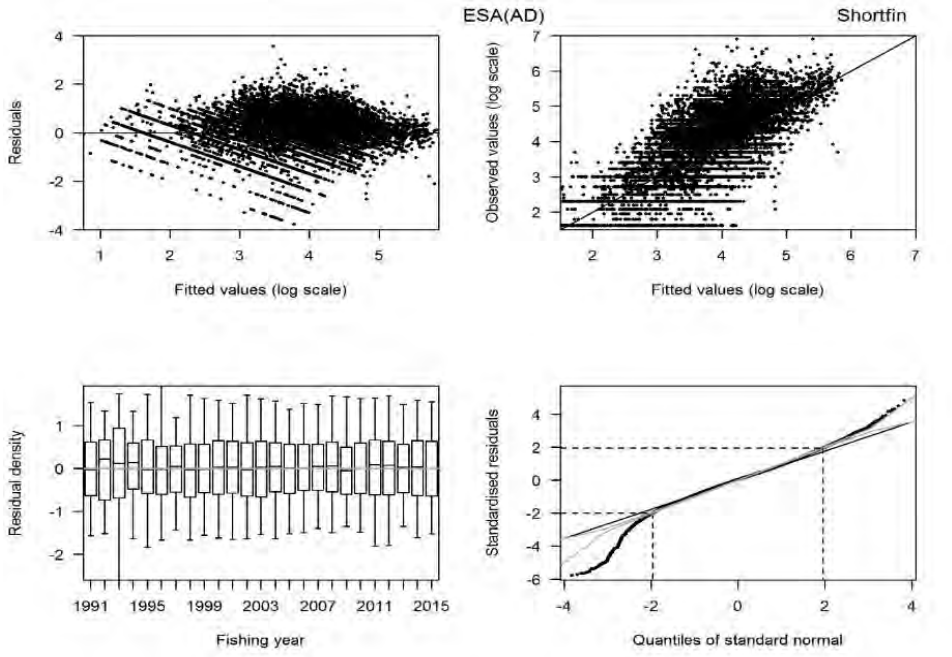


Figure D13: Residual diagnostic plots for the shortfin eel CPUE model for the years 1990–91 to 2014–15. The grey lines on the quantile-quantile plot represent the 95% confidence envelopes of a standard normal distribution (ESA AD).

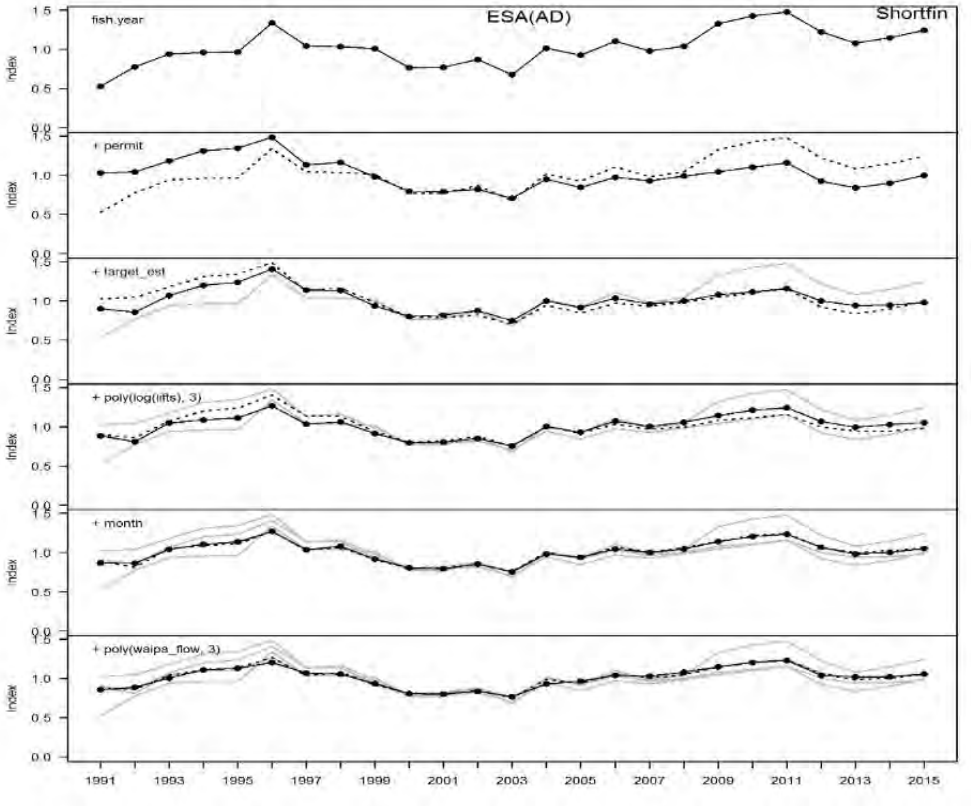


Figure D14: Step plot for the shortfin eel CPUE model for the years 1990–91 to 2014–15. Each panel shows the standardised CPUE index as each explanatory variable is added to the model with the previous index shown by the dotted line and the grey lines for steps before that (ESA AD).

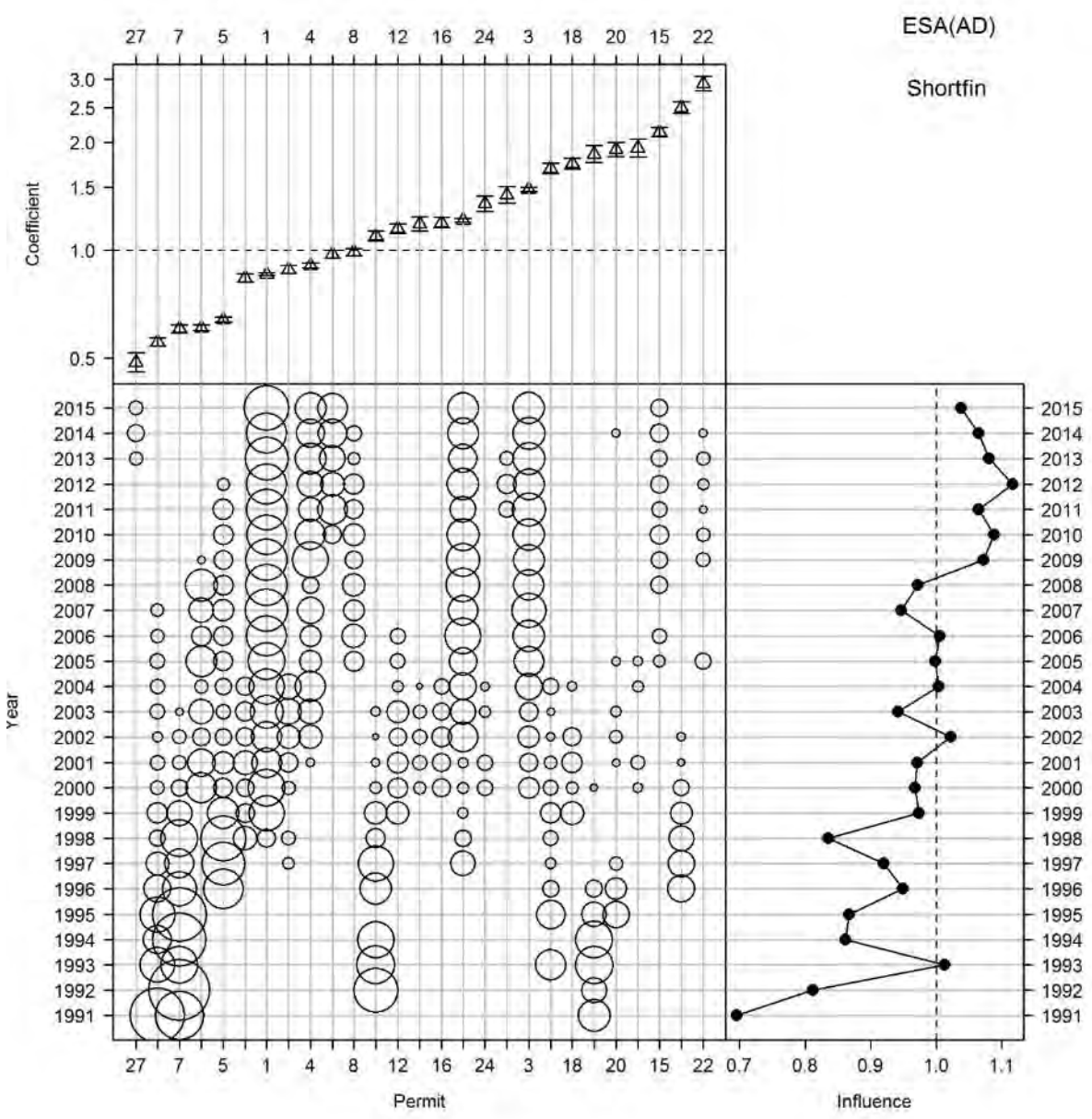


Figure D15: Influence of permit for the shortfin CPUE model for the years 1990–91 to 2014–15 (ESA AD).

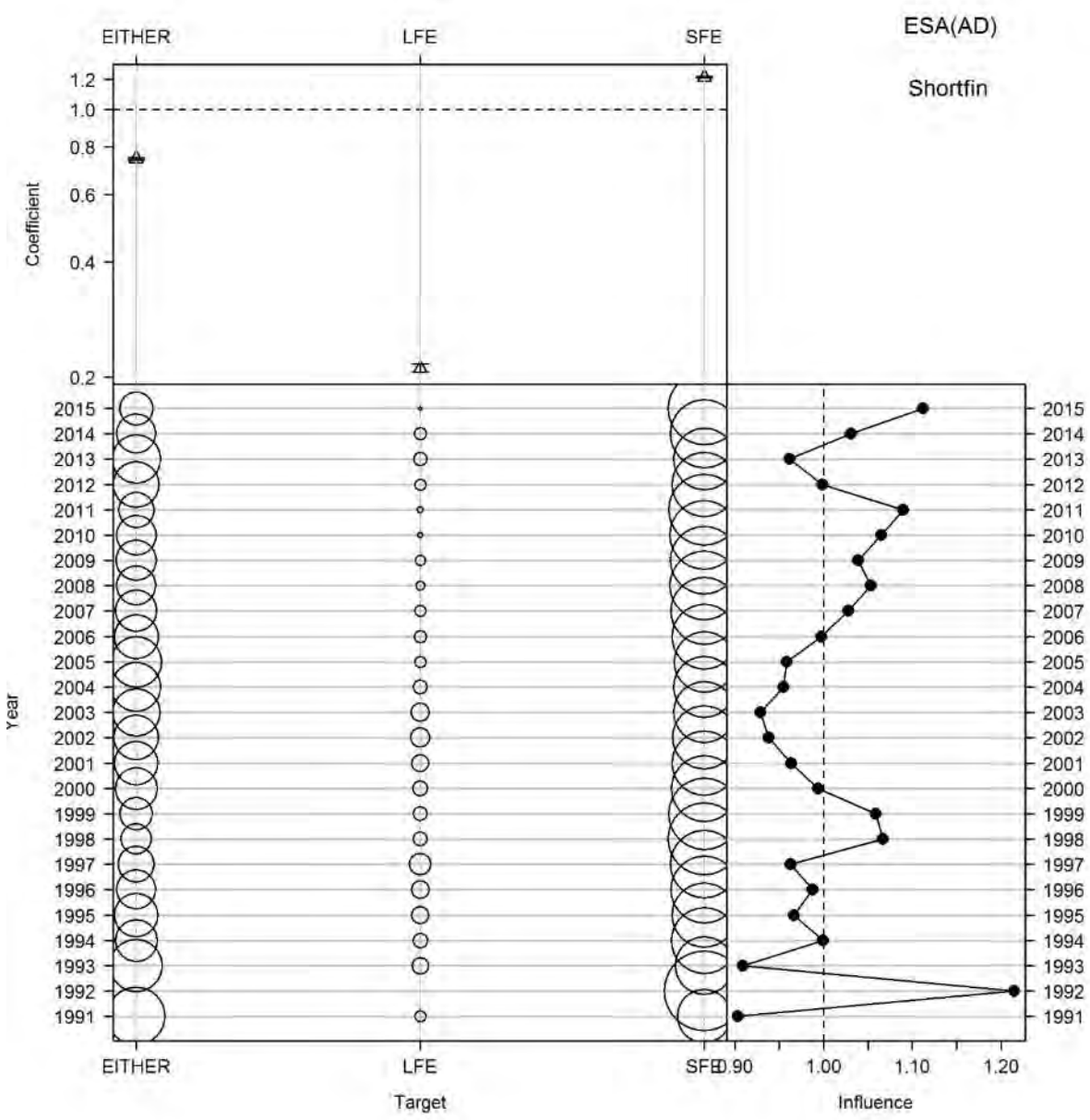


Figure D16: Influence of target for the shortfin CPUE model for the years 1990–91 to 2014–15 (ESA AD).

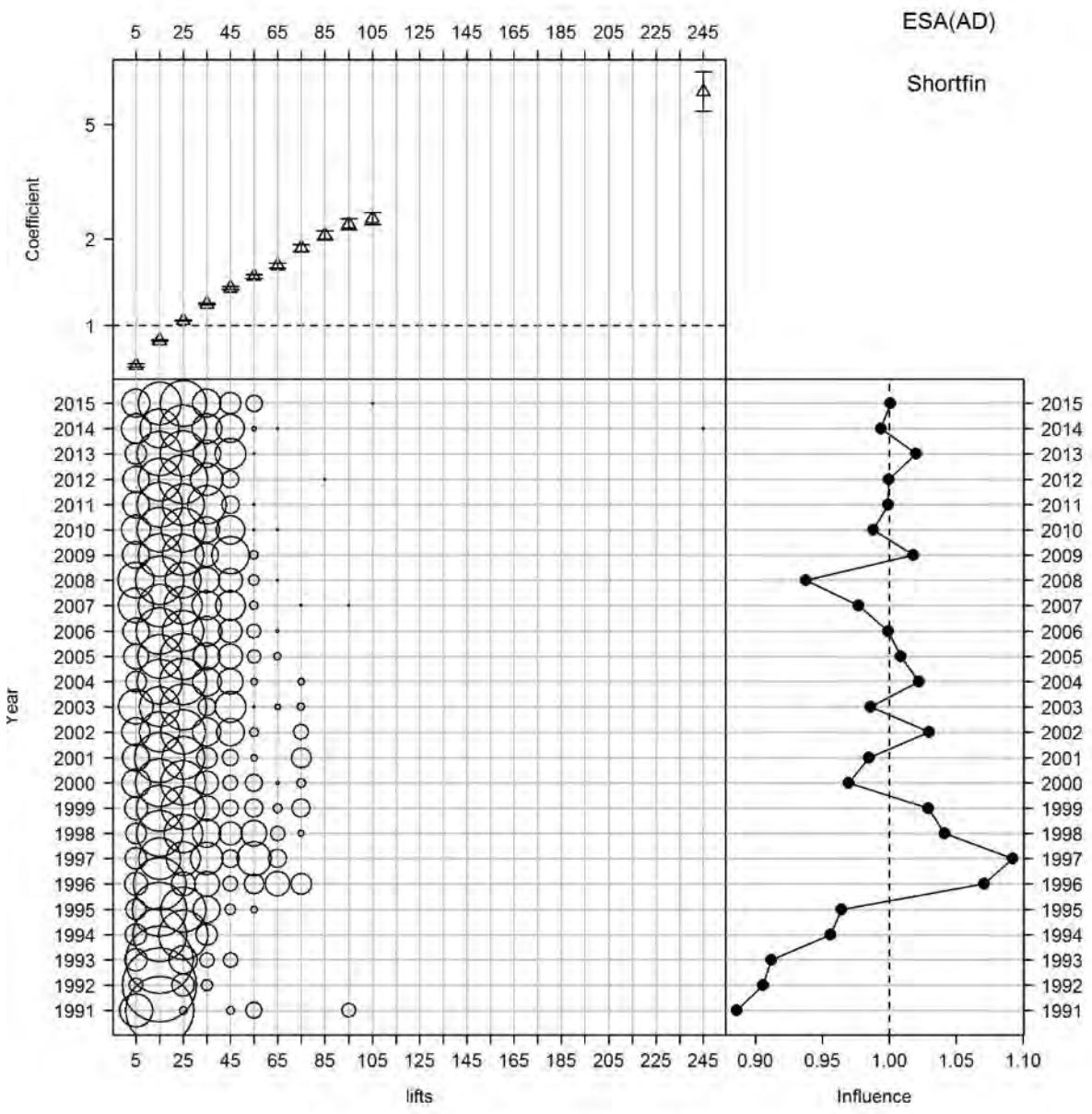


Figure D17: Influence of lifts for the shortfin CPUE model for the years 1990–91 to 2014–15 (ESA AD).

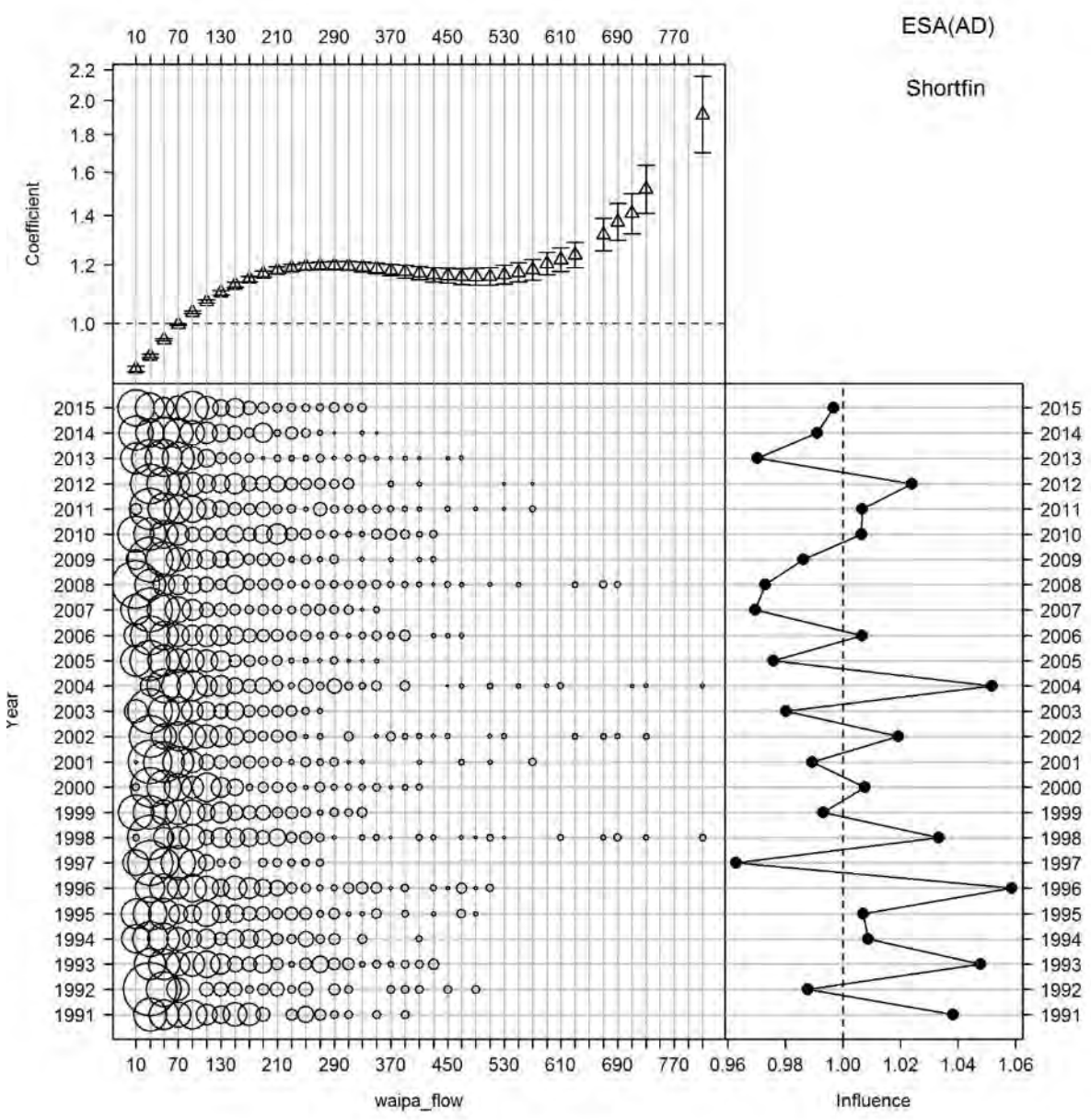


Figure D18: Influence of Waipa River flow for the shortfin CPUE model for the years 1990–91 to 2014–15 (ESA AD).

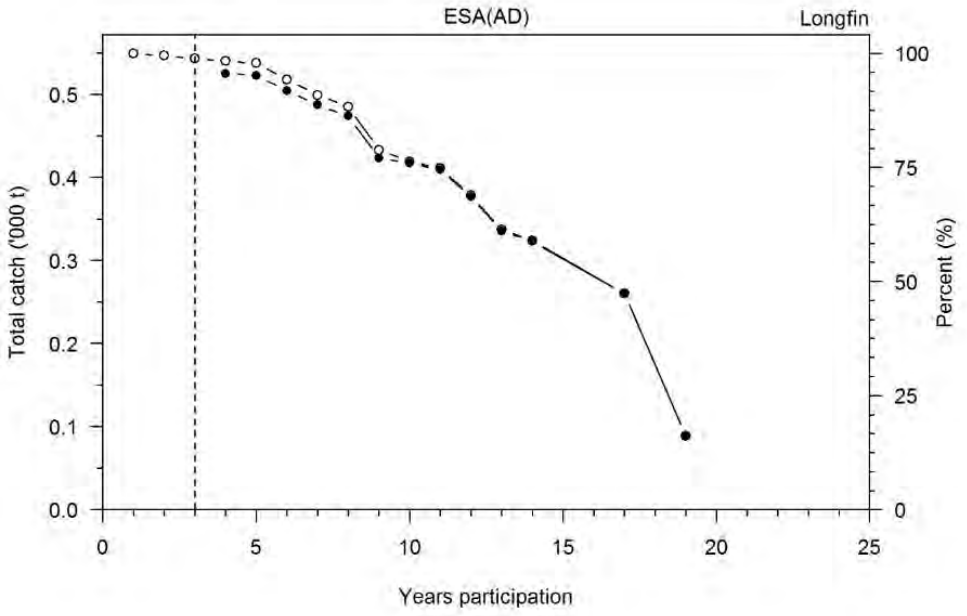


Figure D19: Relationship between years of participation in the fishery and longfin total catch. The open circles represent all longfin catch and the closed circles longfin catch data from fishers who 1) caught longfin in at least three years in each of which fishing took place in 10 days or more, and 2) caught more than 1000 kg over all years. Dotted vertical line represents 3 years participation and indicates the data included in the core longfin fisher analyses for the years 1990–91 to 2014–15 (ESA AD).

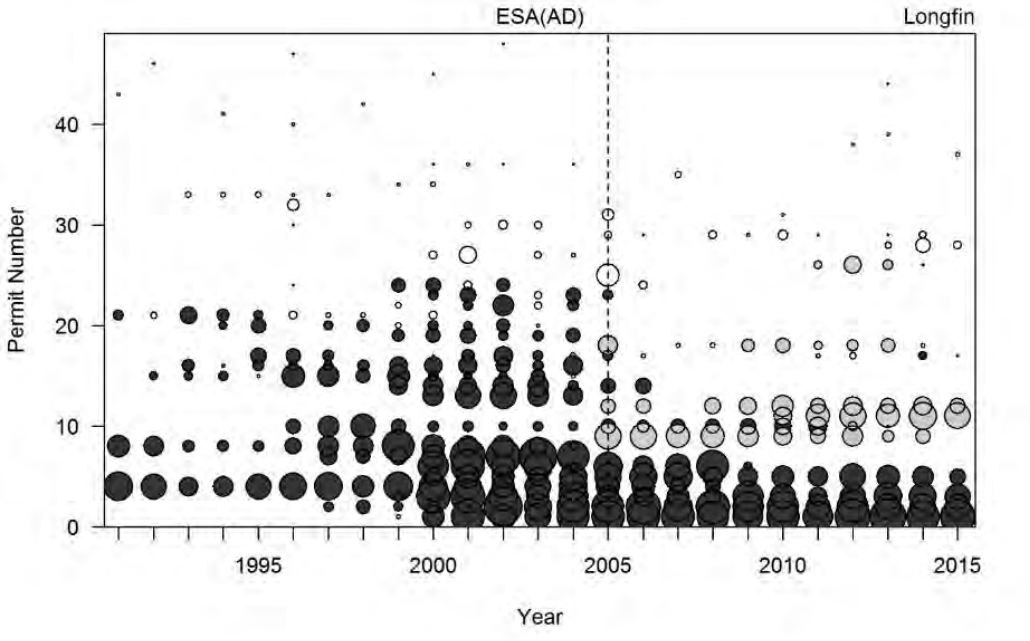


Figure D20: Relative catch of longfin from all fishers (all circles) for the years 1990–91 to 2014–15, and for core fishers (dark and grey shaded circles) included in the catch per unit effort analyses. The vertical dotted line demarks introduction of the QMS in 2004-05. The dark shaded circles post-QMS are existing fishers and the grey, new entrants (ESA AD).

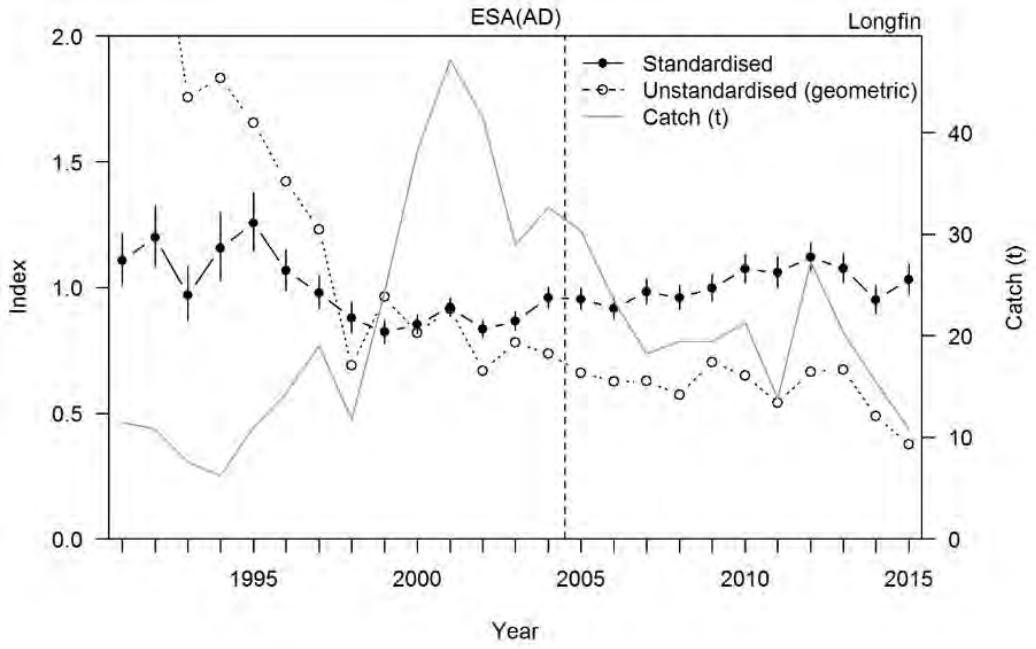


Figure D21: Indices of unstandardised (geometric mean of catch per lift) and standardised CPUE for longfin core fishers for the years 1990–91 to 2014–15. The longfin catch by core fishers is also plotted (ESA AD).

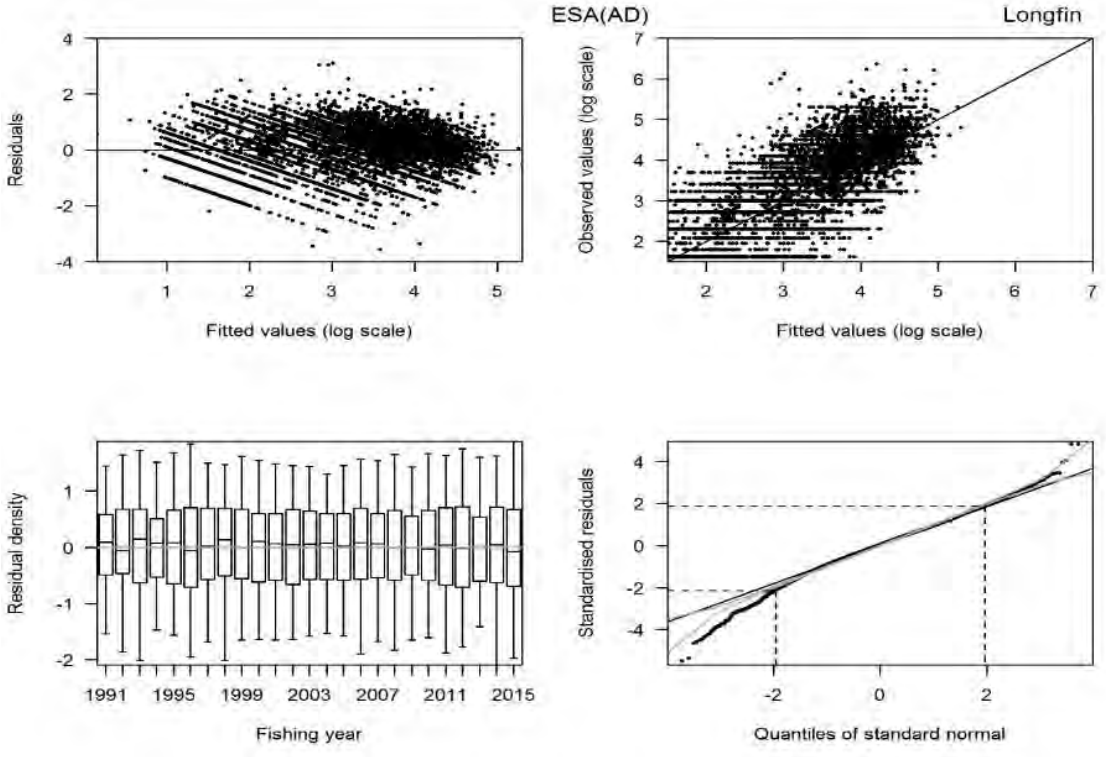


Figure D22: Residual diagnostic plots for the longfin eel CPUE model for the years 1990–91 to 2014–15. The grey lines on the quantile-quantile plot represent the 95% confidence envelopes of a standard normal distribution (ESA AD).

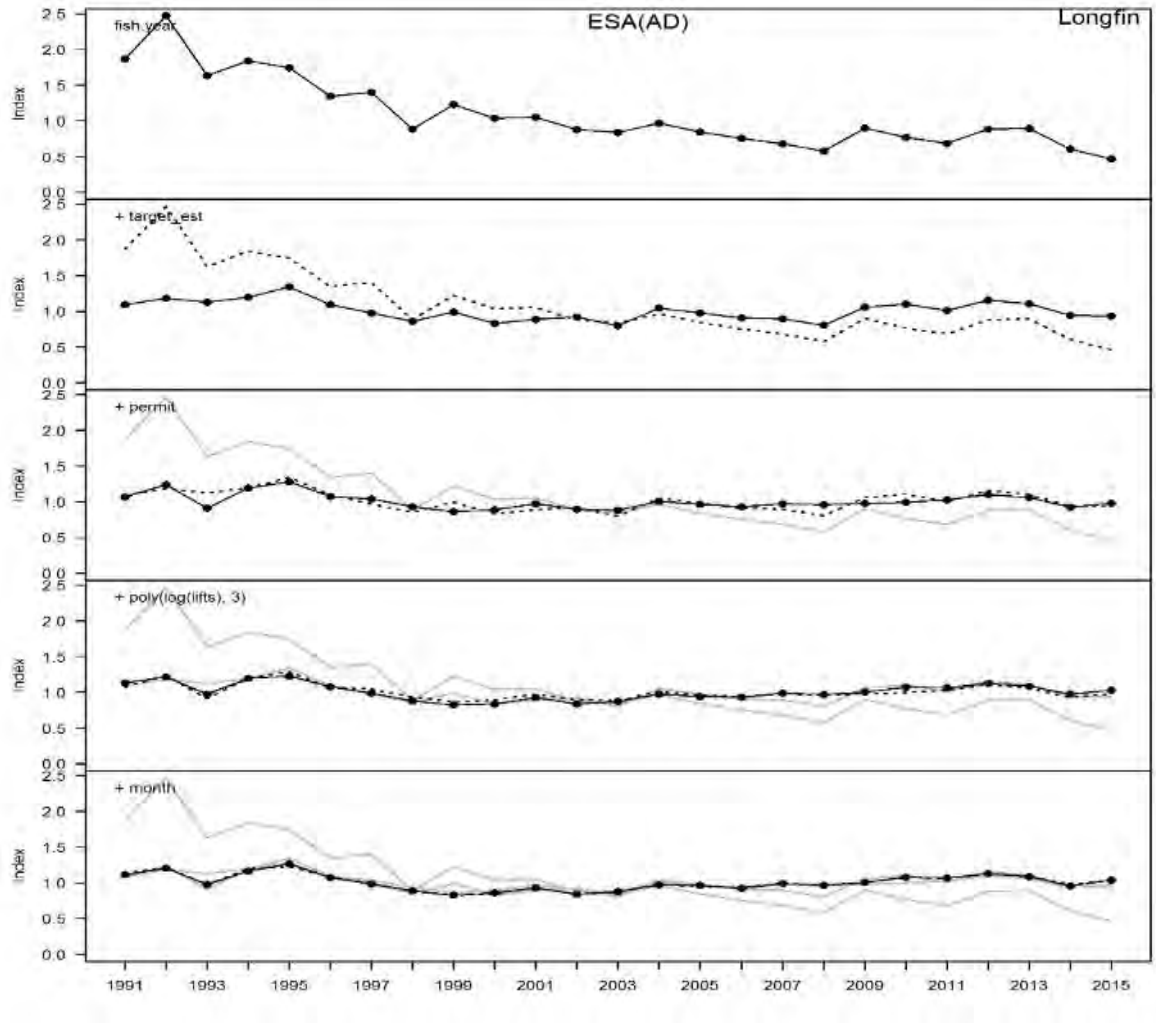


Figure D23: Step plot for the longfin eel CPUE model for the years 1990–91 to 2014–15. Each panel shows the standardised CPUE index as each explanatory variable is added to the model with the previous index shown by the dotted line and the grey lines for steps before that (ESA AD).

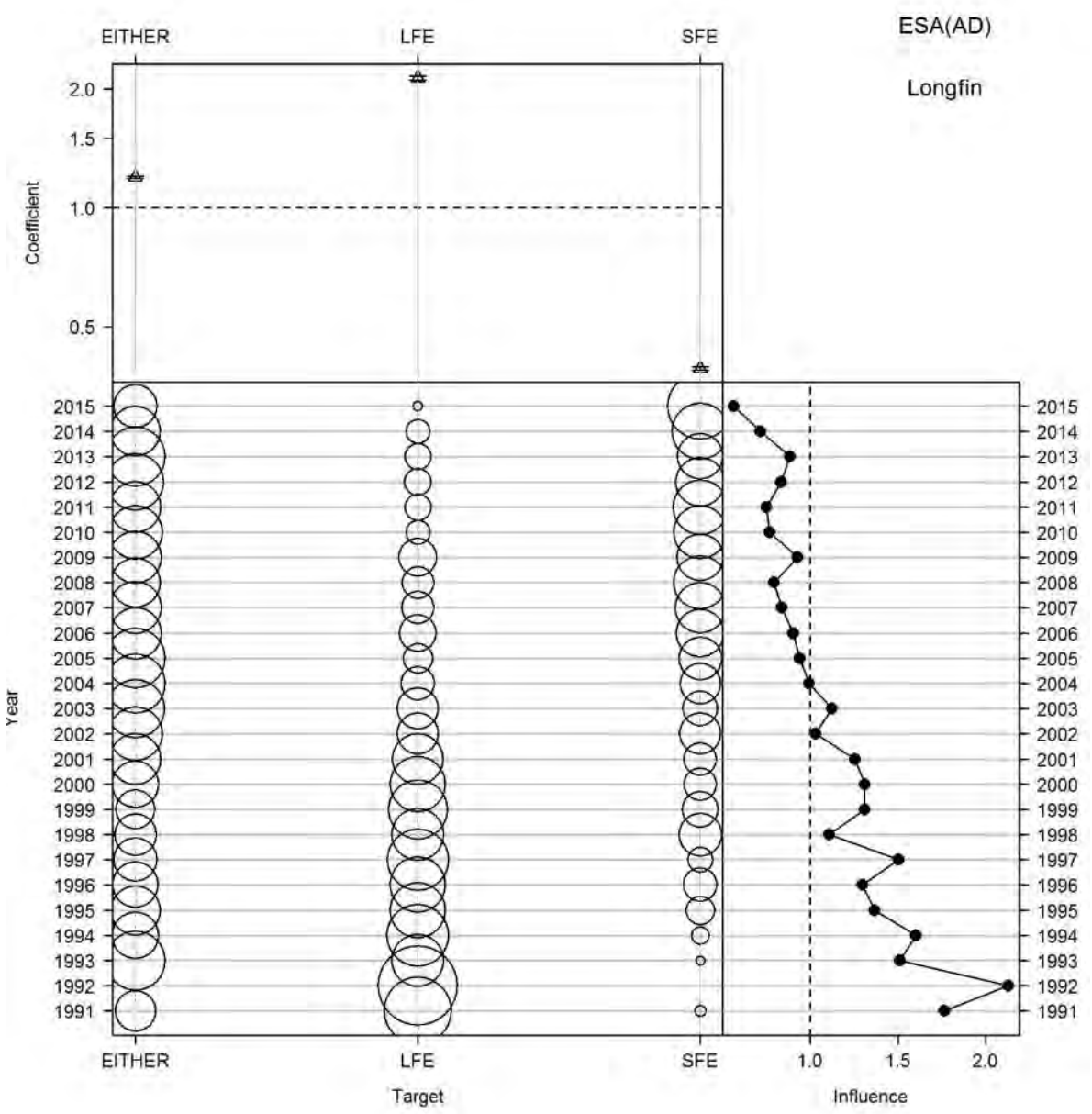


Figure D24: Influence of target for the longfin CPUE model for the years 1990–91 to 2014–15 (ESA AD).

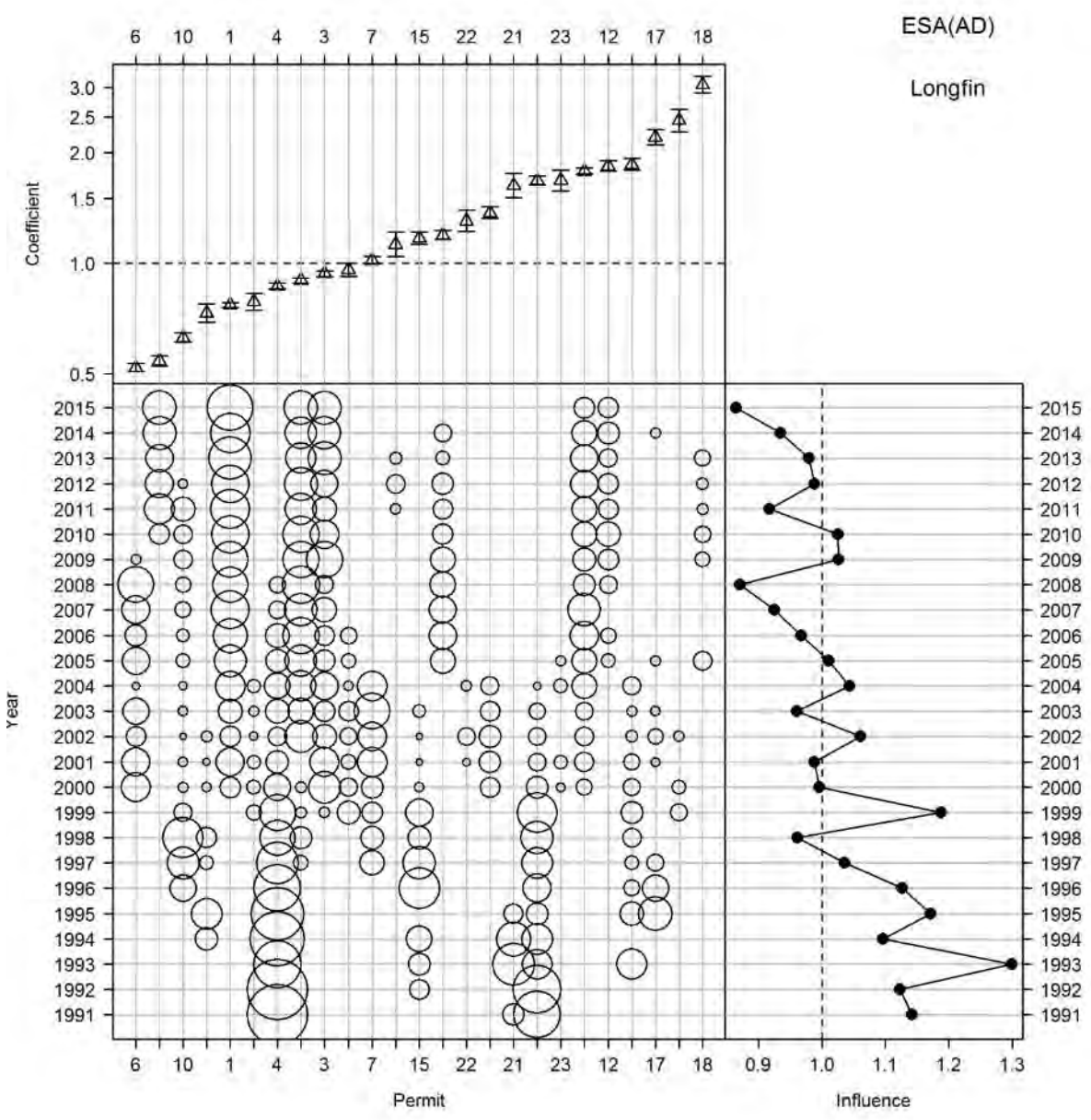


Figure D25: Influence of permit for the longfin CPUE model for the years 1990–91 to 2014–15 (ESA AD).

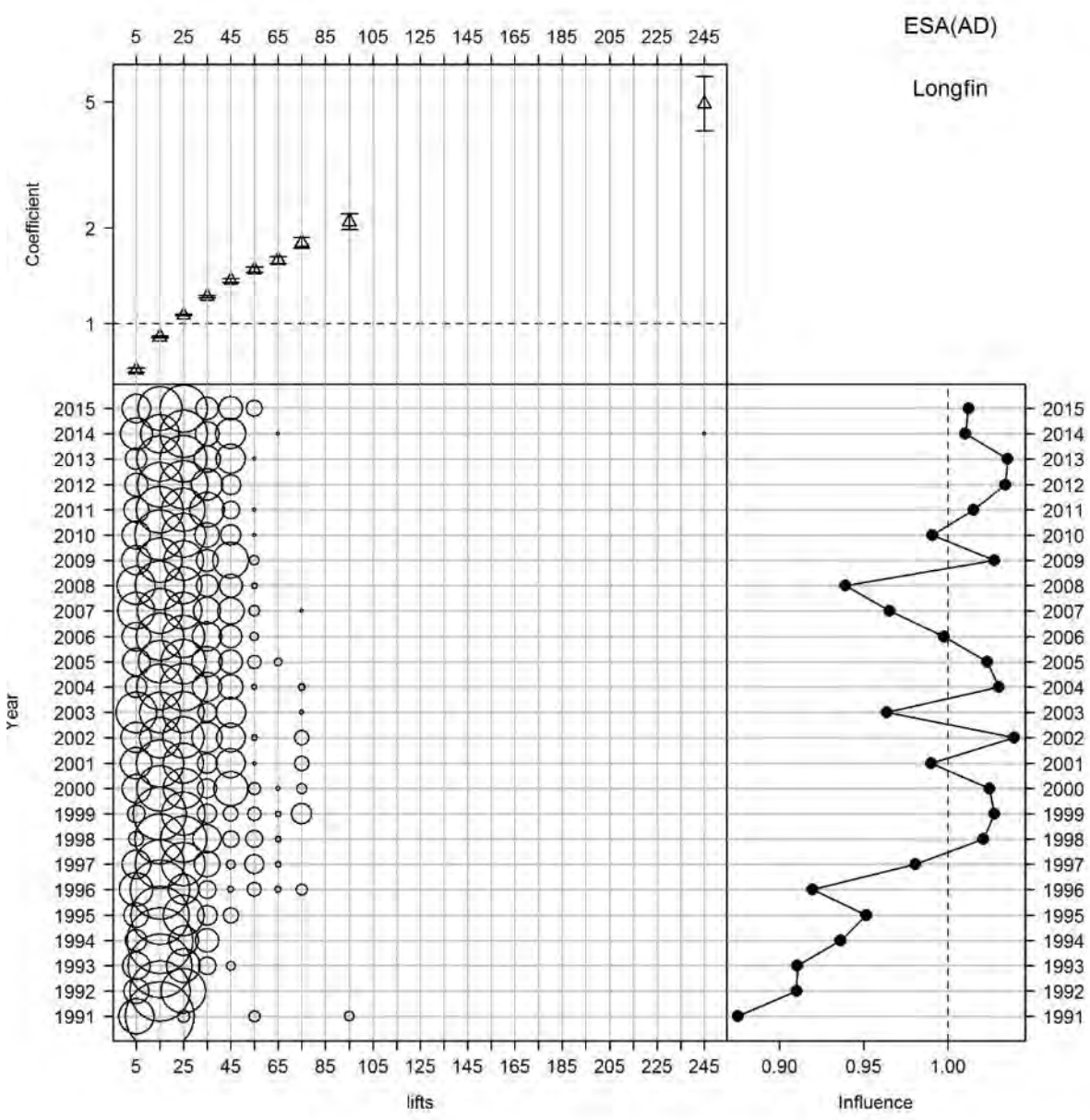


Figure D26: Influence of lifts for the longfin CPUE model for the years 1990–91 to 2014–15 (ESA AD).

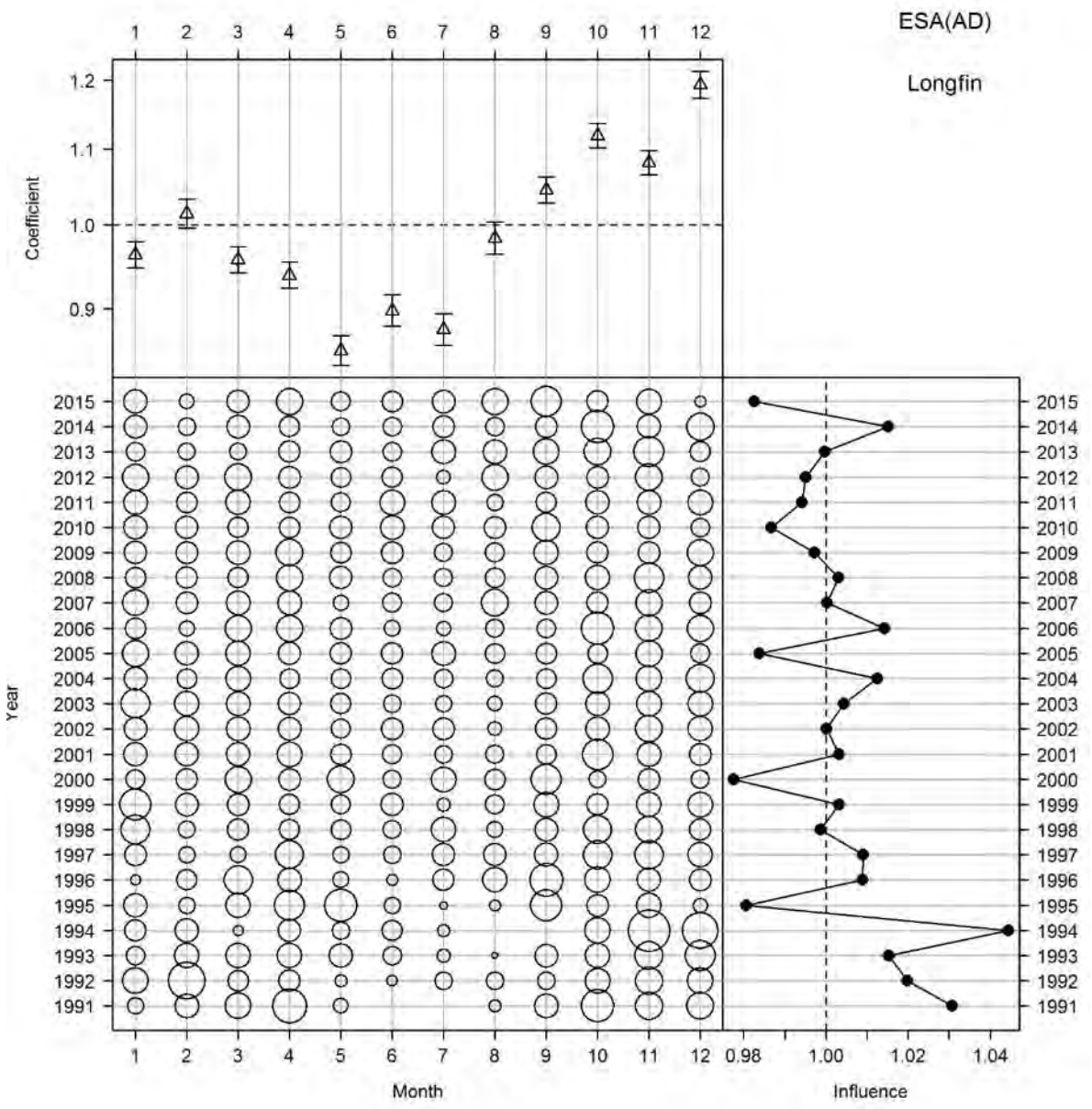


Figure D27: Influence of month for the longfin CPUE model for the years 1990–91 to 2014–15 (ESA AD).

APPENDIX E: BAY OF PLENTY (ESA AE)

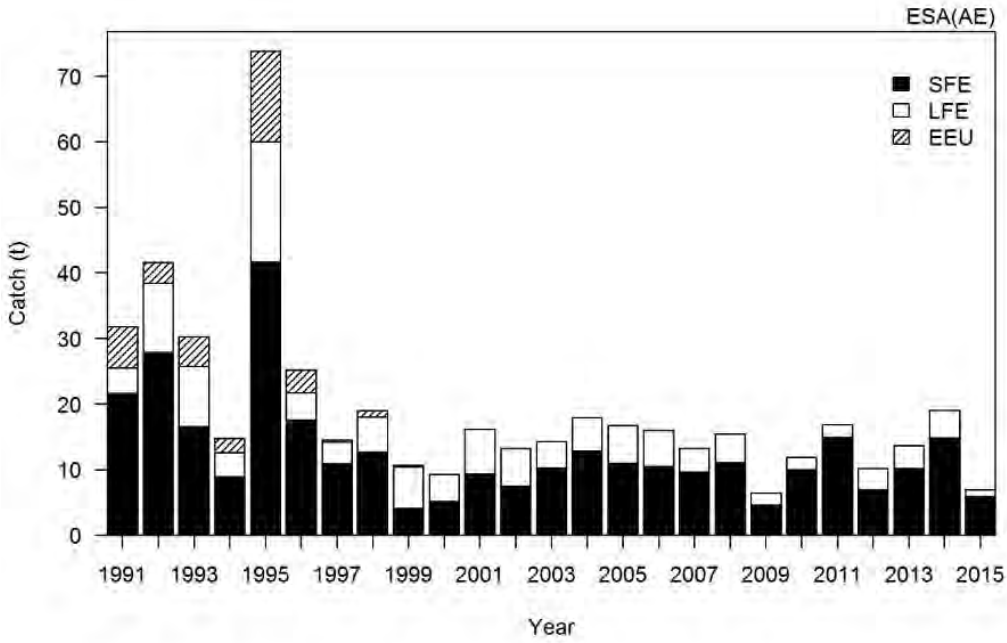


Figure E1: Total estimated commercial catch of shortfin (SFE), longfin (LFE), and unclassified eel catch (EEU) for the years 1990–91 to 2014–15 (ESA AE).

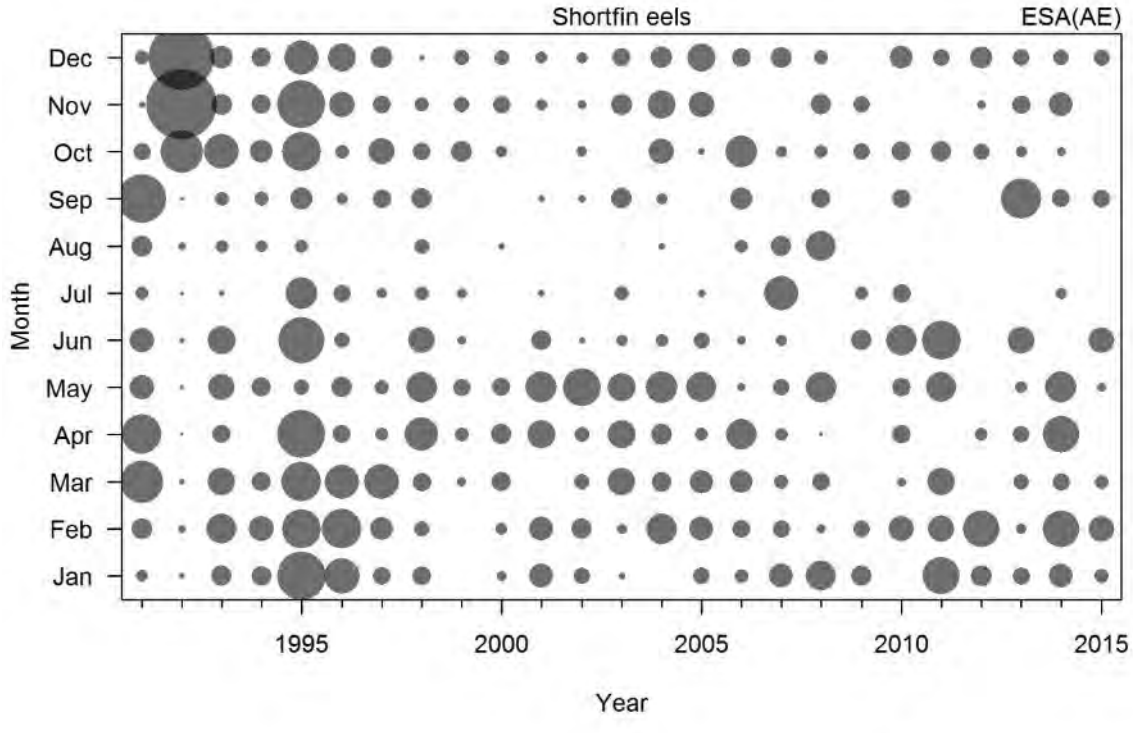


Figure E2: Shortfin eel catch by month for the years 1990–91 to 2014–15. The catch before 2002 is missing an unknown amount that was recorded as EEU (ESA AE).

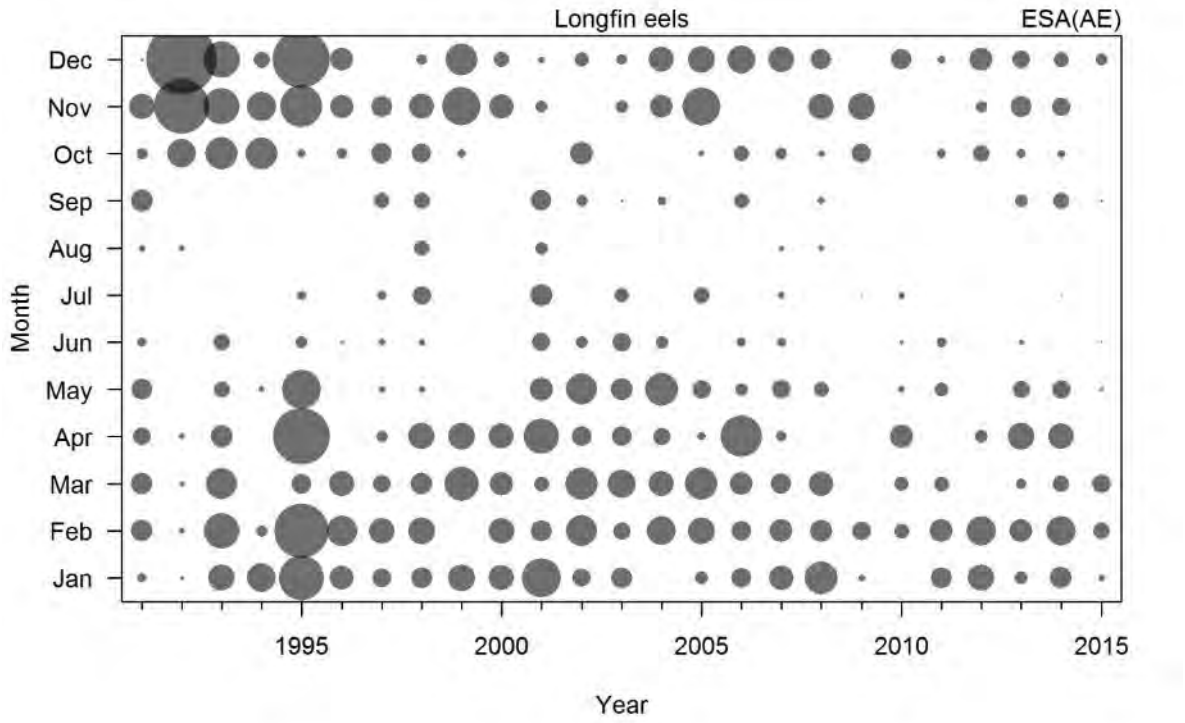


Figure E3: Longfin eel catch by month for the years 1990–91 to 2014–15. The catch before 2002 is missing an unknown amount that was recorded as EEU (ESA AE).

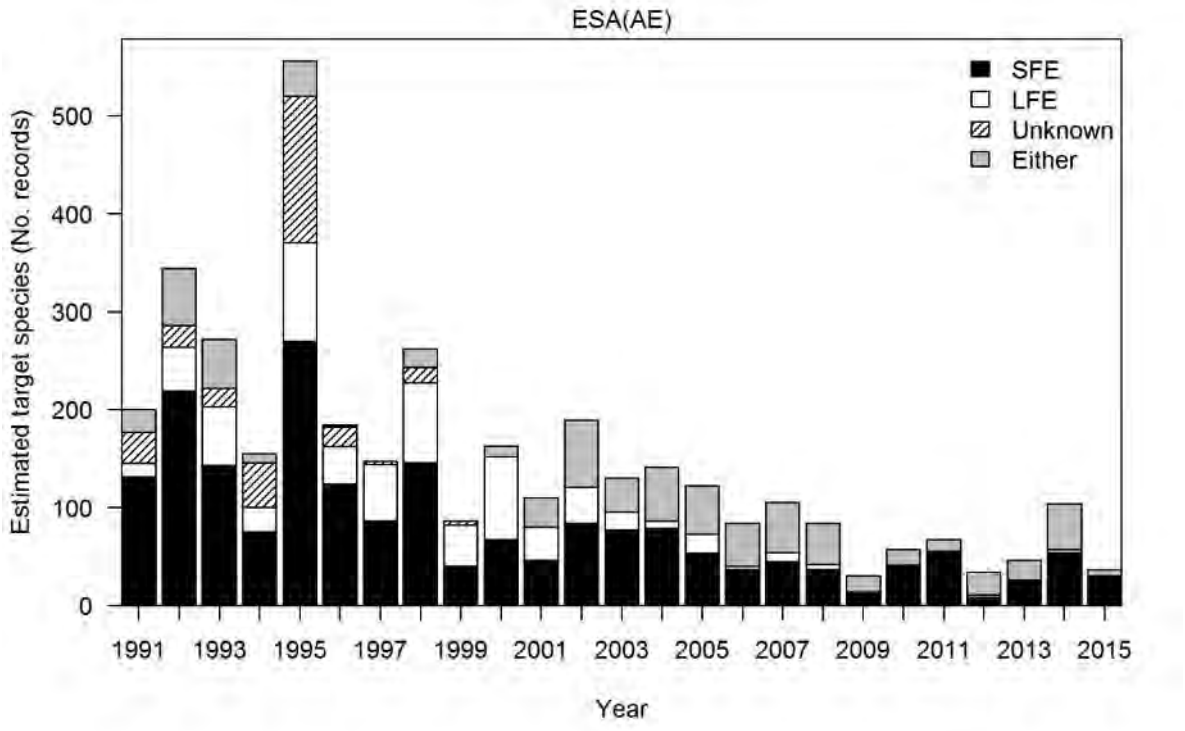


Figure E4: Reconstructed target species for the years 1990–91 to 2014–15 (ESA AE).

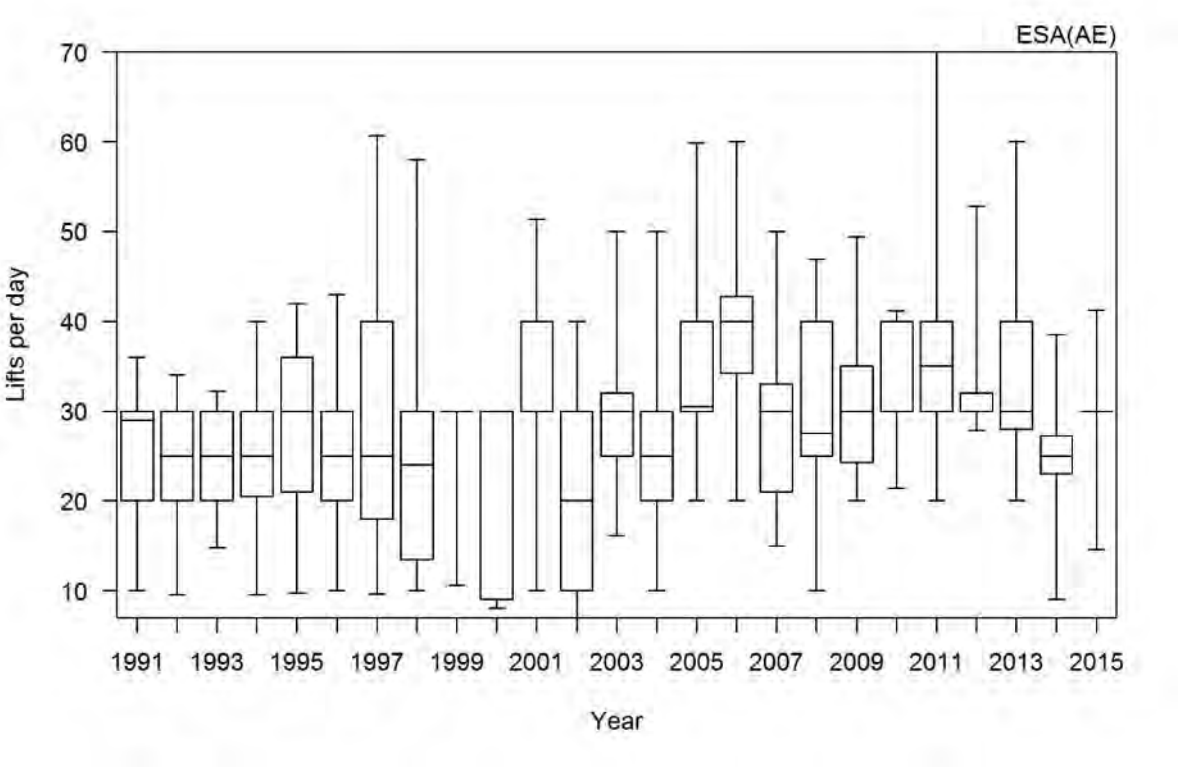


Figure E5: Total lifts per day for the years 1990–91 to 2014–15. The horizontal line is the median, the top and bottom of the box are the interquartiles (25th and 75th), and error bars are the 95th percentile range (ESA AE).

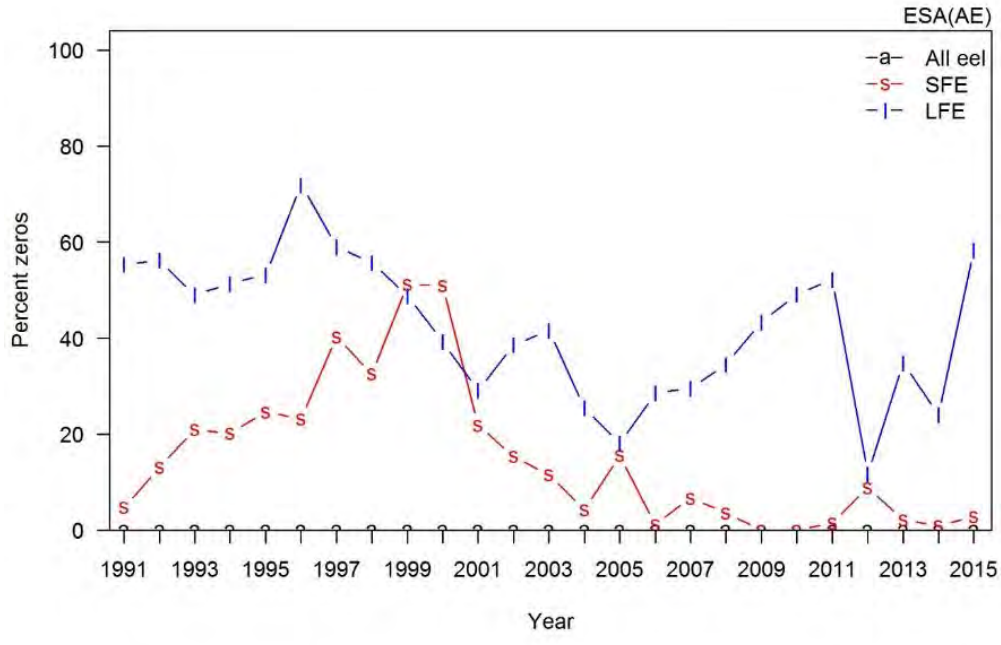


Figure E6: Proportion of valid zero records for all eels, shortfin (SFE), and longfin (LFE) for the years 1990–91 to 2014–15. Excludes zeros associated with reporting EEU (unclassified) (ESA AE).

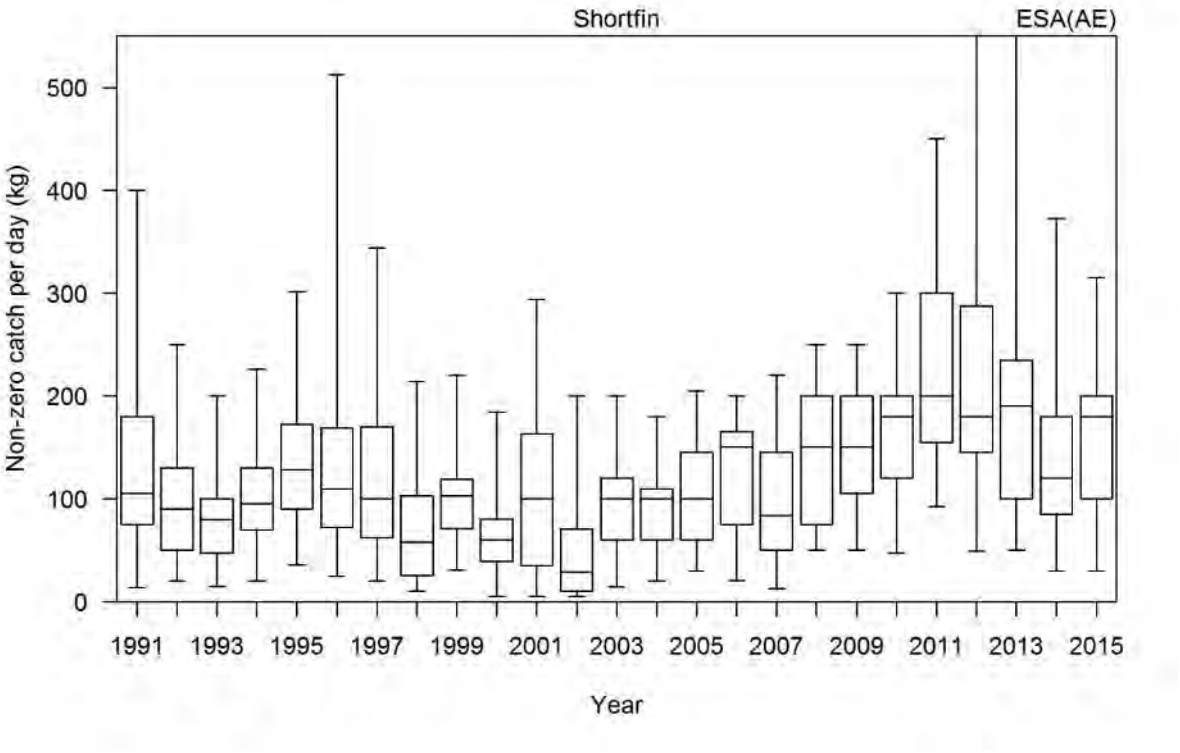


Figure E7: Shortfin non-zero catch per day for the years 1990–91 to 2014–15. The horizontal line is the median, the top and bottom of the box are the interquartiles (25th and 75th), and error bars are the 95th percentile range (ESA AE).

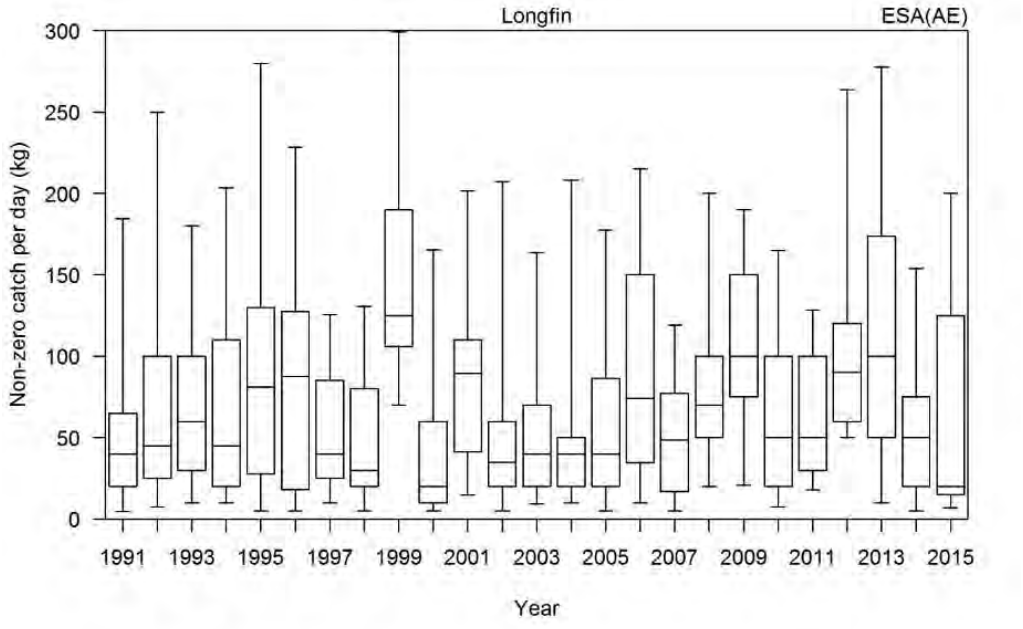


Figure E8: Longfin non-zero catch per day for the years 1990–91 to 2014–15. The horizontal line is the median, the top and bottom of the box are the interquartiles (25th and 75th), and error bars are the 95th percentile range (ESA AE).

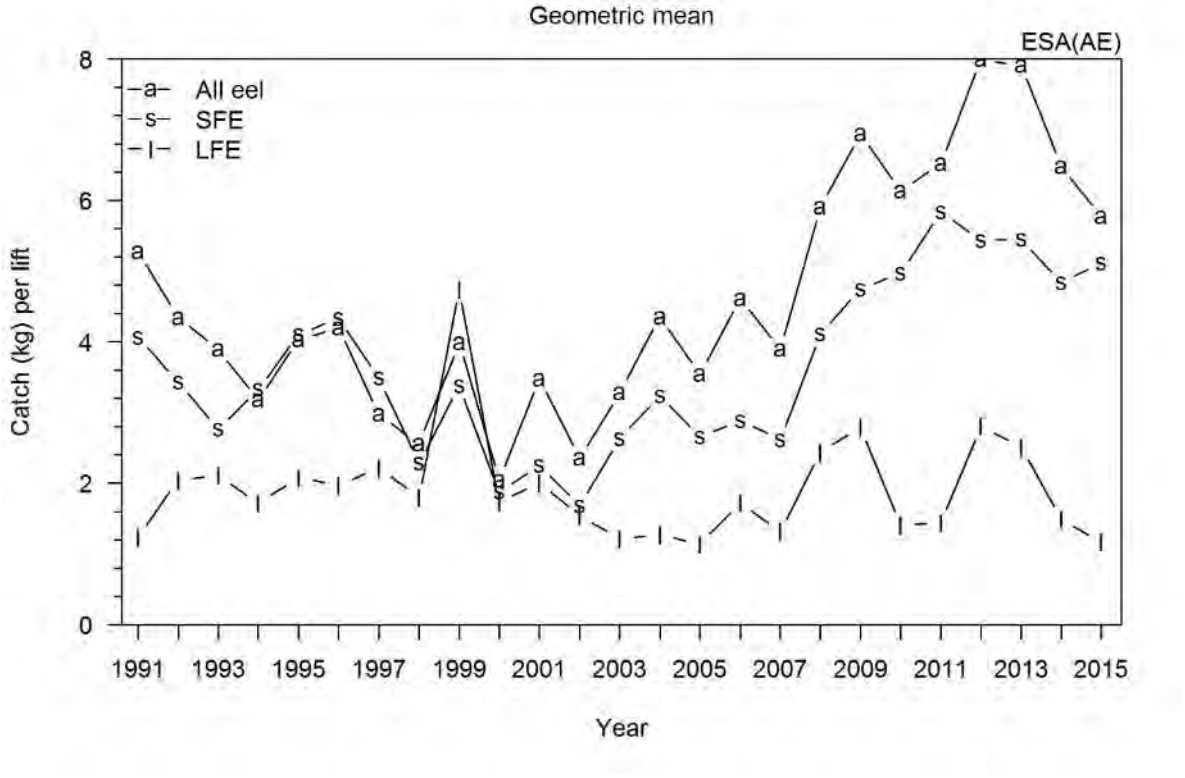


Figure E9: Unstandardised CPUE (geometric mean of catch per lift) for all eels, shortfin (SFE), and longfin (LFE) for the years 1990–91 to 2014–15 (ESA AE).

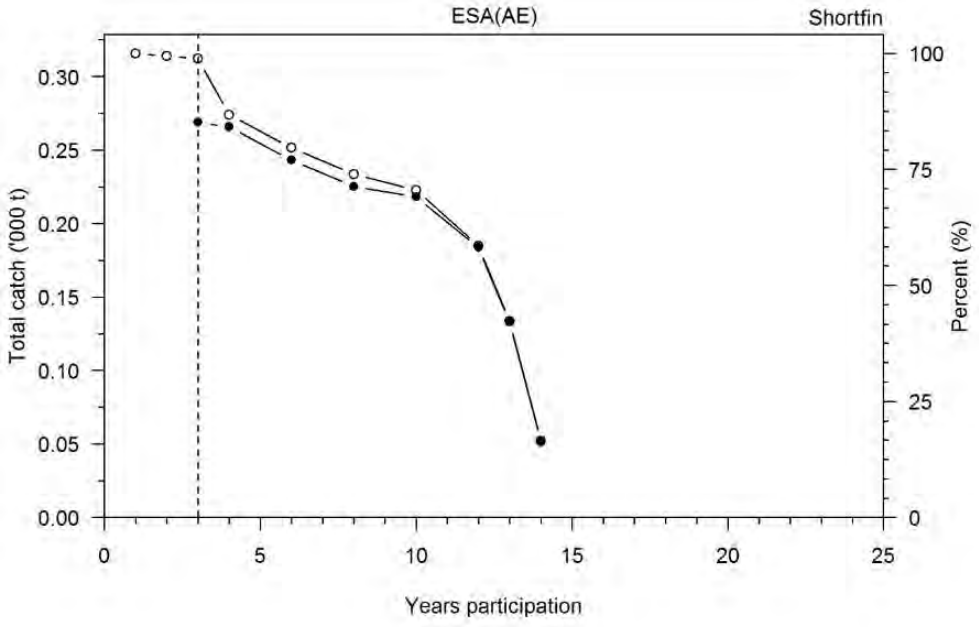


Figure E10: Relationship between years of participation in the fishery and shortfin total catch. The open circles represent all shortfin catch and the closed circles shortfin catch data from fishers who 1) caught shortfin in at least three years in each of which fishing took place in 10 days or more, and 2) caught more than 1000 kg over all years. Dotted vertical line represents 3 years participation and indicates the data included in the core shortfin fisher analyses for the years 1990–91 to 2014–15 (ESA AE).

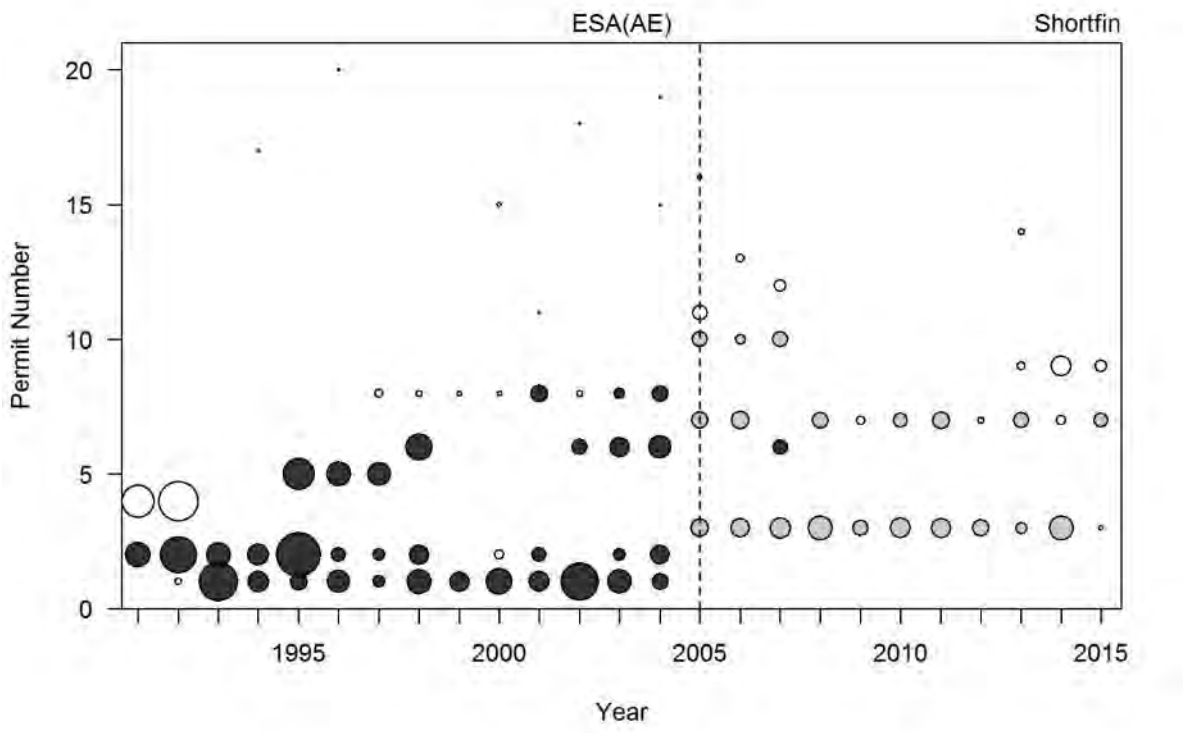


Figure E11: Relative catch of shortfin from all fishers (all circles) for the years 1990–91 to 2014–15, and for core fishers (dark and grey shaded circles) included in the catch per unit effort analyses. The vertical dotted line demarks introduction of the QMS in 2004-05. The dark shaded circles post-QMS are existing fishers and the grey, new entrants (ESA AE).

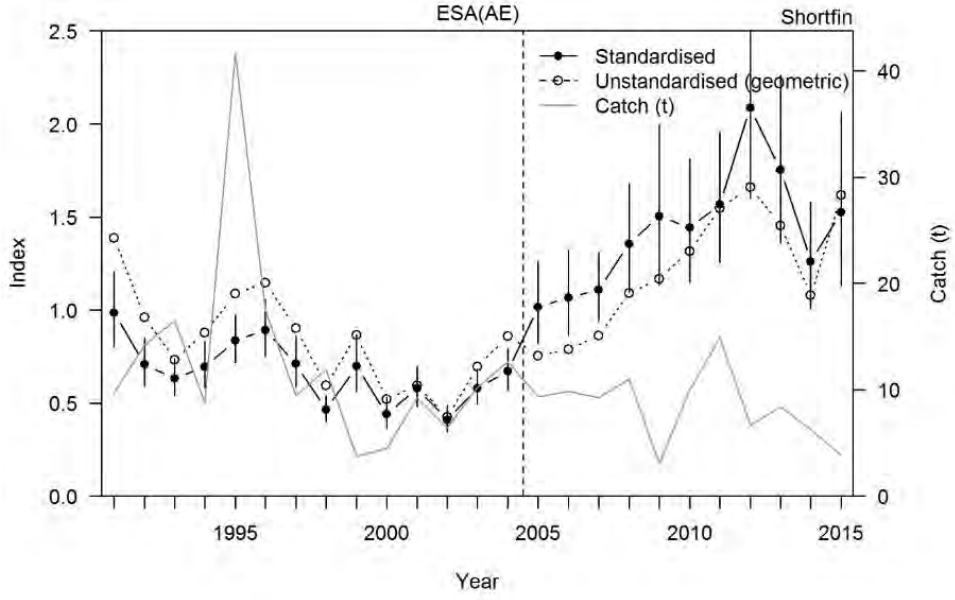


Figure E12: Indices of unstandardised (geometric mean of catch per lift) and standardised CPUE for shortfin core fishers for the years 1990–91 to 2014–15. The shortfin catch by core fishers is also plotted (ESA AE).

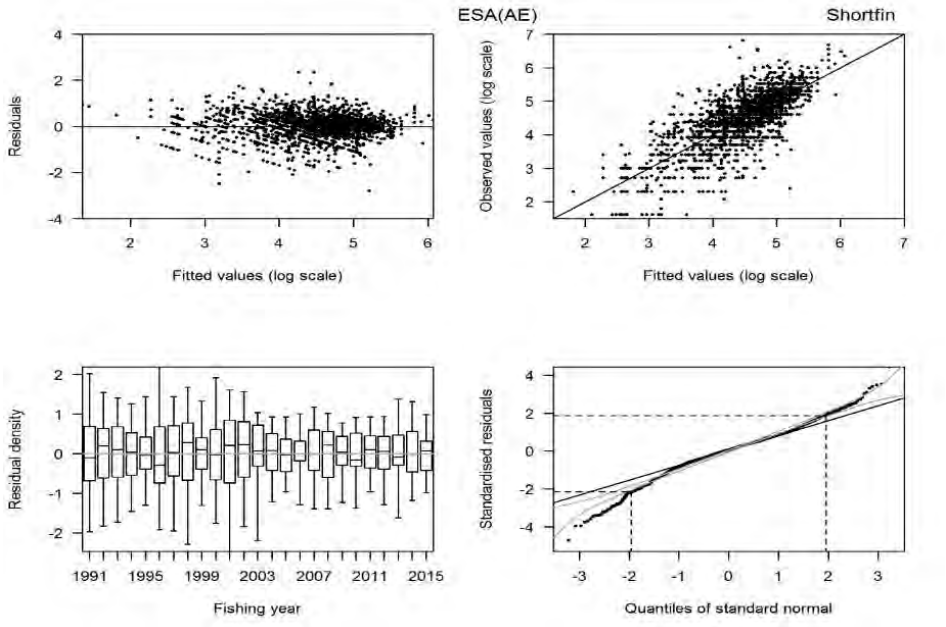


Figure E13: Residual diagnostic plots for the shortfin eel CPUE model for the years 1990–91 to 2014–15. The grey lines on the quantile-quantile plot represent the 95% confidence envelopes of a standard normal distribution (ESA AE).

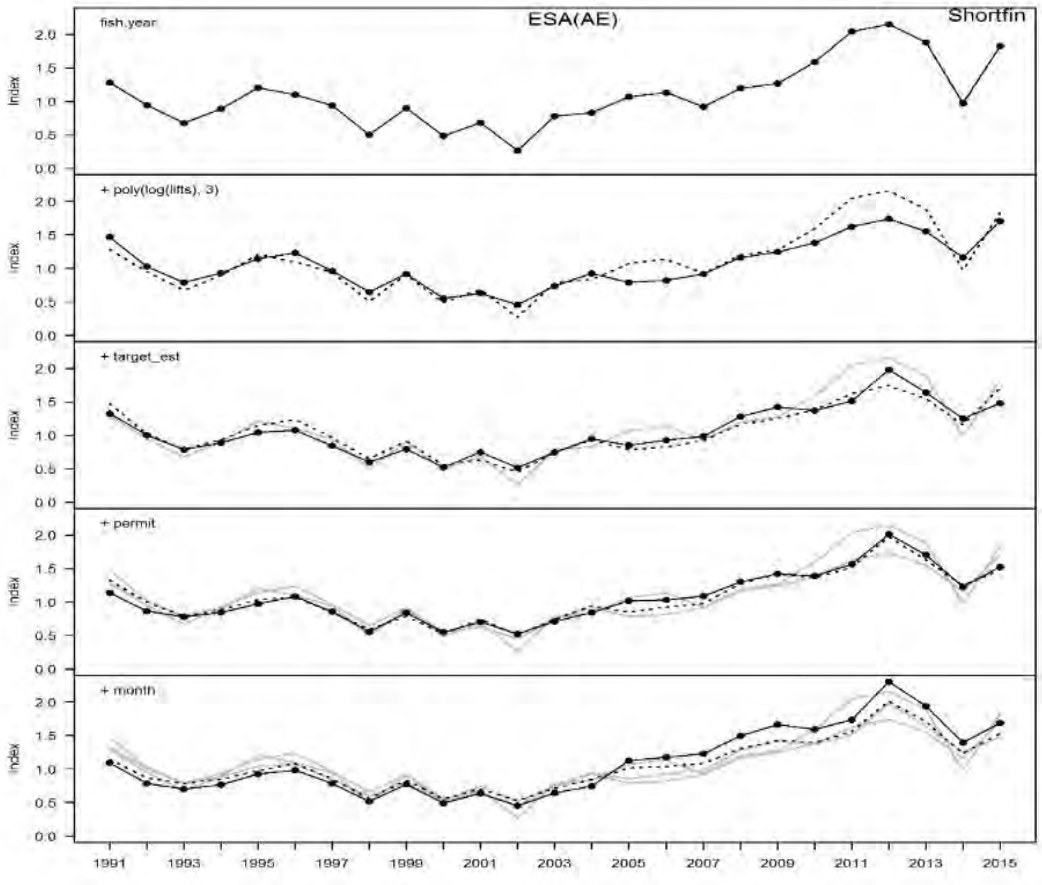


Figure E14: Step plot for the shortfin eel CPUE model for the years 1990–91 to 2014–15. Each panel shows the standardised CPUE index as each explanatory variable is added to the model with the previous index shown by the dotted line and the grey lines for steps before that (ESA AE).

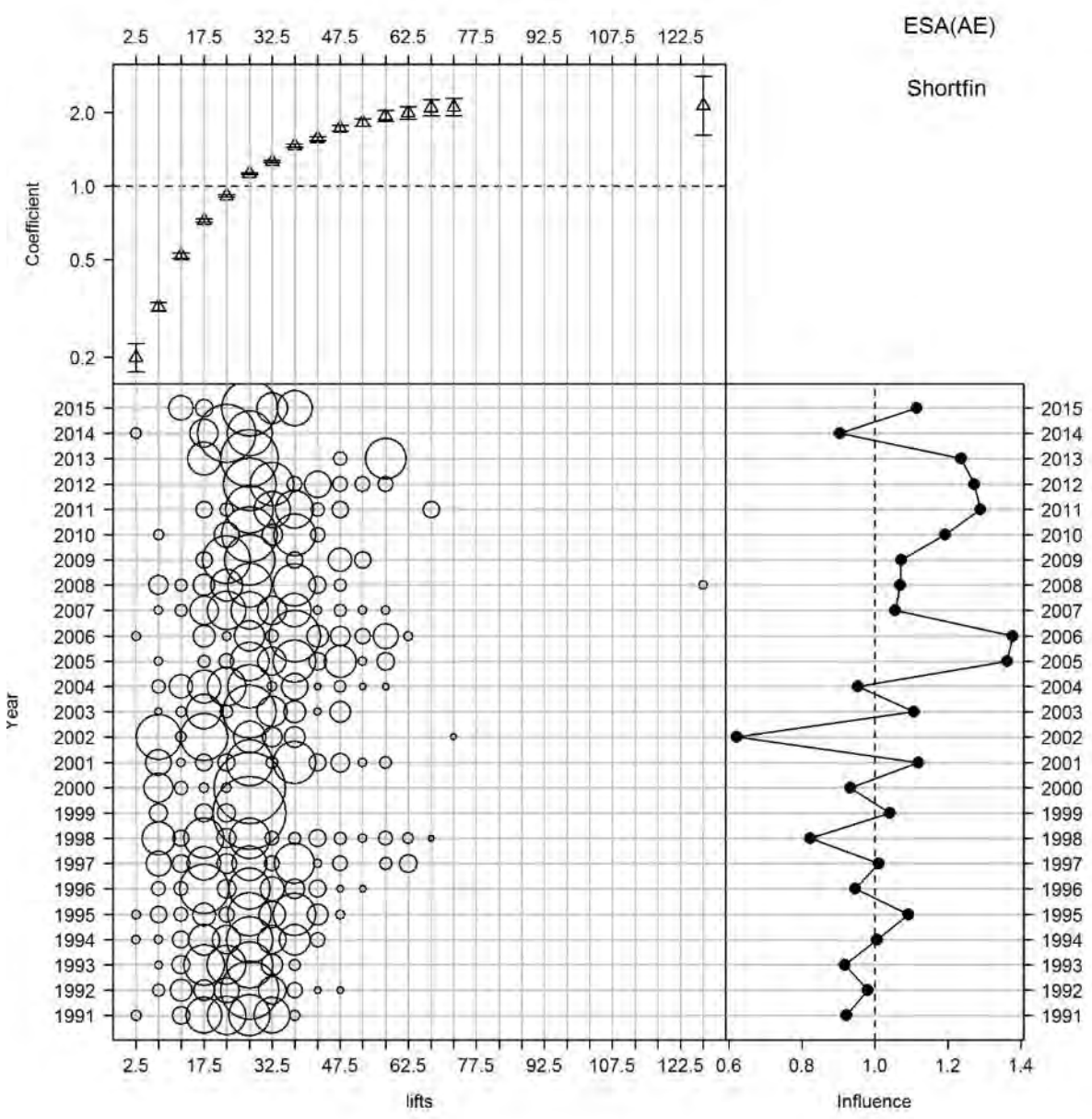


Figure E15: Influence of lifts for the shortfin CPUE model for the years 1990–91 to 2014–15 (ESA AE).

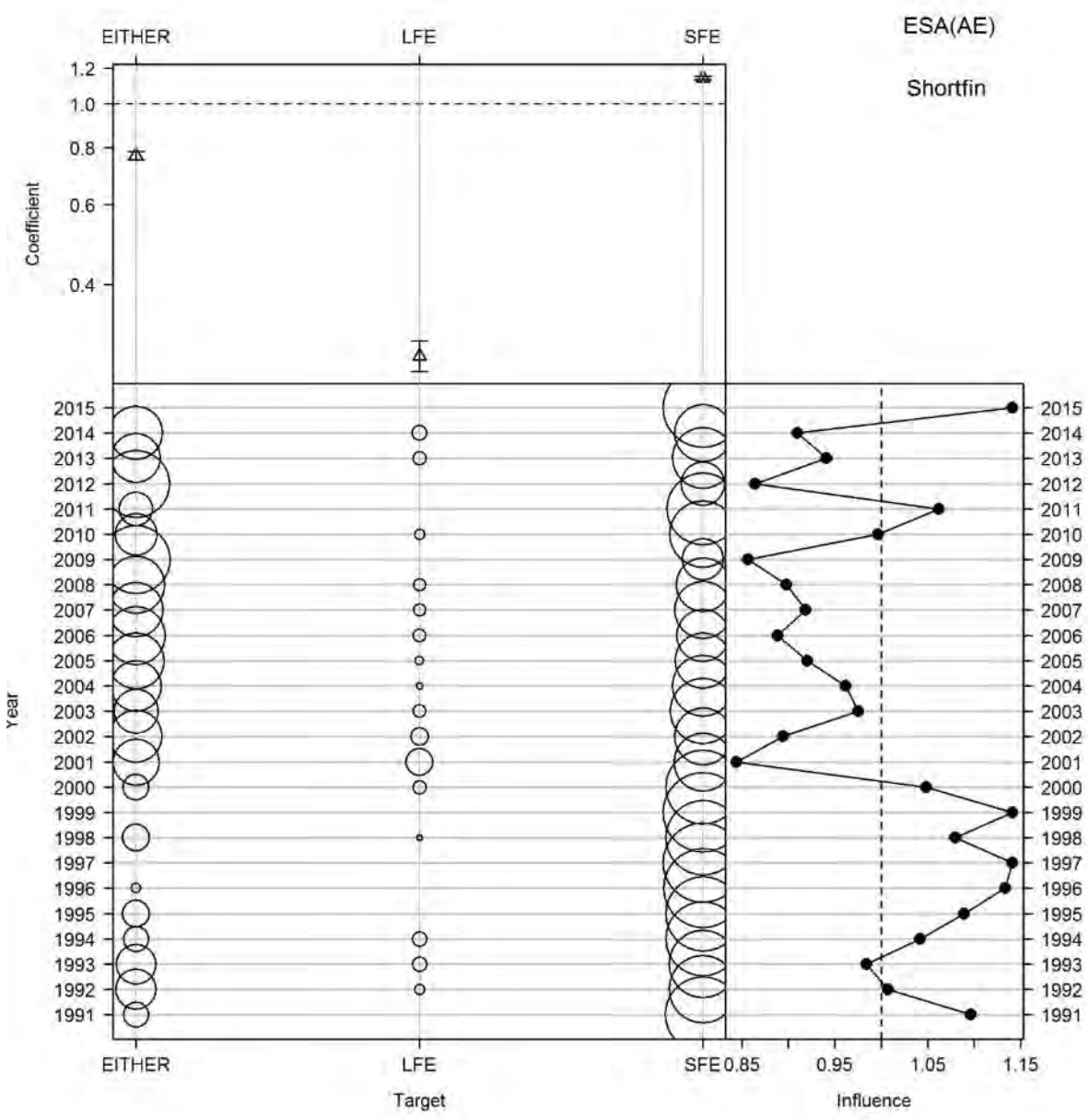


Figure E16: Influence of target for the shortfin CPUE model for the years 1990–91 to 2014–15 (ESA AE).

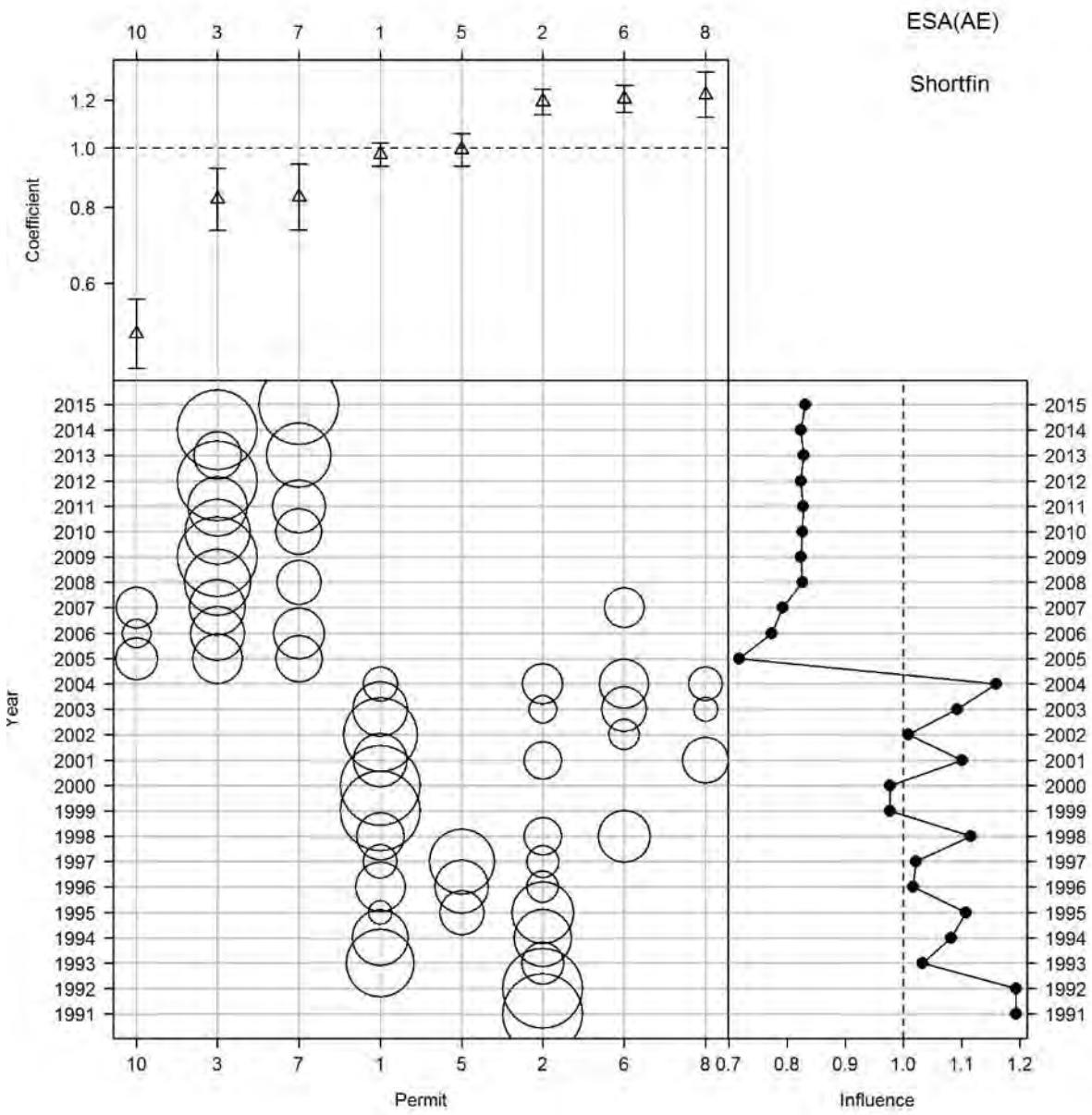


Figure E17: Influence of permit for the shortfin CPUE model for the years 1990–91 to 2014–15 (ESA AE).

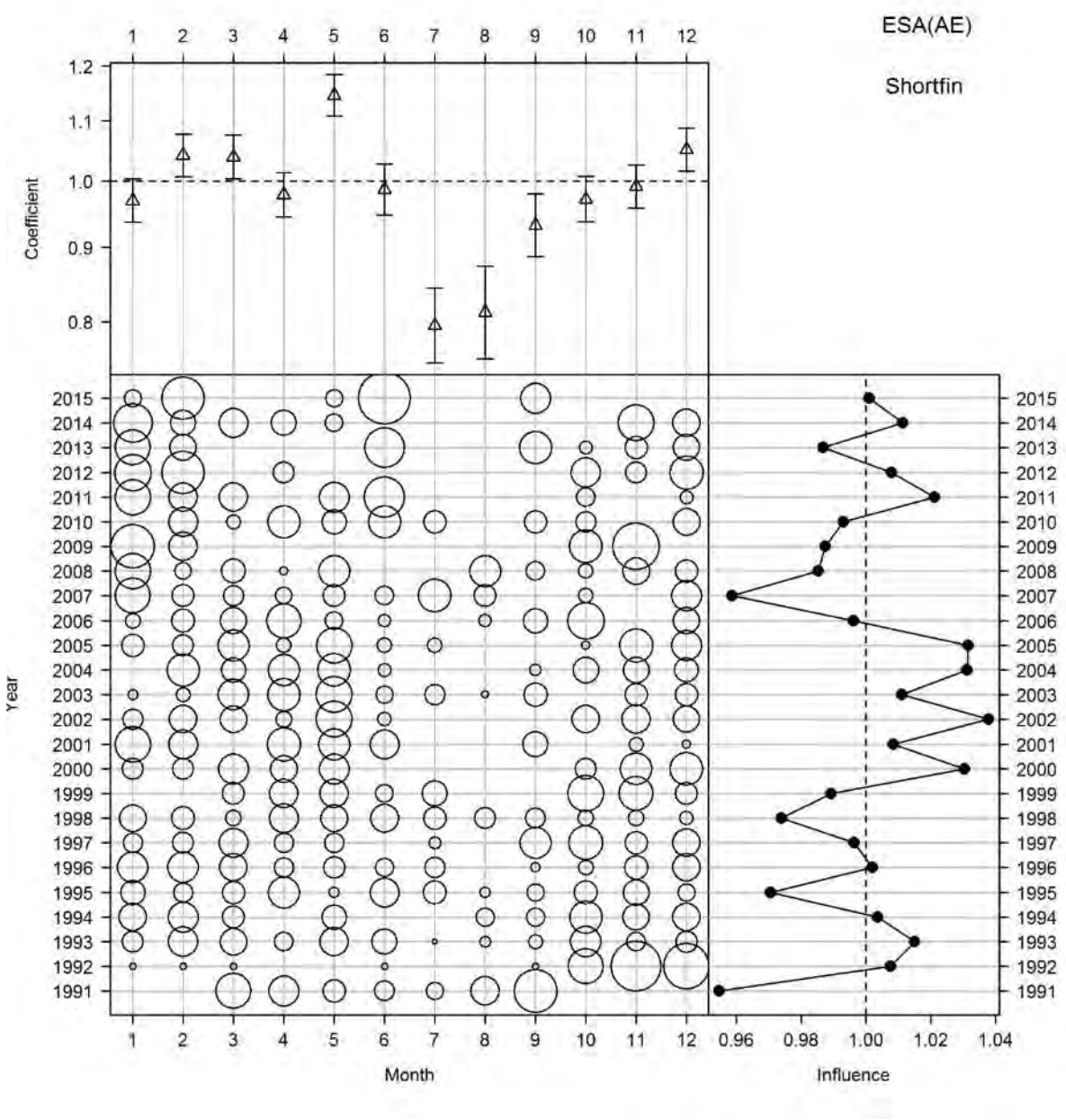
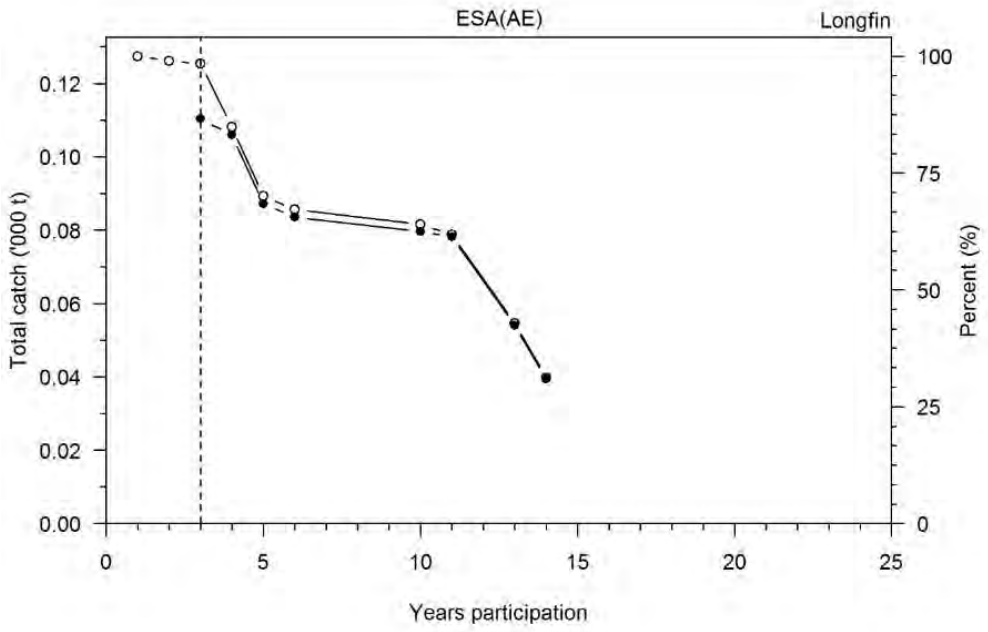


Figure E18: Influence of month flow for the shortfin CPUE model for the years 1990–91 to 2014–15 (ESA AE).



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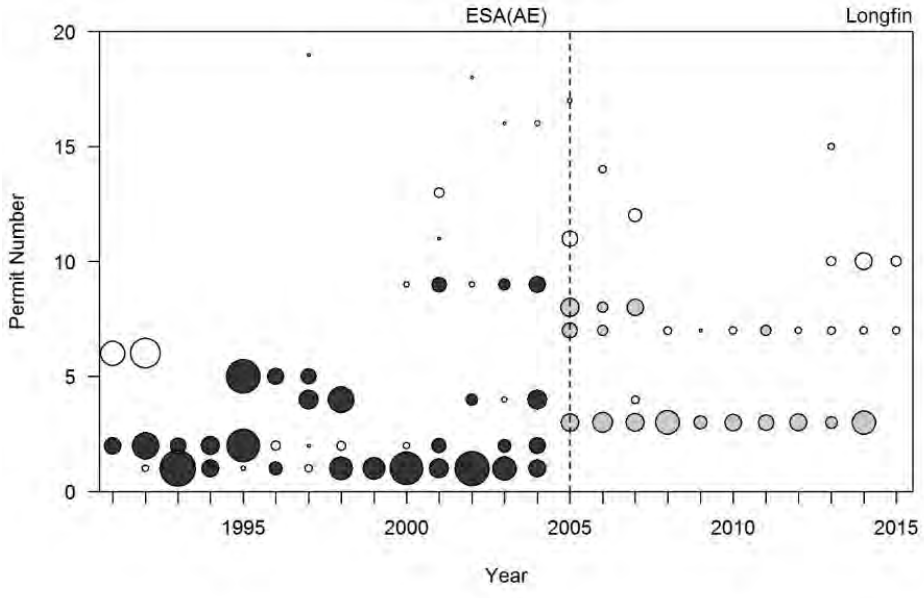

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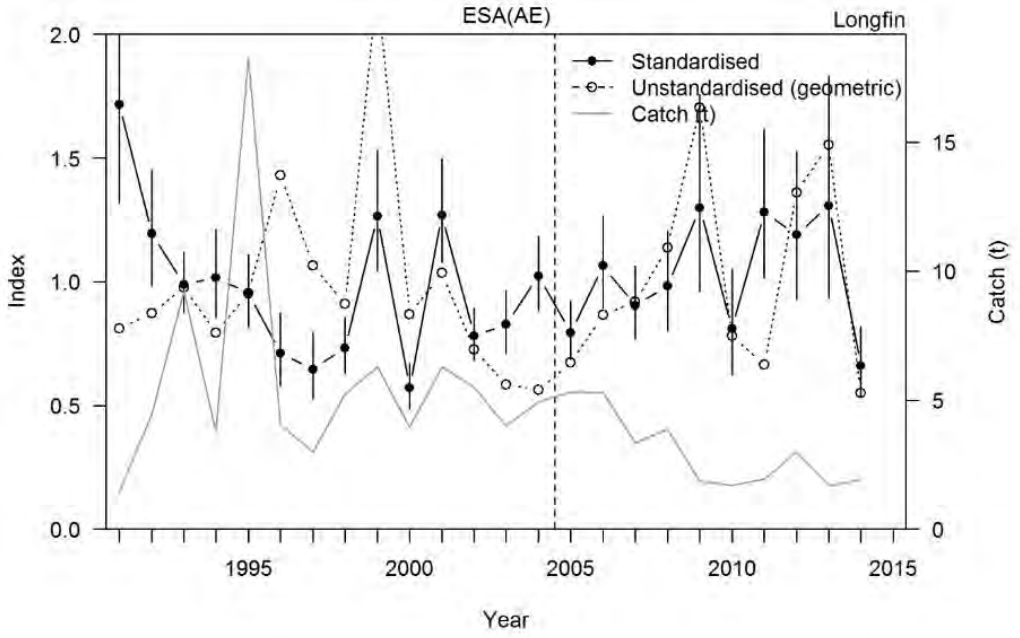

Figure E21: Indices of unstandardised (geometric mean of catch per lift) and standardised CPUE for longfin core fishers for the years 1990–91 to 2014–15. The longfin catch by core fishers is also plotted (ESA AE).

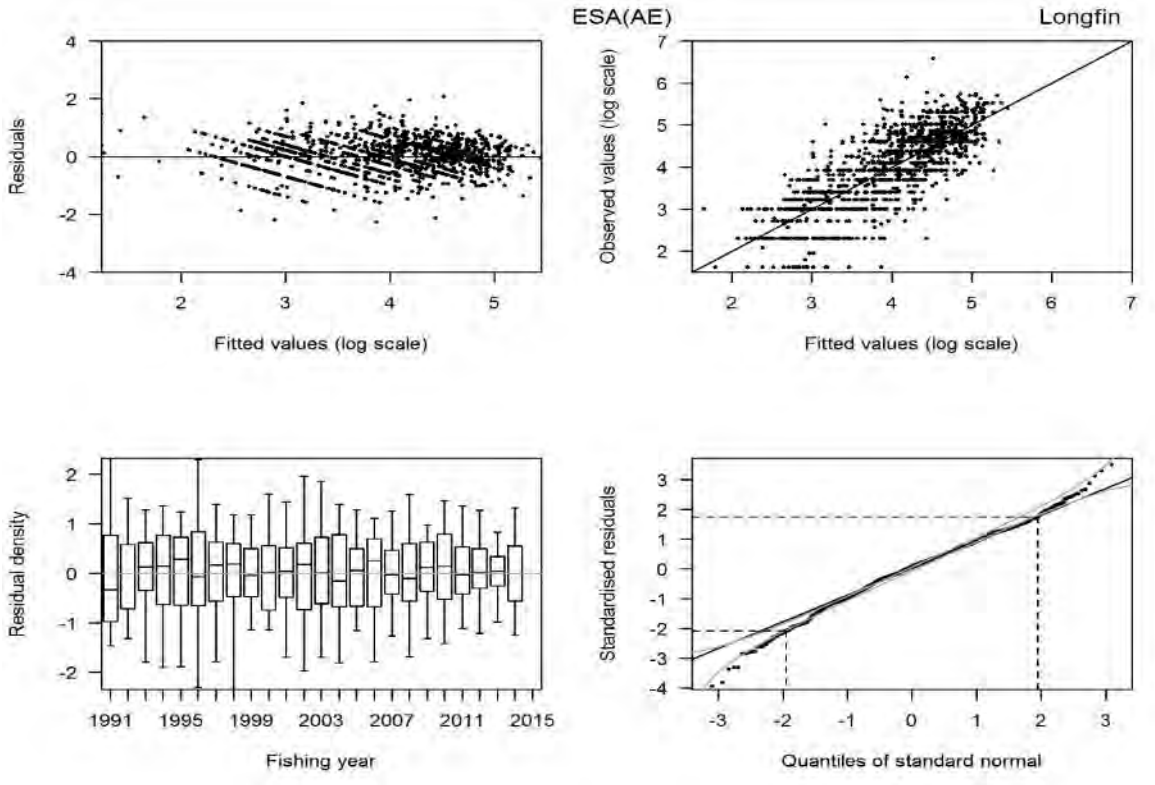

Figure E22: Residual diagnostic plots for the longfin eel CPUE model for the years 1990–91 to 2014–15. The grey lines on the quantile-quantile plot represent the 95% confidence envelopes of a standard normal distribution (ESA AE).

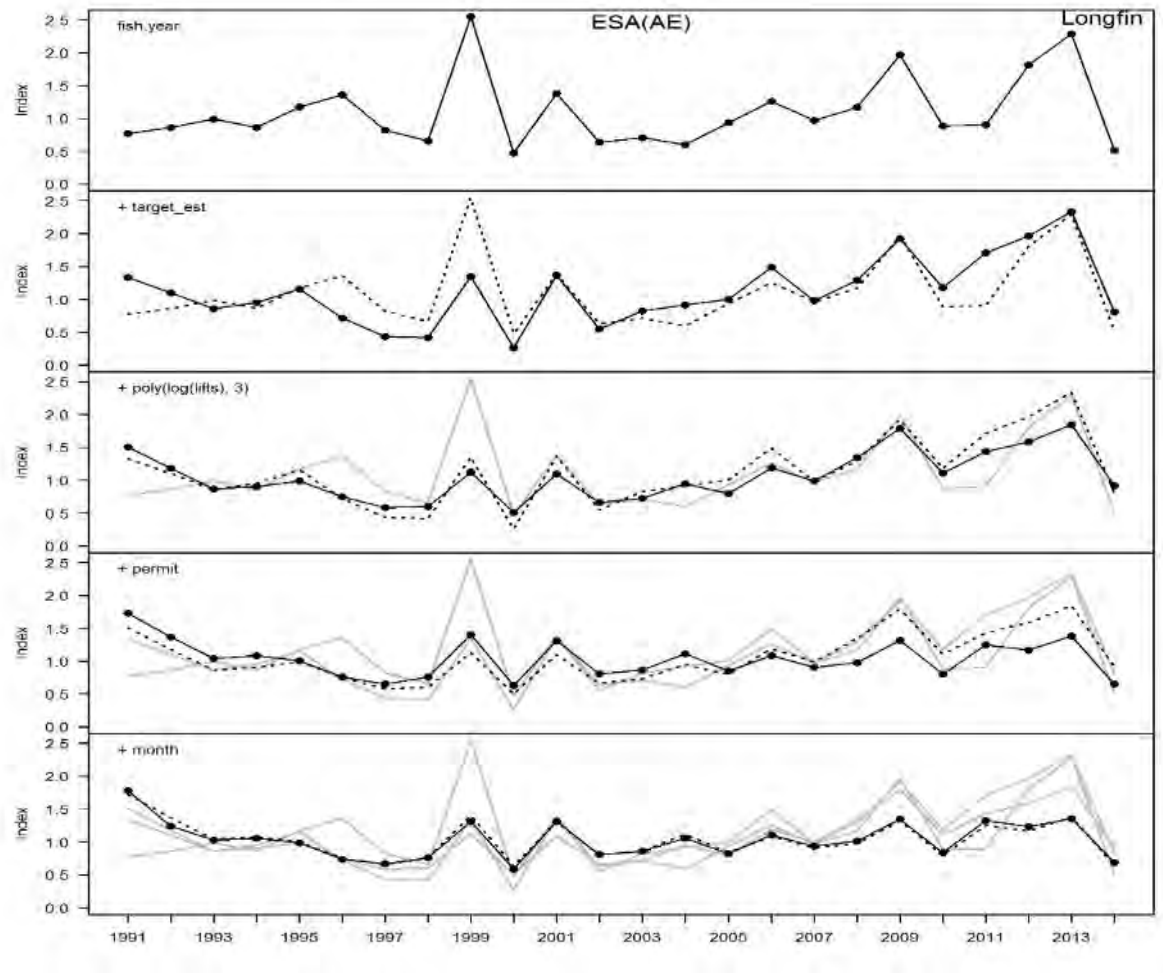

Figure E23: Step plot for the longfin eel CPUE model for the years 1990–91 to 2014–15. Each panel shows the standardised CPUE index as each explanatory variable is added to the model with the previous index shown by the dotted line and the grey lines for steps before that (ESA AE).

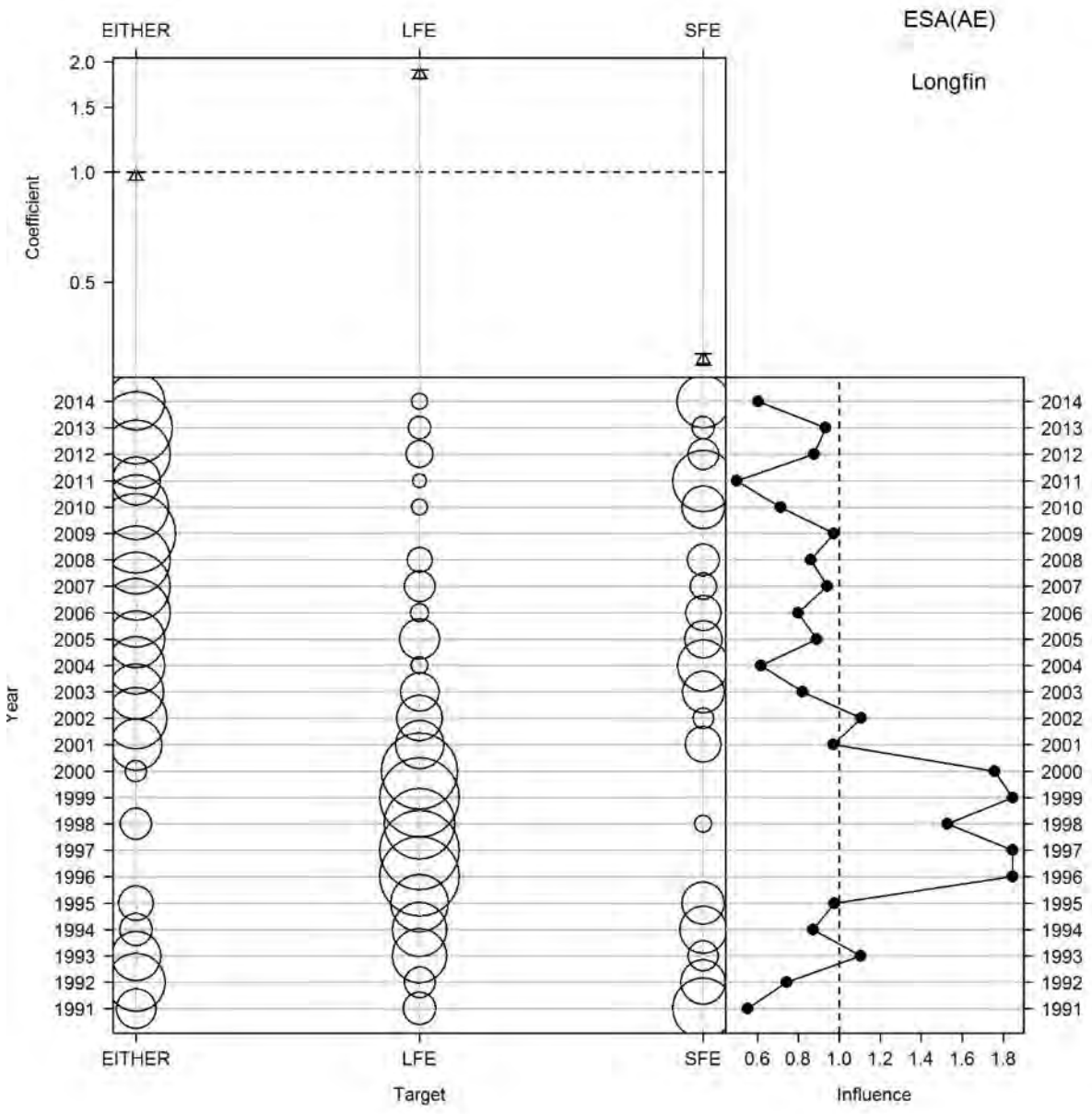

Figure E24: Influence of target for the longfin CPUE model for the years 1990–91 to 2014–15 (ESA AE).

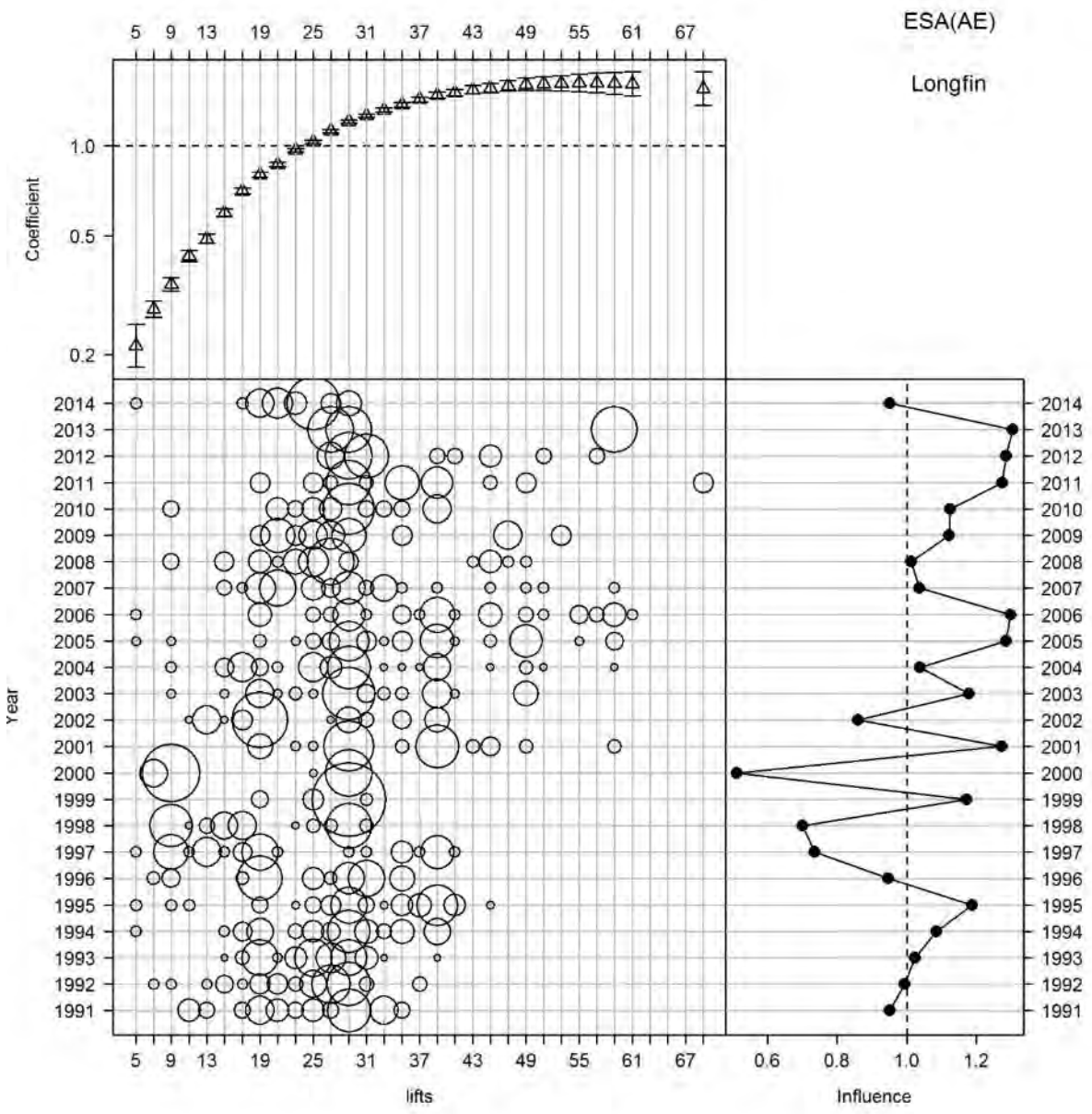

Figure E25: Influence of lifts for the longfin CPUE model for the years 1990–91 to 2014–15 (ESA AE).

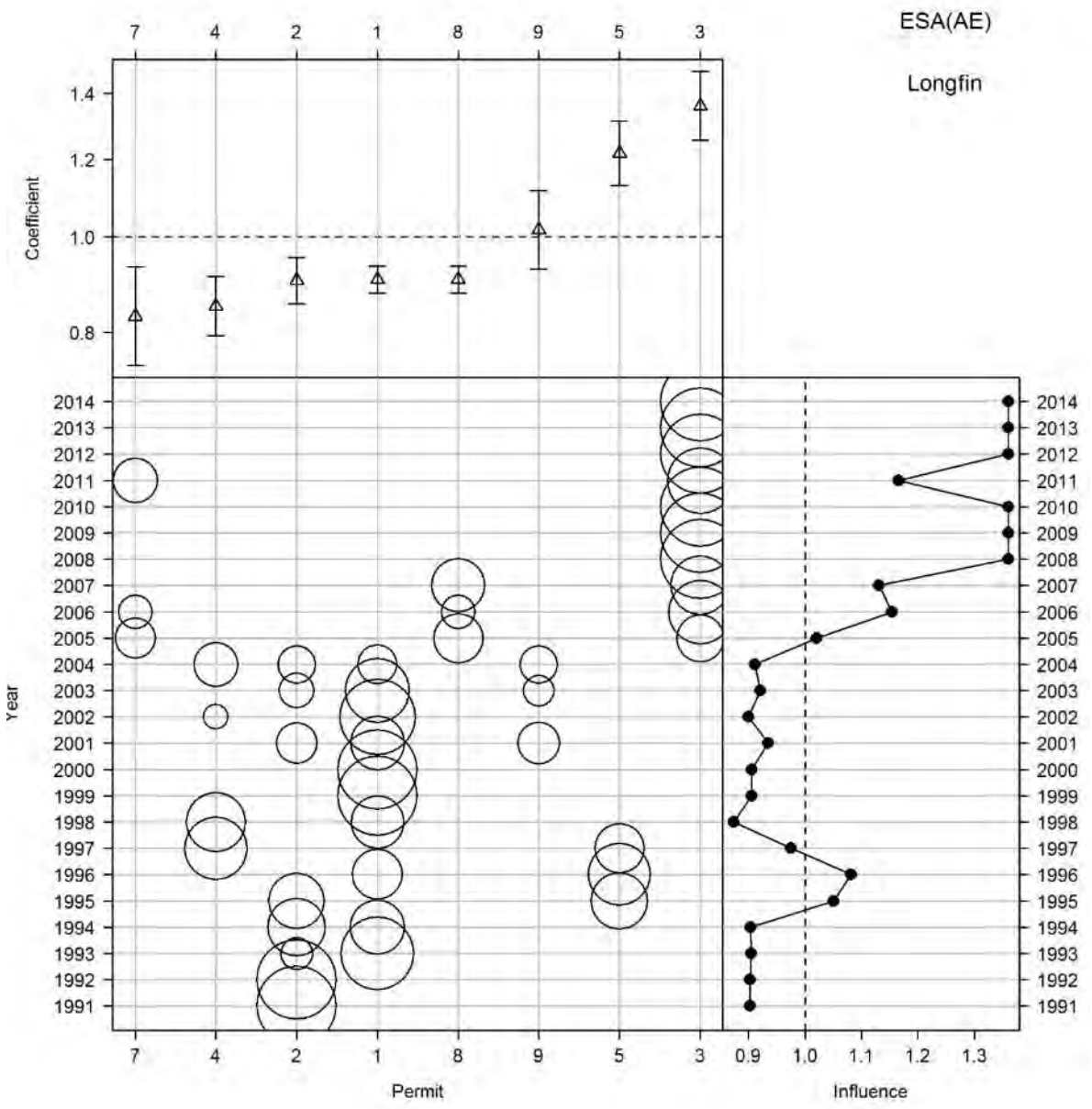

Figure E26: Influence of permit for the longfin CPUE model for the years 1990–91 to 2014–15 (ESA AE).

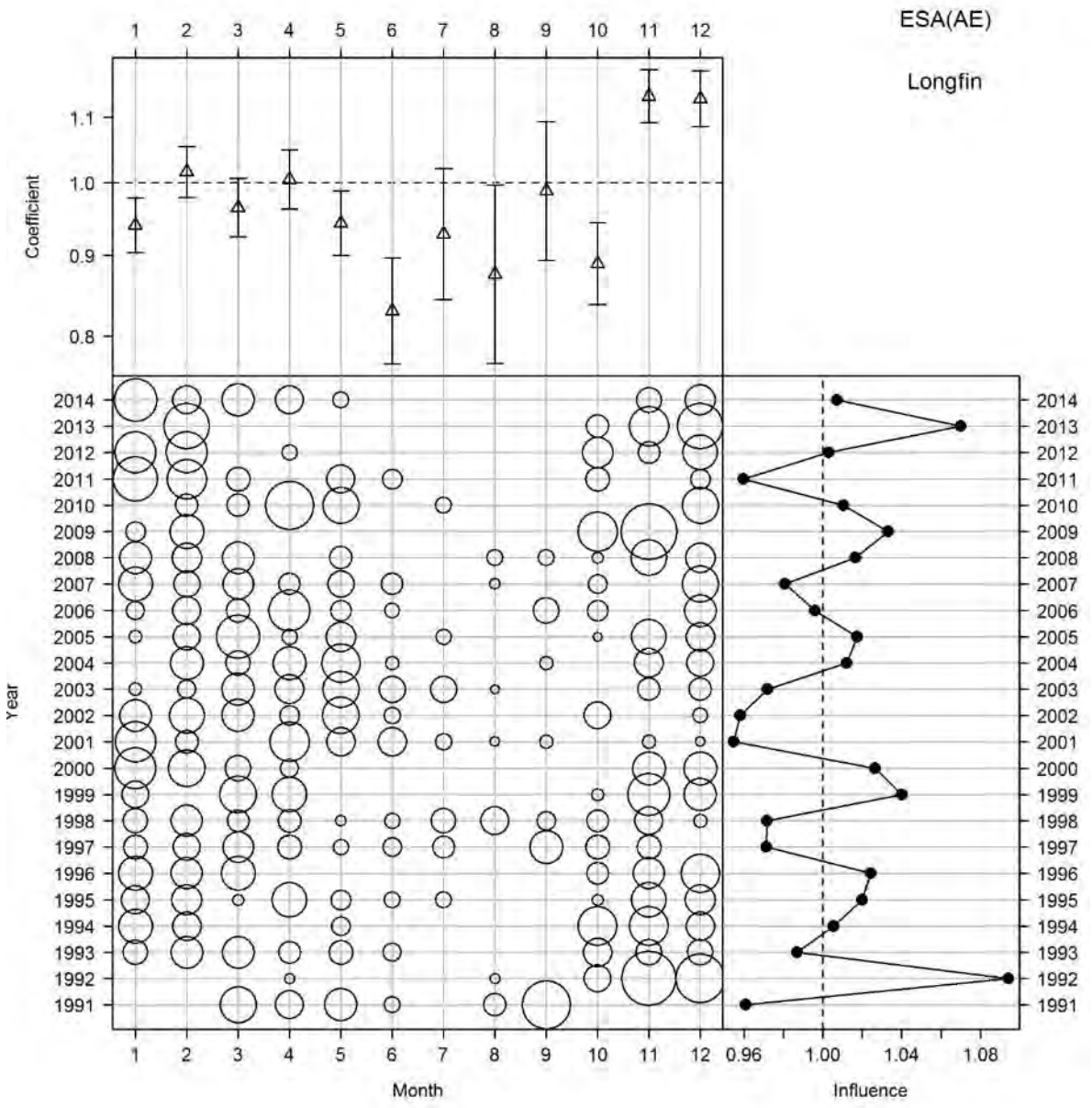

Figure E27: Influence of month for the longfin CPUE model for the years 1990–91 to 2014–15 (ESA AE).

APPENDIX F: POVERTY BAY (ESA AF)

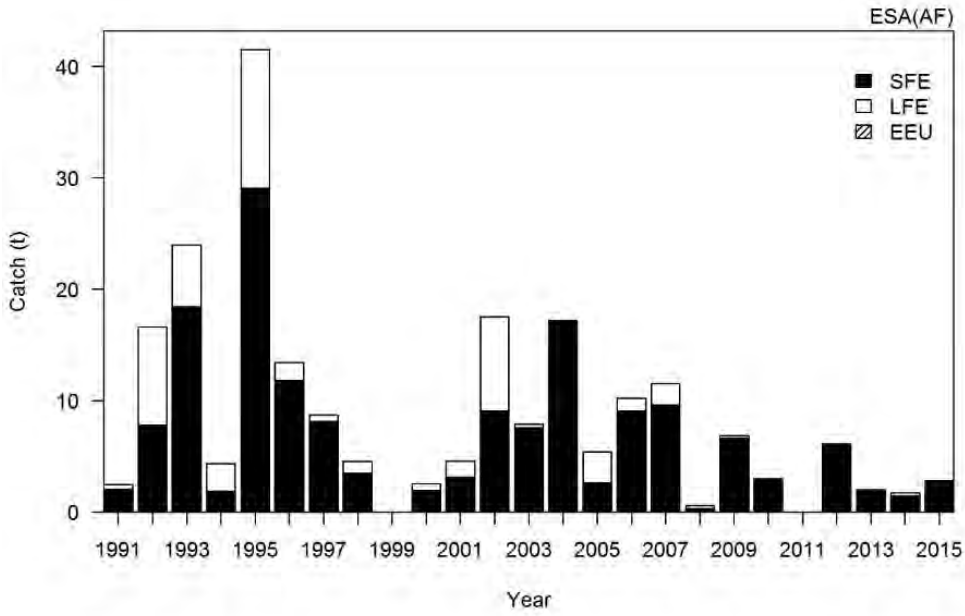

Figure F1: Total estimated commercial catch of shortfin (SFE), longfin (LFE), and unclassified eel catch (EEU) for the years 1990–91 to 2014–15 (ESA AF).

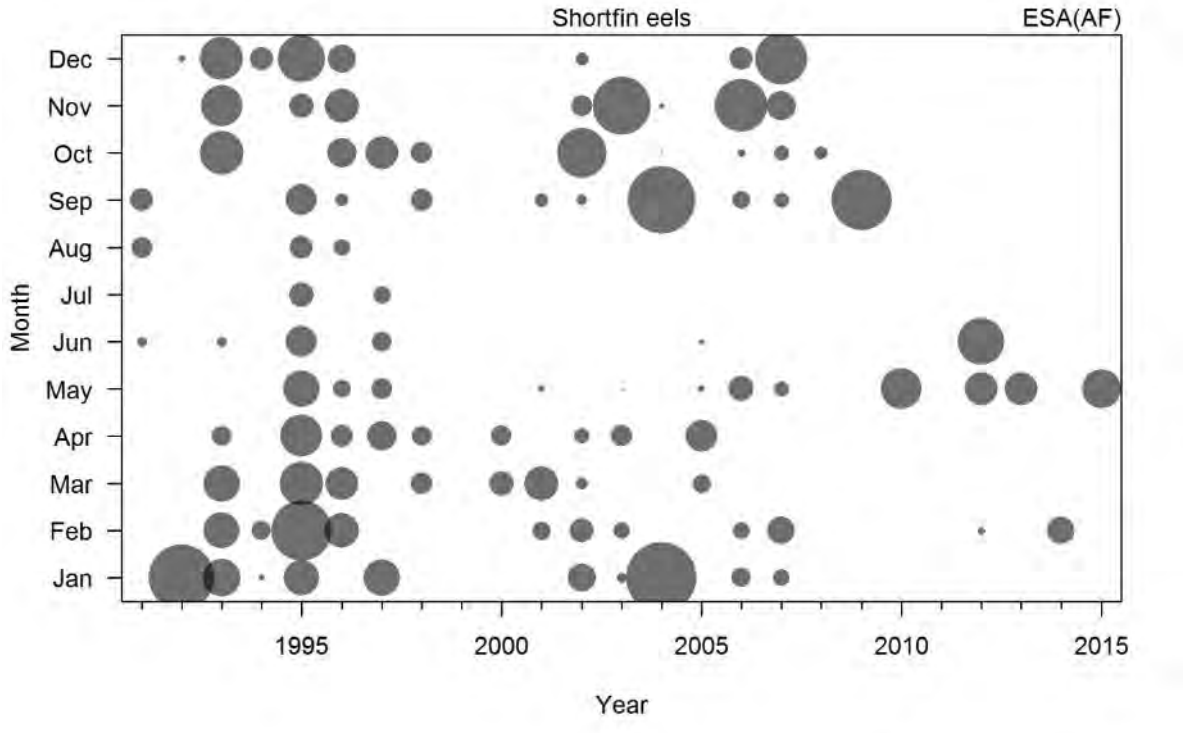

Figure F2: Shortfin eel catch by month for the years 1990–91 to 2014–15. The catch before 2002 is missing an unknown amount that was recorded as EEU (ESA AF).

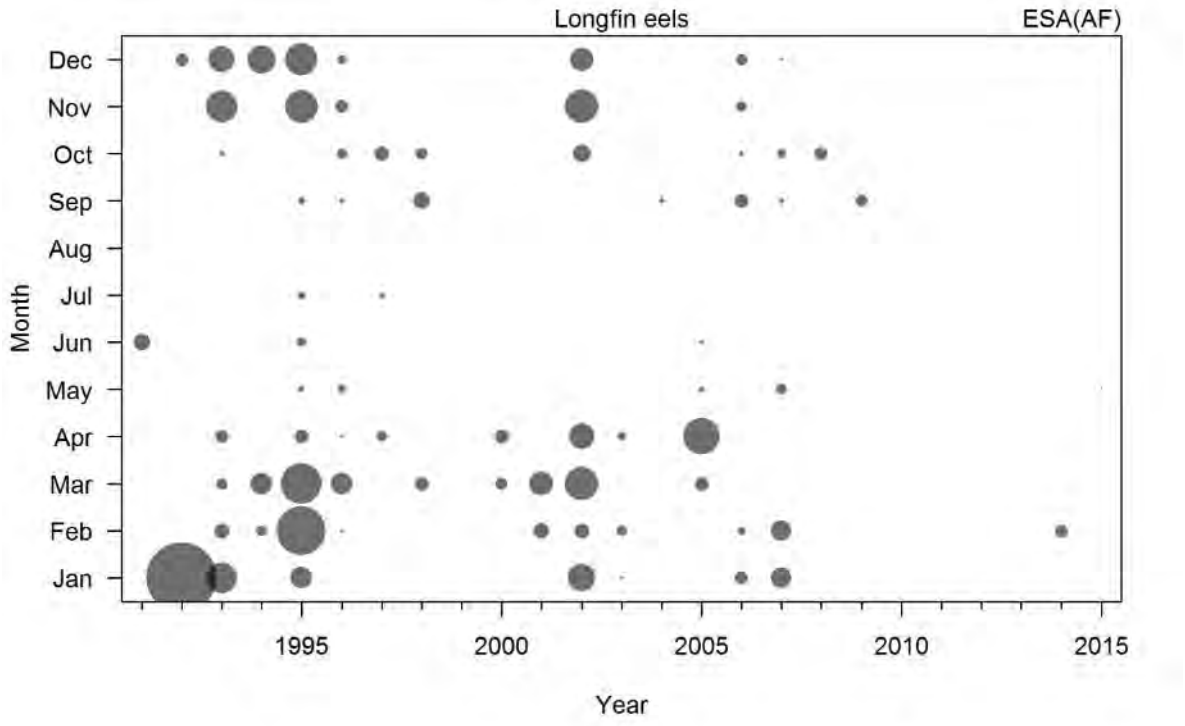

Figure F3: Longfin eel catch by month for the years 1990–91 to 2014–15. The catch before 2002 is missing an unknown amount that was recorded as EEU (ESA AF).

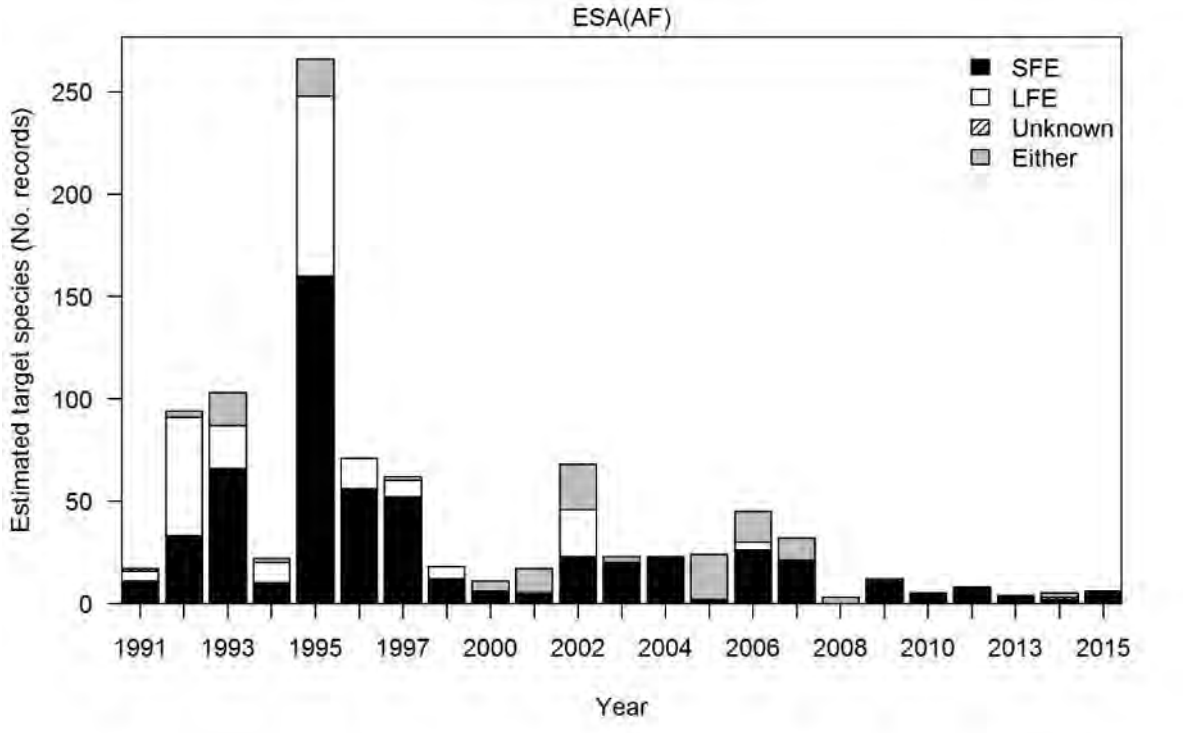

Figure F4: Reconstructed target species for the years 1990–91 to 2014–15 (ESA AF).

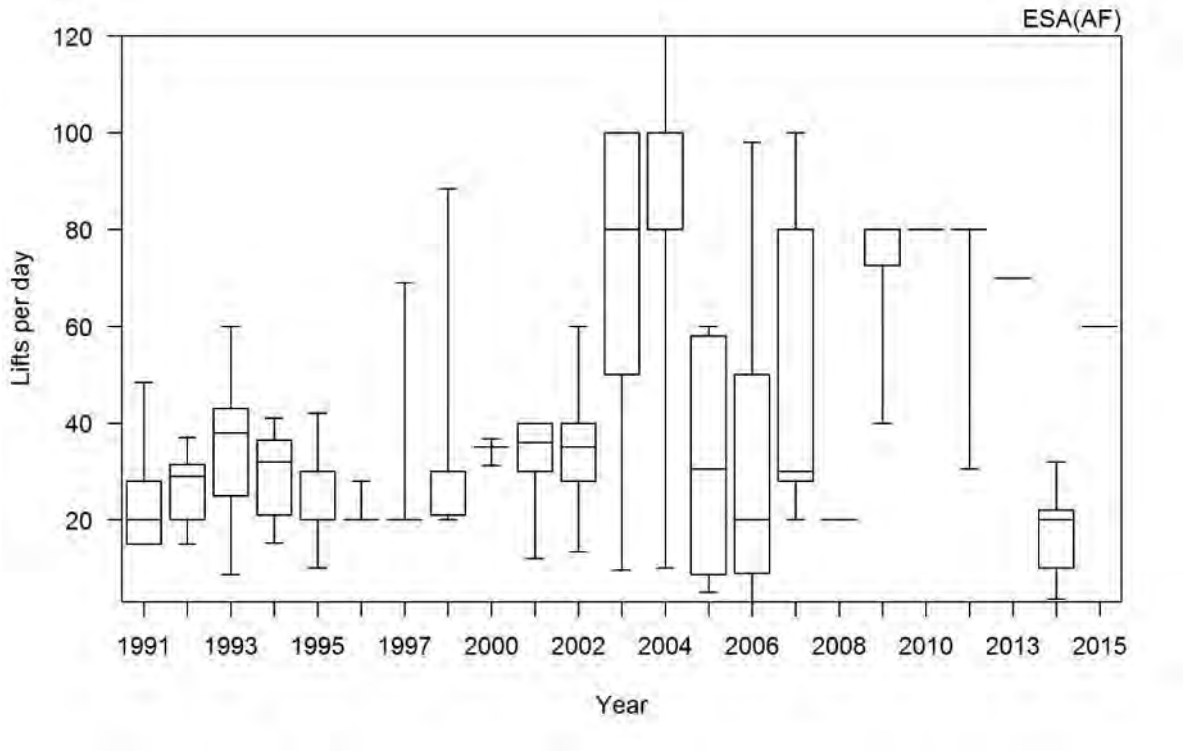

Figure F5: Total lifts per day for the years 1990–91 to 2014–15. The horizontal line is the median, the top and bottom of the box are the interquartiles (25th and 75th), and error bars are the 95th percentile range (ESA AF).

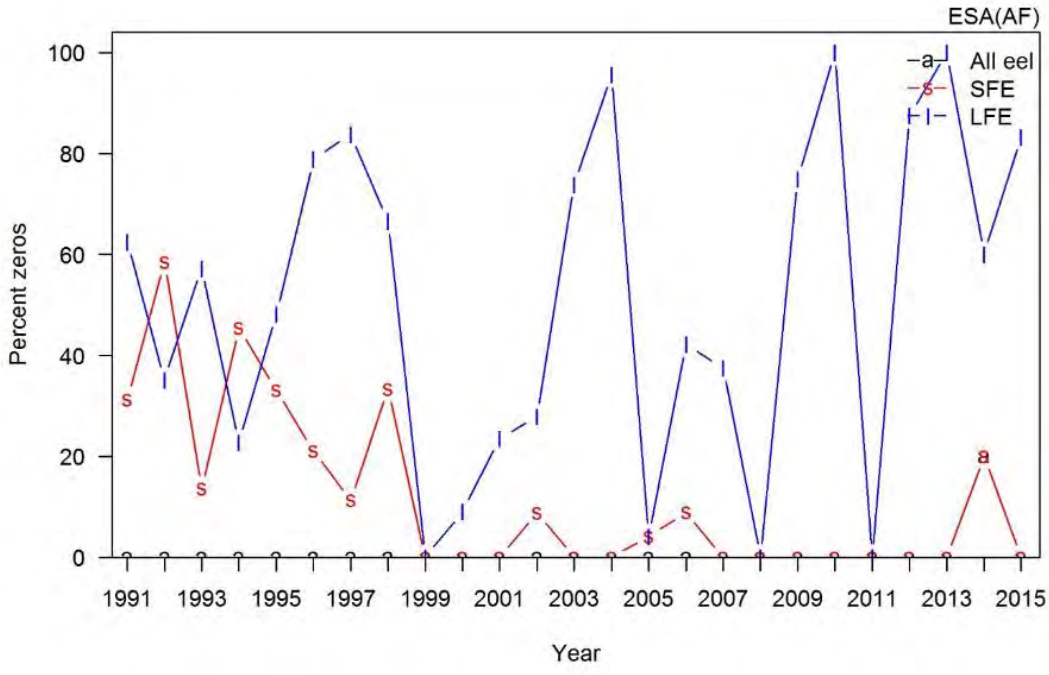

Figure F6: Proportion of valid zero records for all eels, shortfin (SFE), and longfin (LFE) for the years 1990–91 to 2014–15. Excludes zeros associated with reporting EEU (unclassified) (ESA AF).

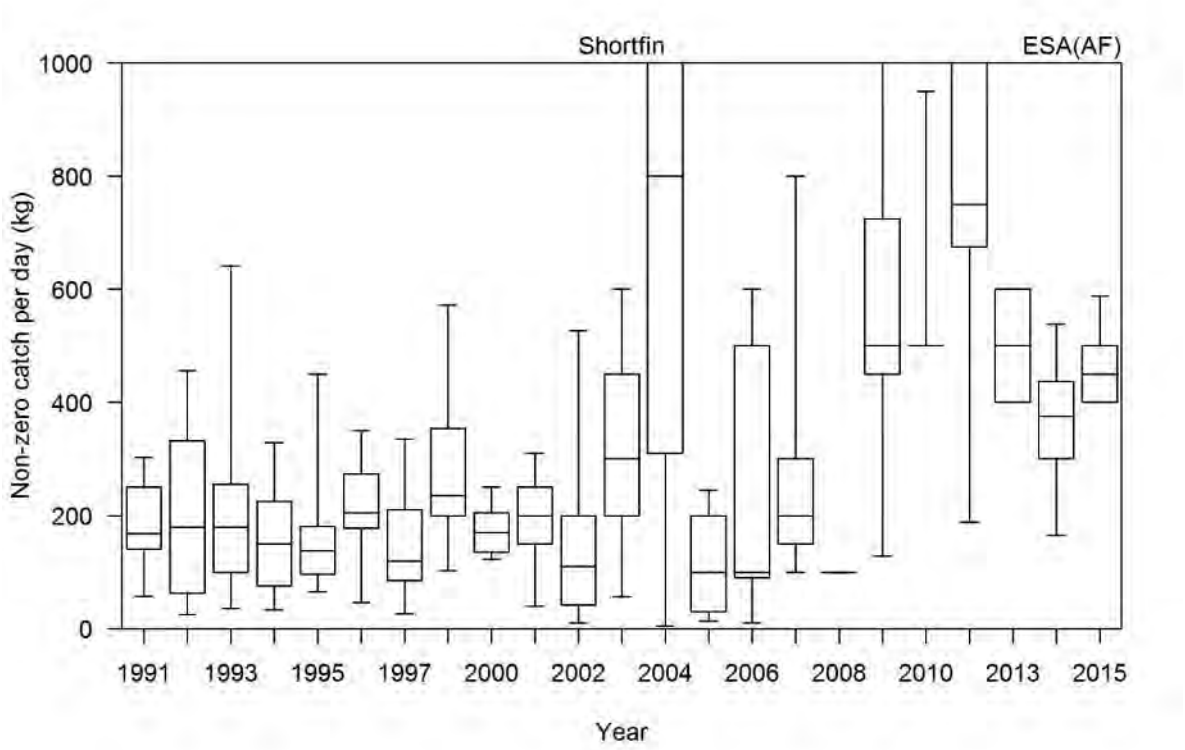

Figure F7: Shortfin non-zero catch per day for the years 1990–91 to 2014–15. The horizontal line is the median, the top and bottom of the box are the interquartiles (25th and 75th), and error bars are the 95th percentile range (ESA AF).

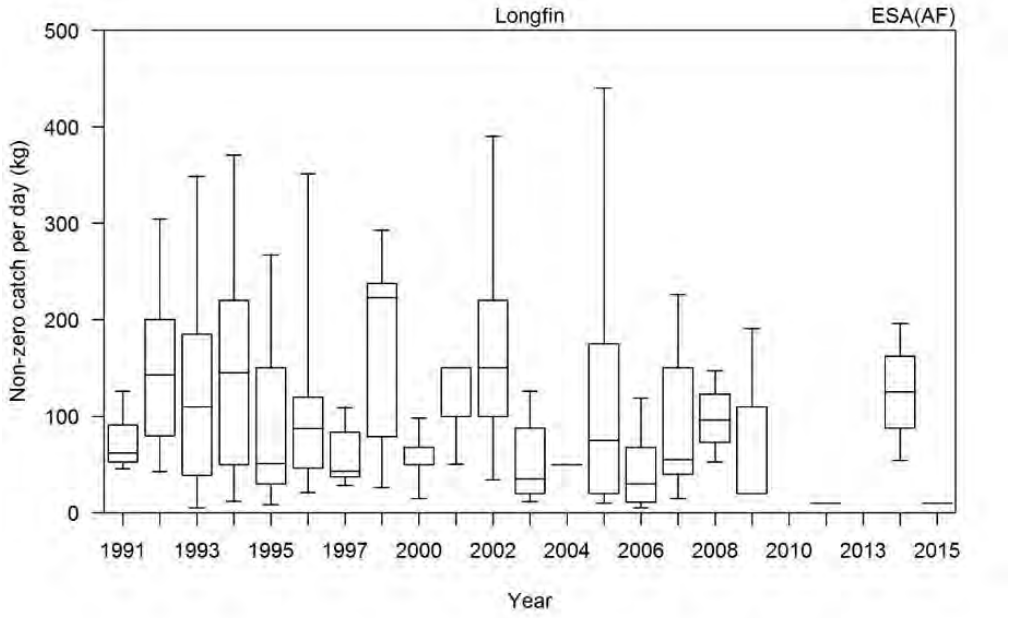

Figure F8: Longfin non-zero catch per day for the years 1990–91 to 2014–15. The horizontal line is the median, the top and bottom of the box are the interquartiles (25th and 75th), and error bars are the 95th percentile range (ESA AF).

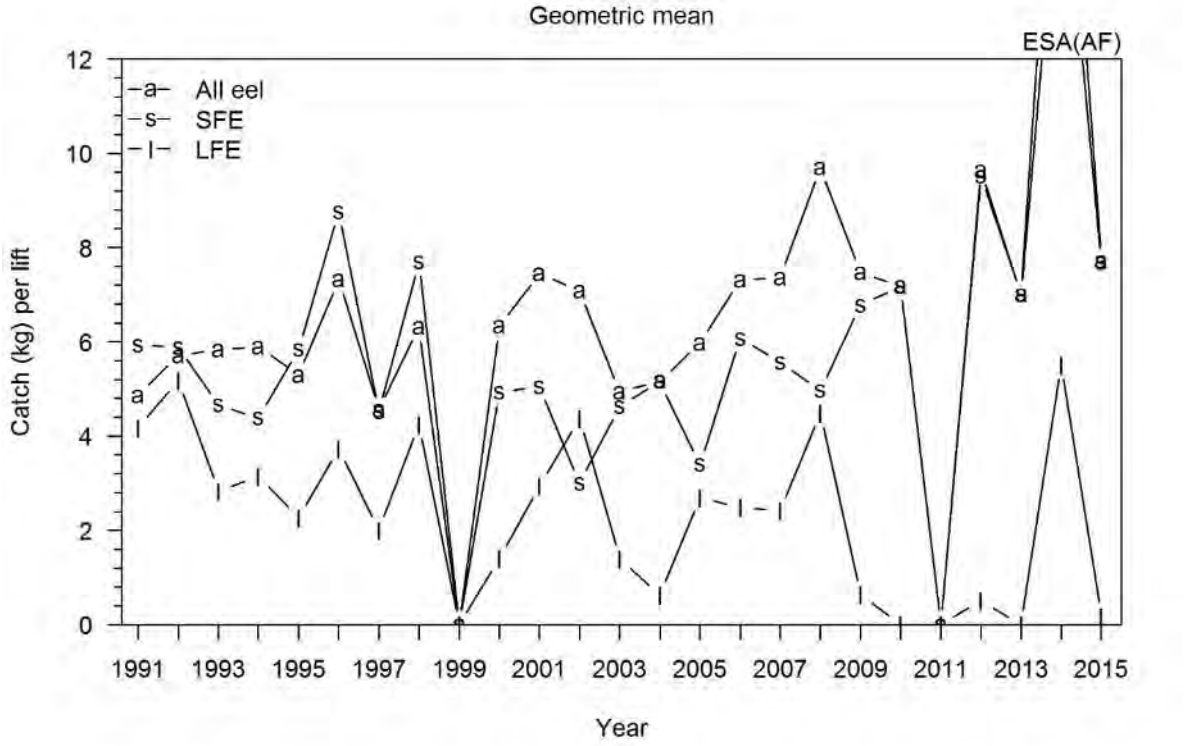

Figure F9: Unstandardised CPUE (geometric mean of catch per lift) for all eels, shortfin (SFE), and longfin (LFE) for the years 1990–91 to 2014–15 (ESA AF).

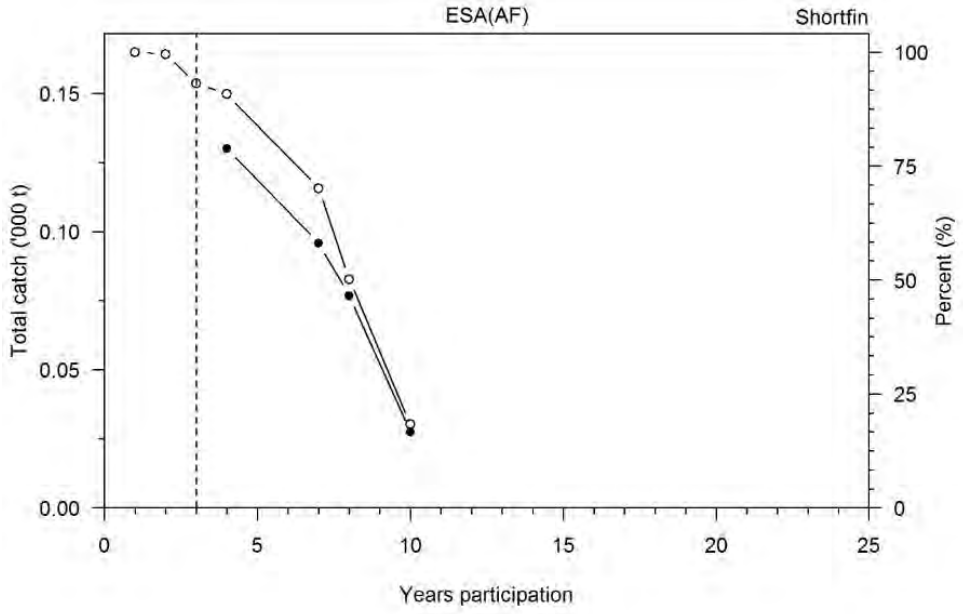

Figure F10: Relationship between years of participation in the fishery and shortfin total catch. The open circles represent all shortfin catch and the closed circles shortfin catch data from fishers who 1) caught shortfin in at least three years in each of which fishing took place in 10 days or more, and 2) caught more than 1000 kg over all years. Dotted vertical line represents 3 years participation and indicates the data included in the core shortfin fisher analyses for the years 1990–91 to 2014–15 (ESA AF).

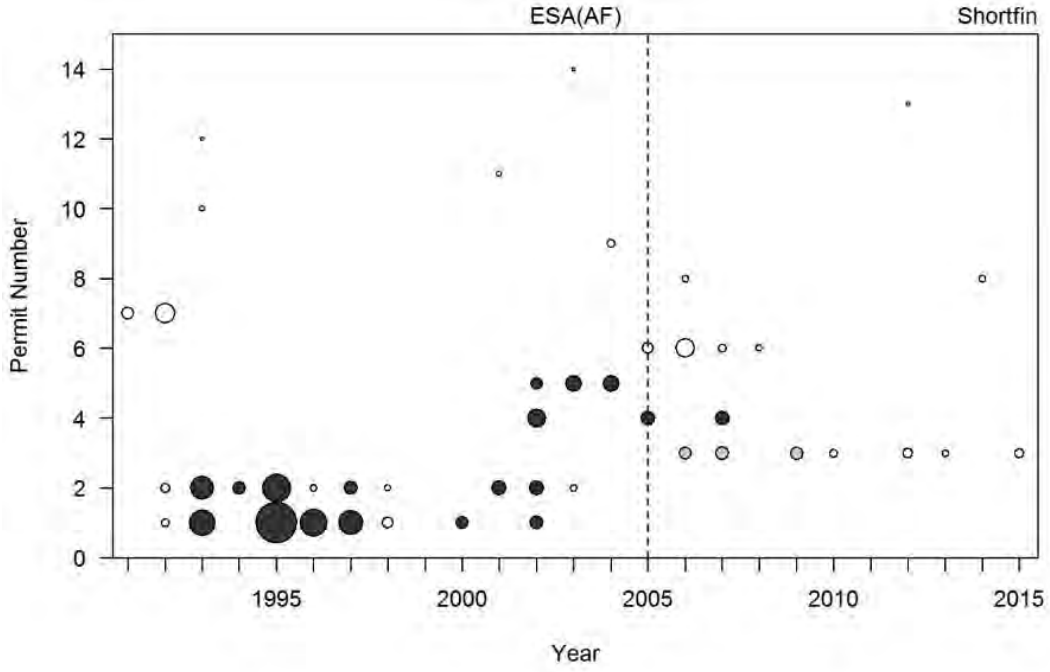

Figure F11: Relative catch of shortfin from all fishers (all circles) for the years 1990–91 to 2014–15, and for core fishers (dark and grey shaded circles) included in the catch per unit effort analyses. The vertical dotted line demarks introduction of the QMS in 2004–05. The dark shaded circles post-QMS are existing fishers and the grey, new entrants (ESA AF).

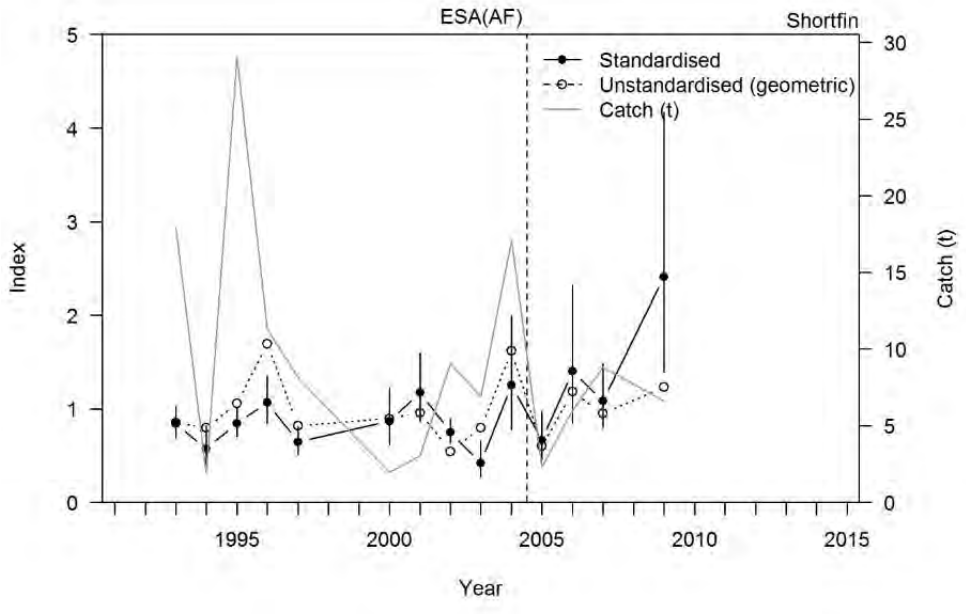

Figure F12: Indices of unstandardised (geometric mean of catch per lift) and standardised CPUE for shortfin core fishers for the years 1990–91 to 2014–15. The shortfin catch by core fishers is also plotted (ESA AF).

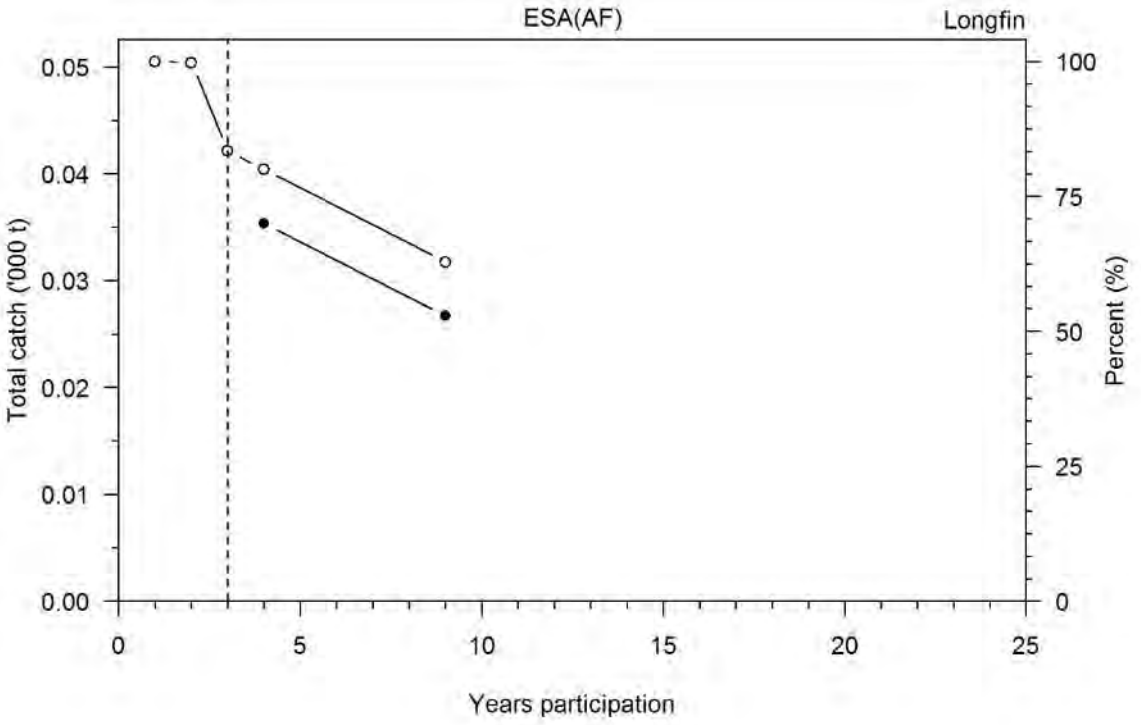

Figure F13: Relationship between years of participation in the fishery and longfin total catch. The open circles represent all longfin catch and the closed circles longfin catch data from fishers who 1) caught longfin in at least three years in each of which fishing took place in 10 days or more, and 2) caught more than 1000 kg over all years. Dotted vertical line represents 3 years participation and indicates the data included in the core longfin fisher analyses for the years 1990–91 to 2014–15 (ESA AF).

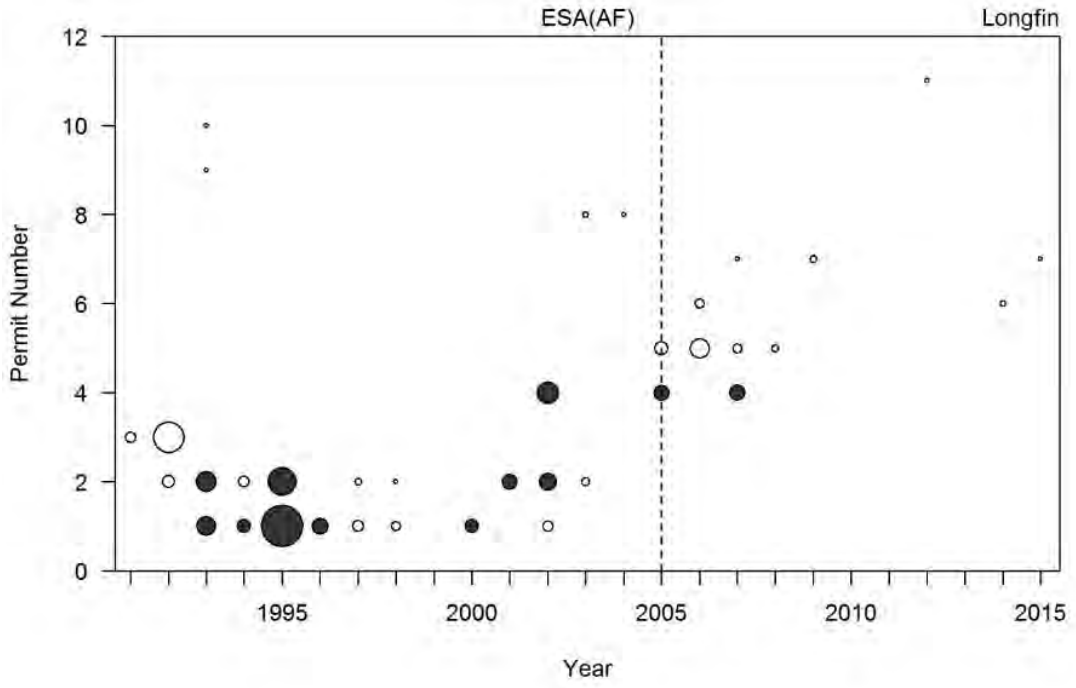

Figure F14: Relative catch of longfin from all fishers (all circles) for the years 1990–91 to 2014–15, and for core fishers (dark and grey shaded circles) included in the catch per unit effort analyses. The vertical dotted line demarks introduction of the QMS in 2004–05. The dark shaded circles post-QMS are existing fishers and the grey, new entrants (ESA AF).

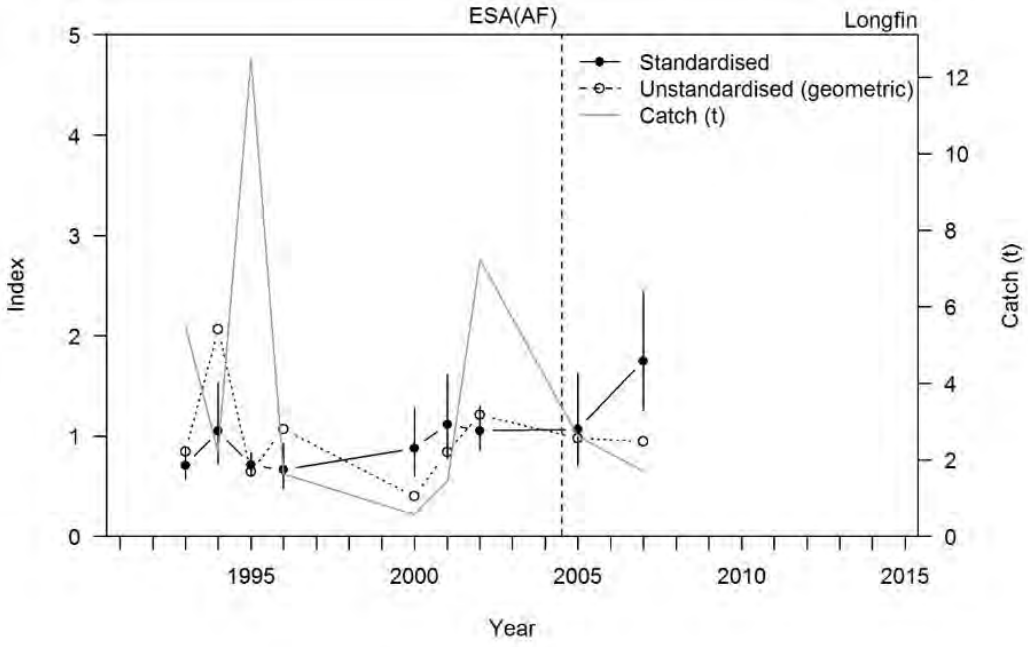

Figure F15: Indices of unstandardised (geometric mean of catch per lift) and standardised CPUE for longfin core fishers for the years 1990–91 to 2014–15. The longfin catch by core fishers is also plotted (ESA AF).