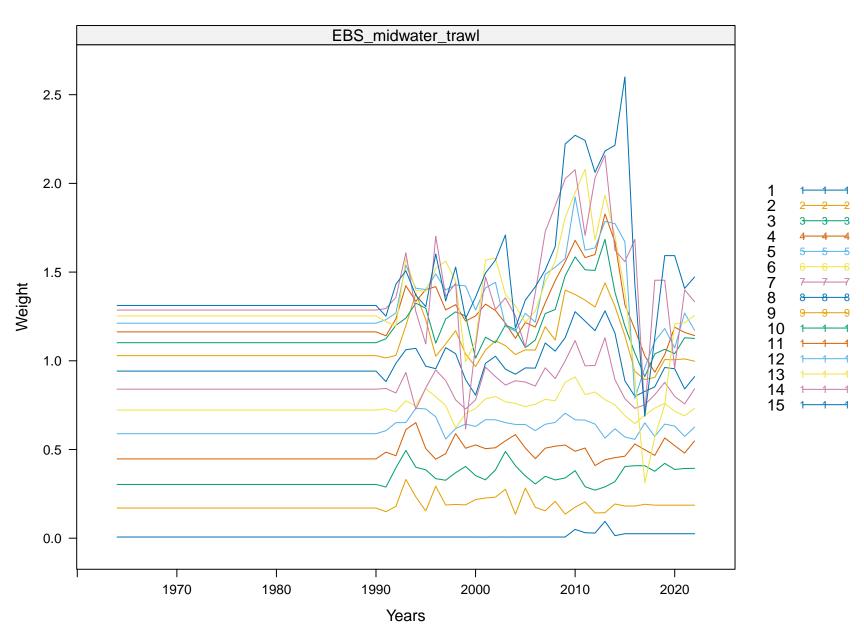
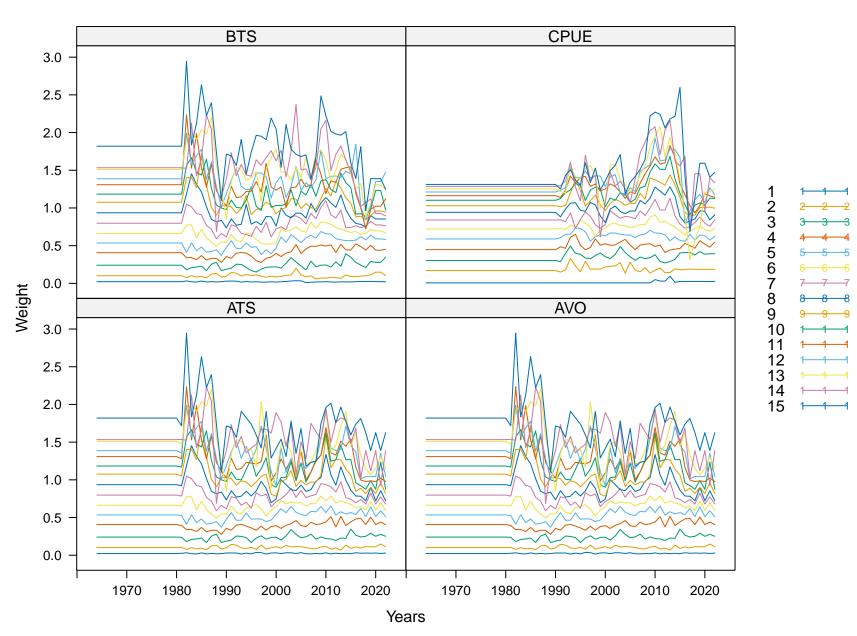
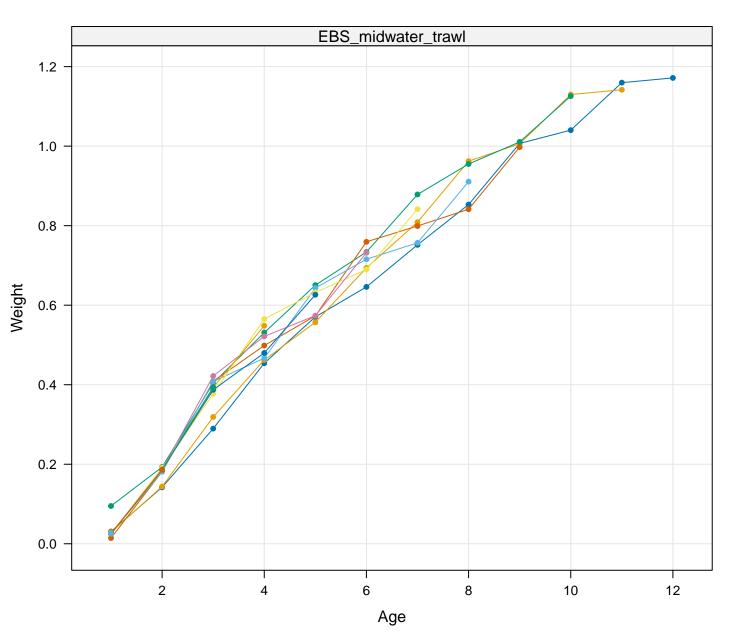
# Weight at age in the fishery



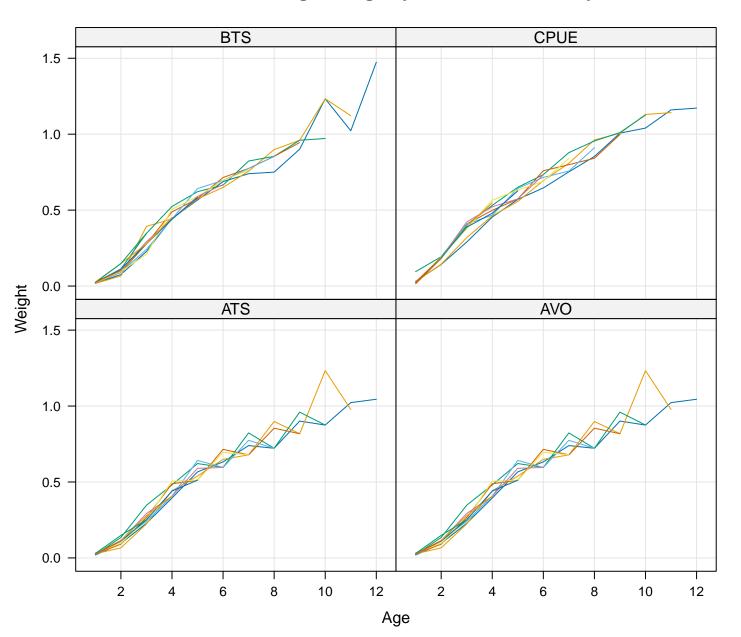
## Weight at age in the survey



# Weight at age by cohort in the fleet

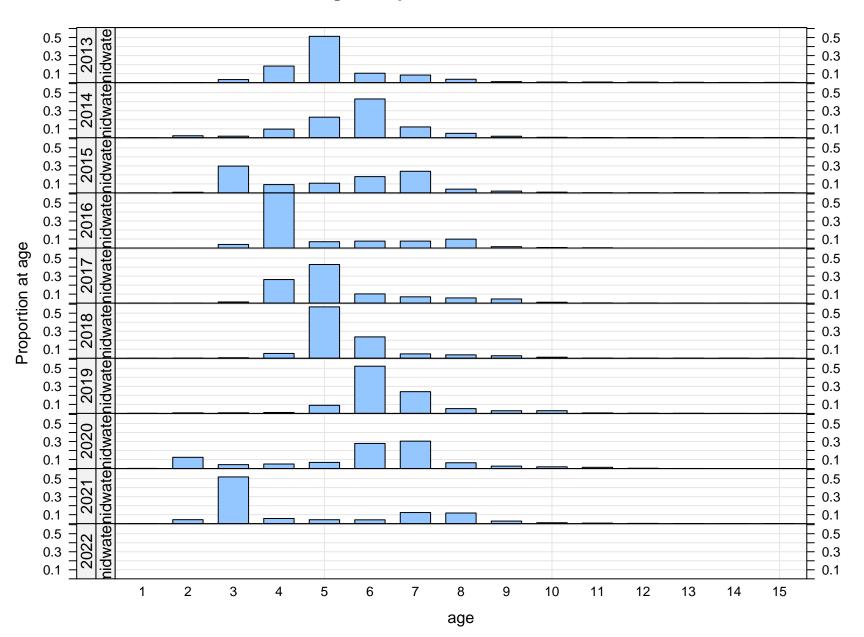


# Weight at age by cohort in the survey

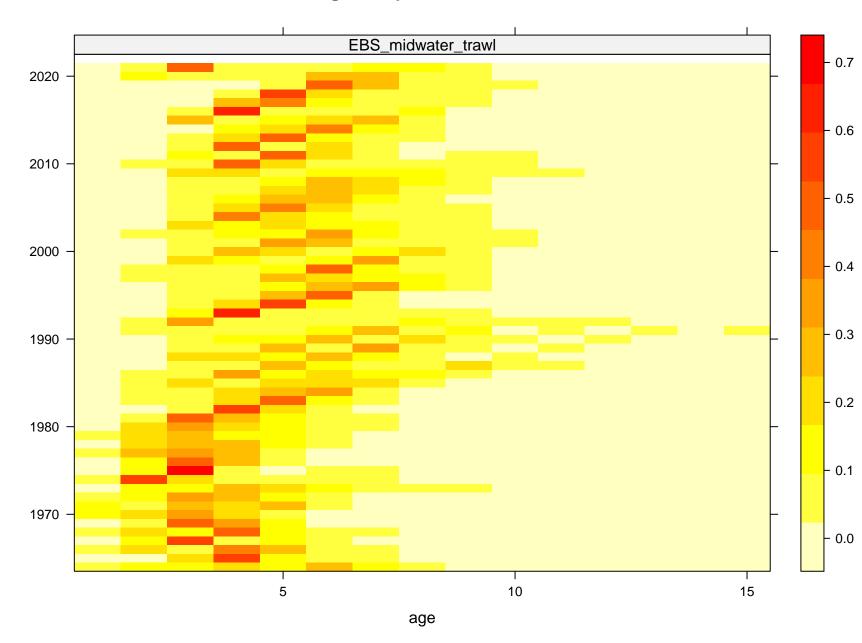




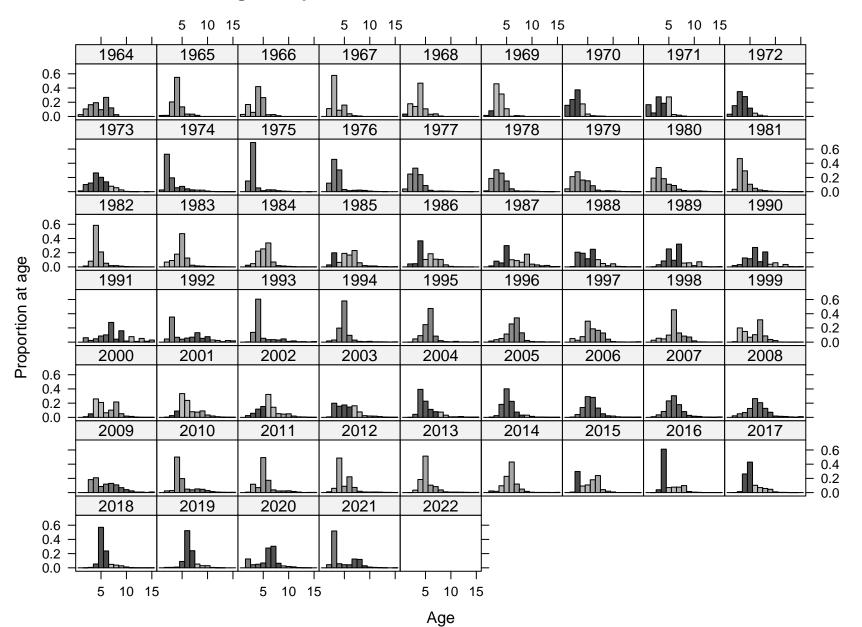
## Age composition in fleets



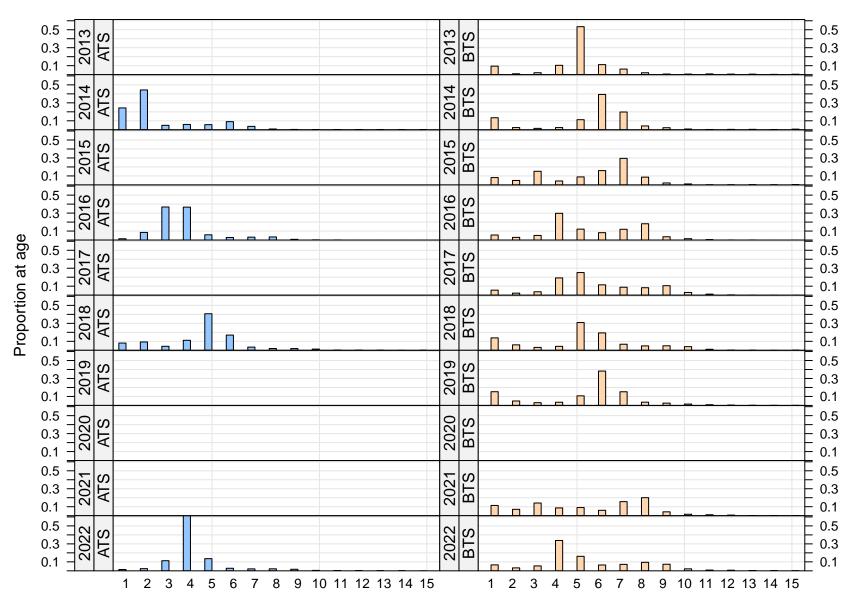
# Age composition in fleets



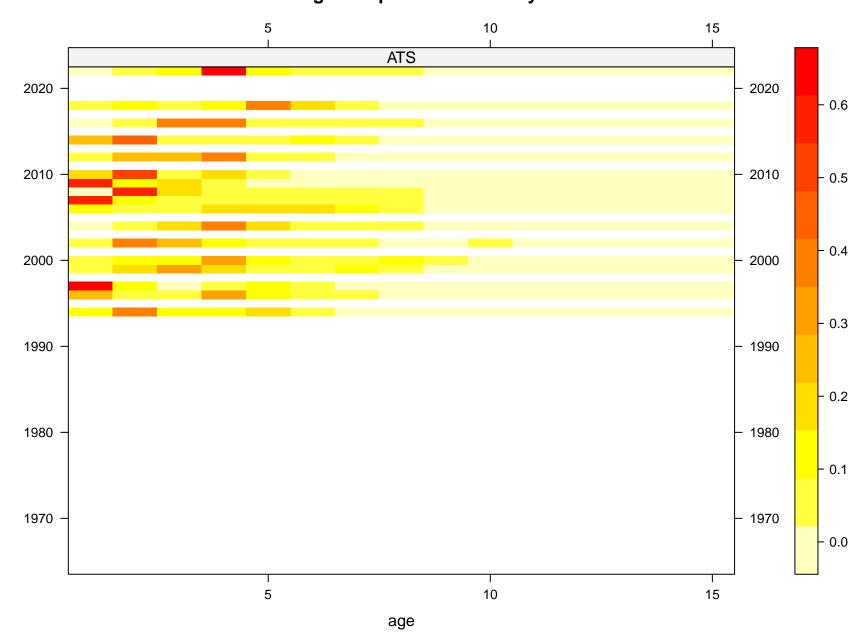
## Age composition in fleets EBS\_midwater\_trawl



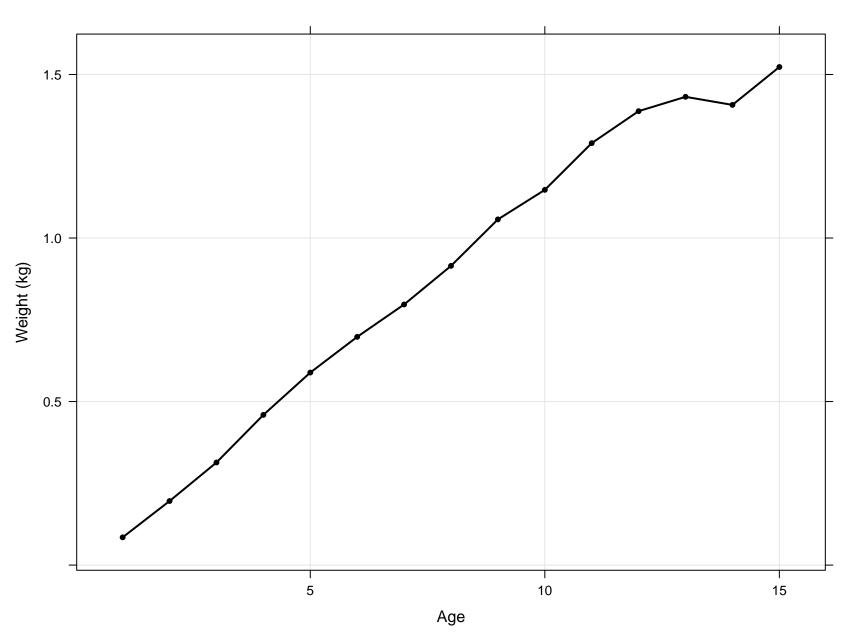
### Age composition in surveys



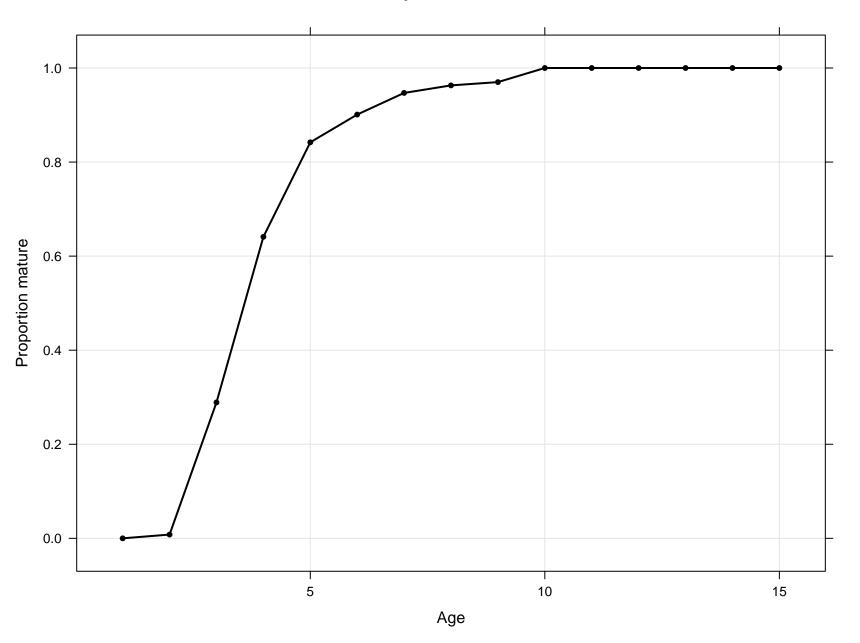
Age composition in surveys



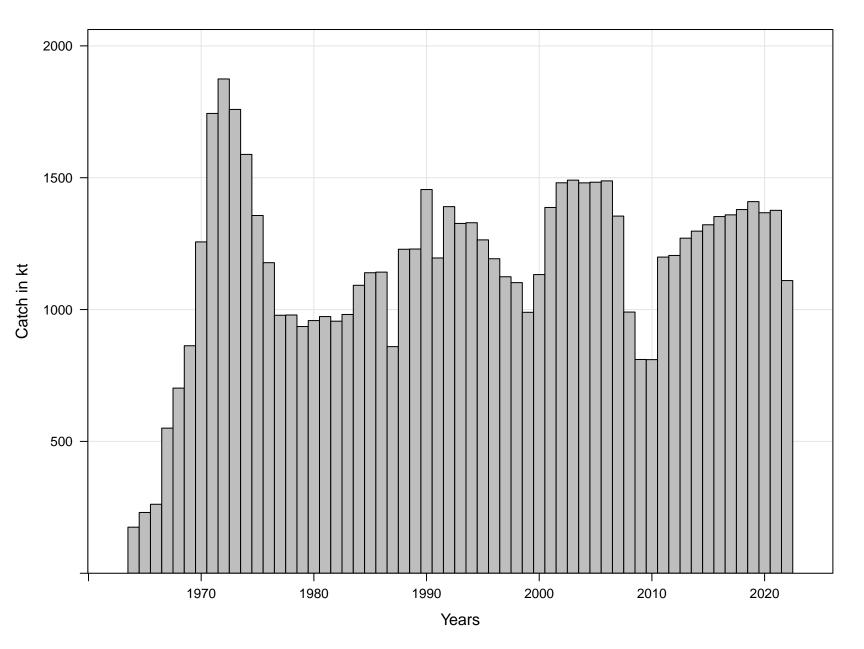
Weight in the stock



Maturity in the stock

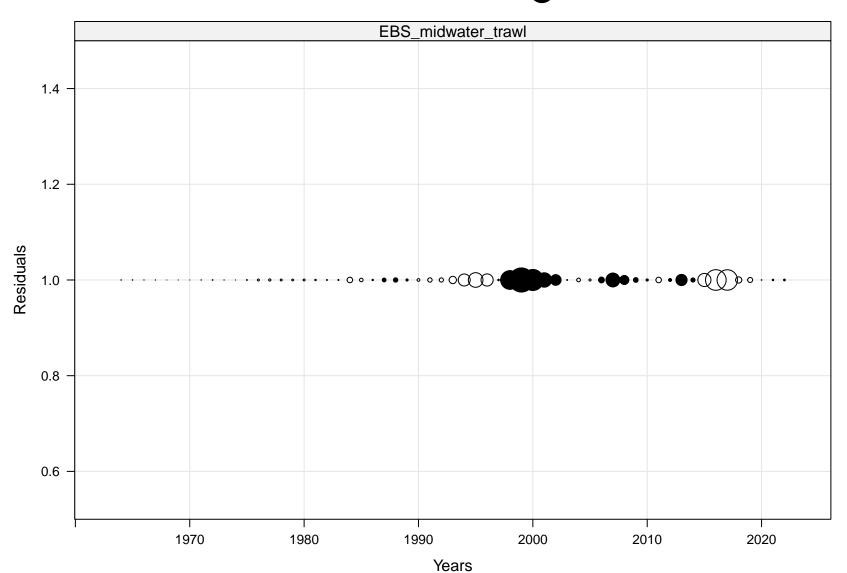


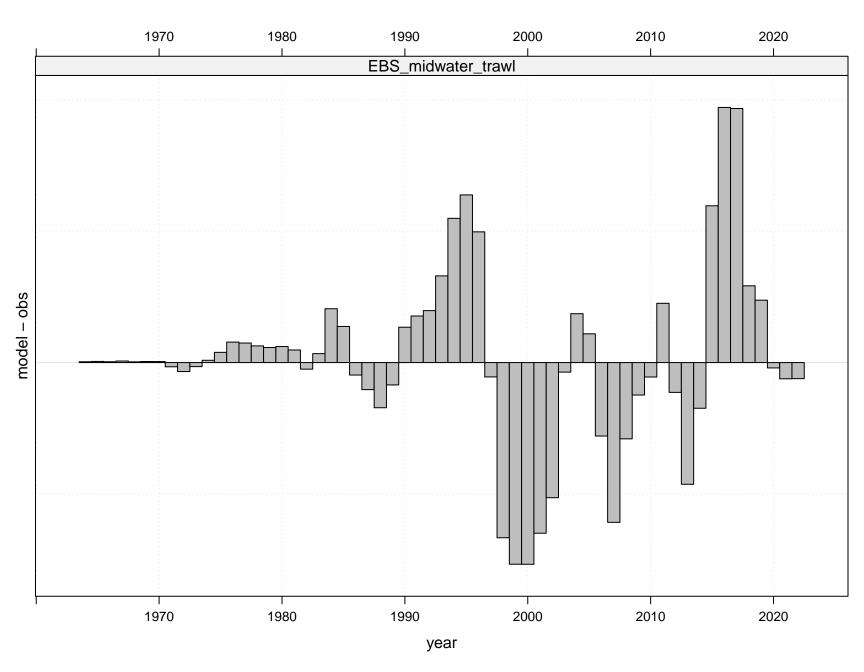
**Total catch** 



Catch residuals by fleet







Absolute residual catch by fleet

-0.22 ( -0.12

 $\bigcirc$ 

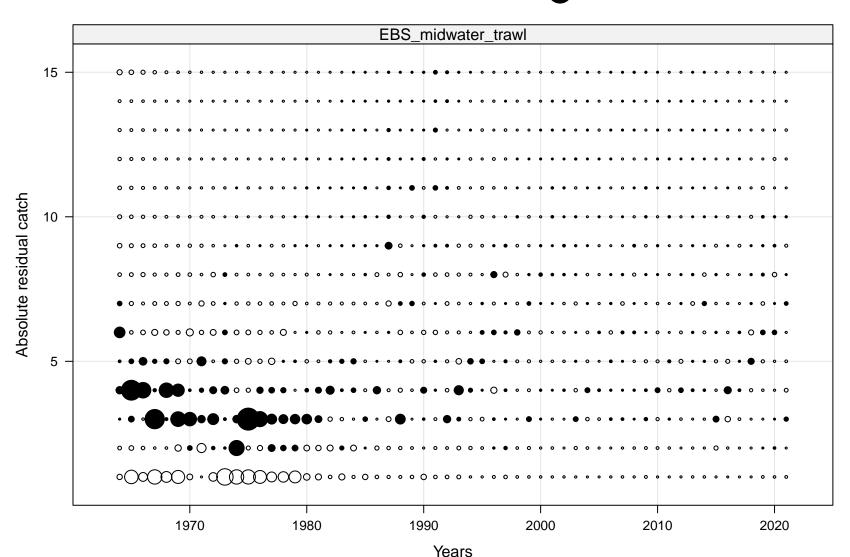
0.1

9

-0.01

Ò

. 31 (



Observed **Predicted** 10 15 10 15 5 10 15 10 15 10 15 10 15 5 10 15 5 15 5 5 10 15 5 5 1969 1972 1964 1965 1966 1967 1968 1970 1971 0.6 0.6 0.4 0.4 0.2 0.2 0.0 0.0 1973 1974 1975 1976 1977 1978 1979 1980 1981 0.6 0.6 0.4 0.4 0.2 0.0 0.2 0.0 1983 1987 1989 1982 1984 1985 1986 1988 1990 0.6 0.6 0.4 0.4 0.2 0.2 age MM 0.0 0.0 1991 1992 1993 1994 1996 1998 1995 1997 1999 Proportion at 0.6 0.6 0.4 0.4 0.2 0.2 0.0 0.0 2002 2003 2005 2006 2007 2000 2001 2004 2008 0.6 0.6 0.4 0.4 0.2 0.2 0.0 0.0 2009 2010 2011 2012 2013 2014 2015 2016 2017 0.6 0.6 0.4 0.4 0.2 0.2 0.0 0.0 2018 2019 2020 2021 0.6 0.6 0.4 -0.2 -0.0 -0.4 0.2 0.0

Age fits EBS\_midwater\_trawl

10 15

5

5 10 15

10 15

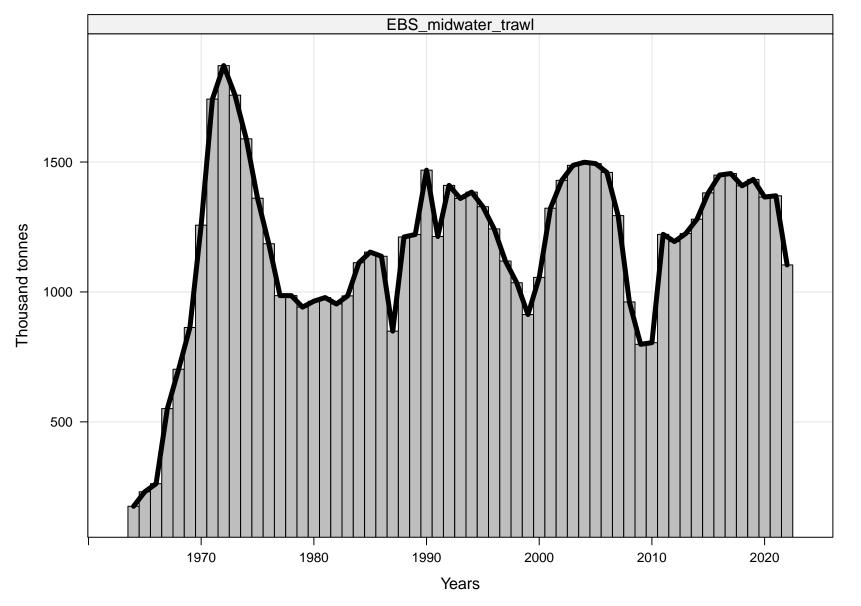
5

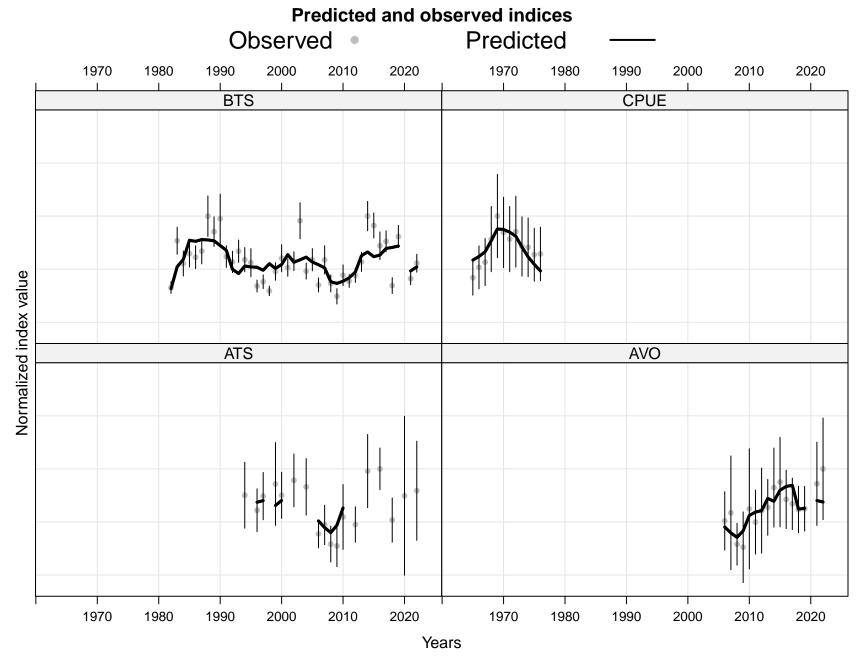
5

15

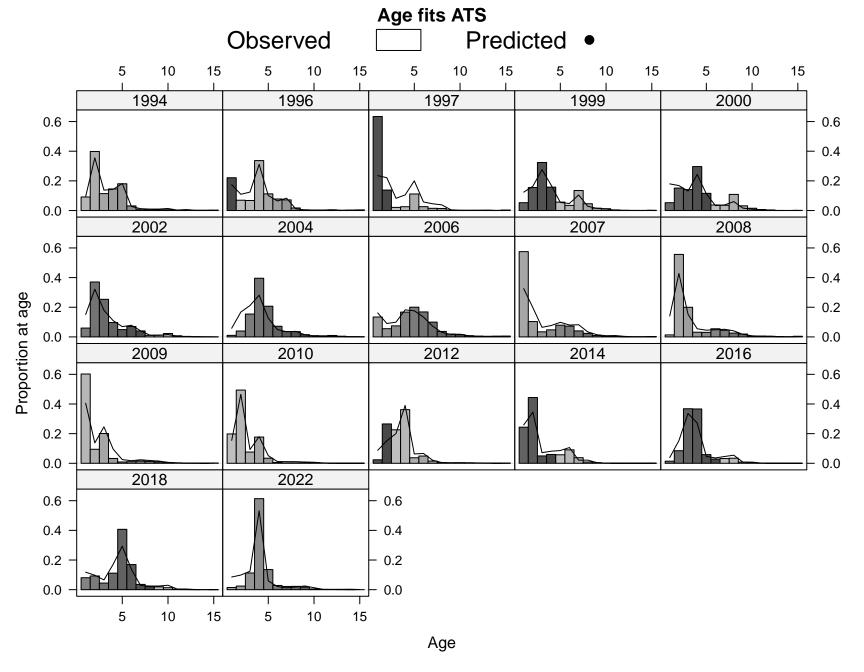
10

Predicted and observed catches by fleet
Observed Predicted ——



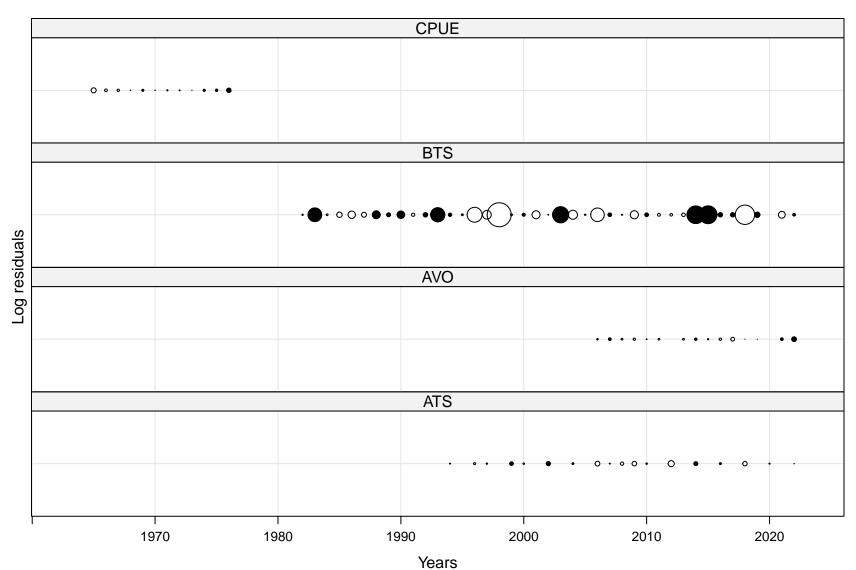


**Age fits BTS Predicted** Observed 0.5 0.4 0.3 0.2 0.1 0.0 0.5 0.4 0.3 0.2 0.1 0.0 0.5 0.4 0.3 0.2 0.1 0.0 0.5 0.4 0.3 0.2 0.1 0.0 0.5 0.4 0.3 0.2 0.1 0.0 0.5 0.4 0.3 0.2 0.1 0.0 Proportion at age 0.5 0.4 0.3 0.2 0.1 0.0 0.5 0.4 0.3 0.2 0.1 0.0 0.5 0.4 0.3 0.2 0.1 0.0 0.5 0.4 0.3 0.2 0.1 0.0 0.5 0.4 0.3 0.2 0.1 0.0 0.5 0.4 0.3 0.2 0.1 0.0 Age

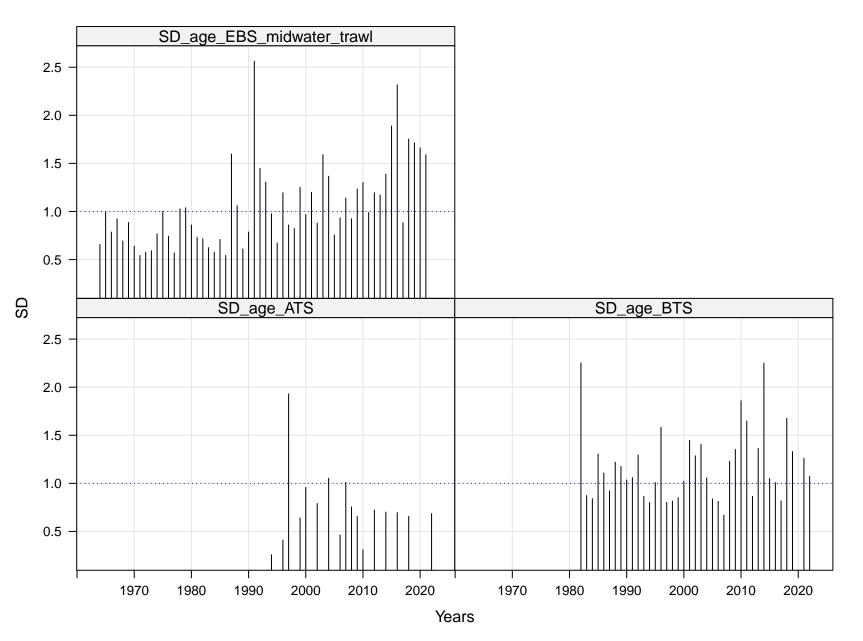


Standardized survey residuals

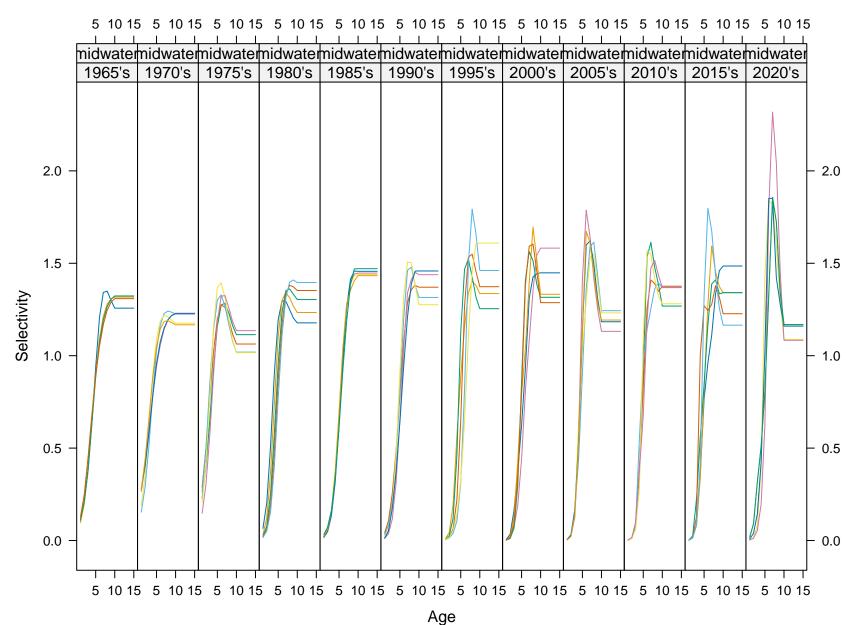




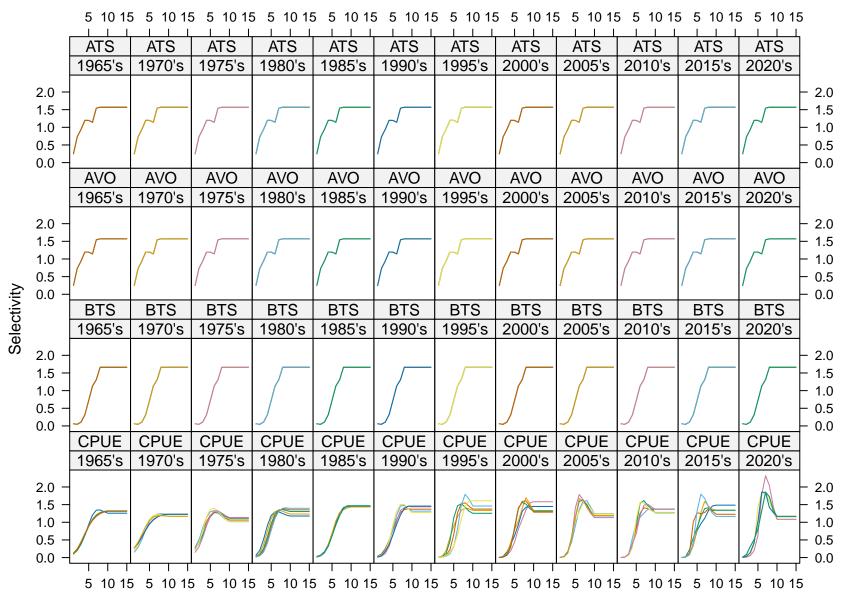
## SD per input series



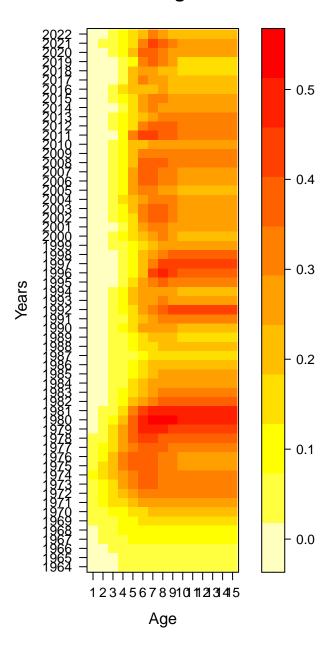
## Selectivity of the Fishery by Pentad



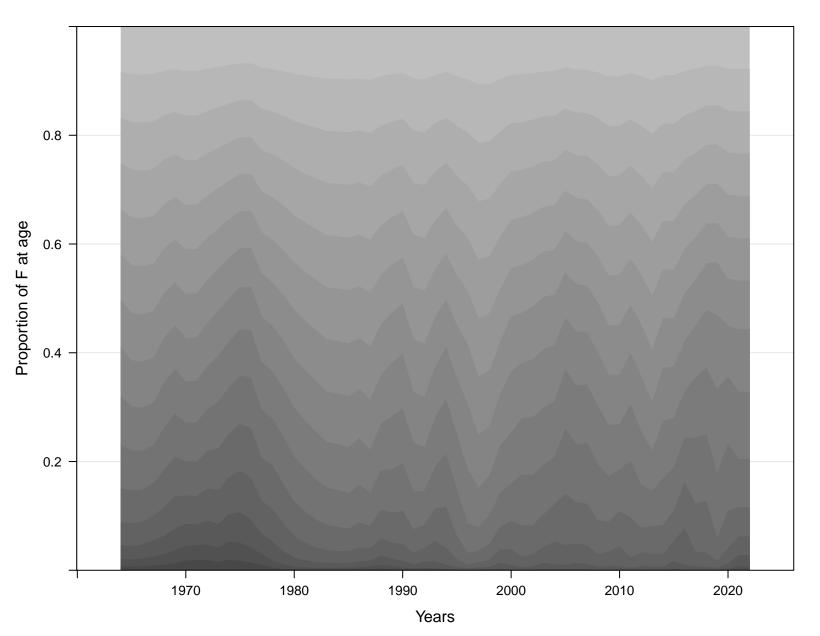
#### Selectivity of the survey by Pentad



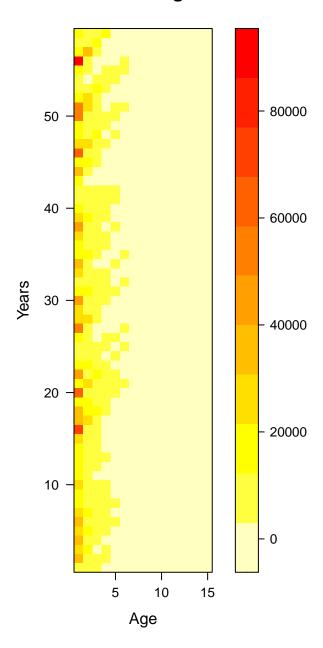
F at age



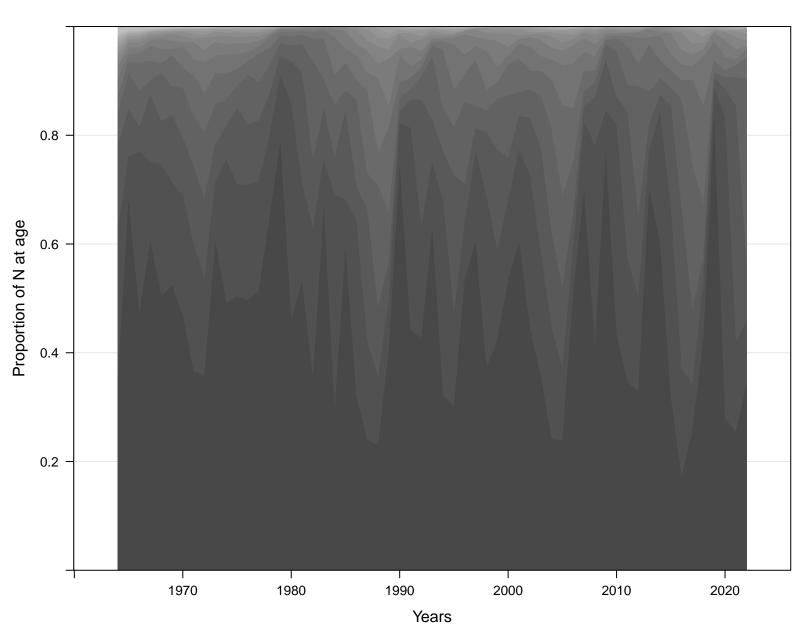
# F proportion at age





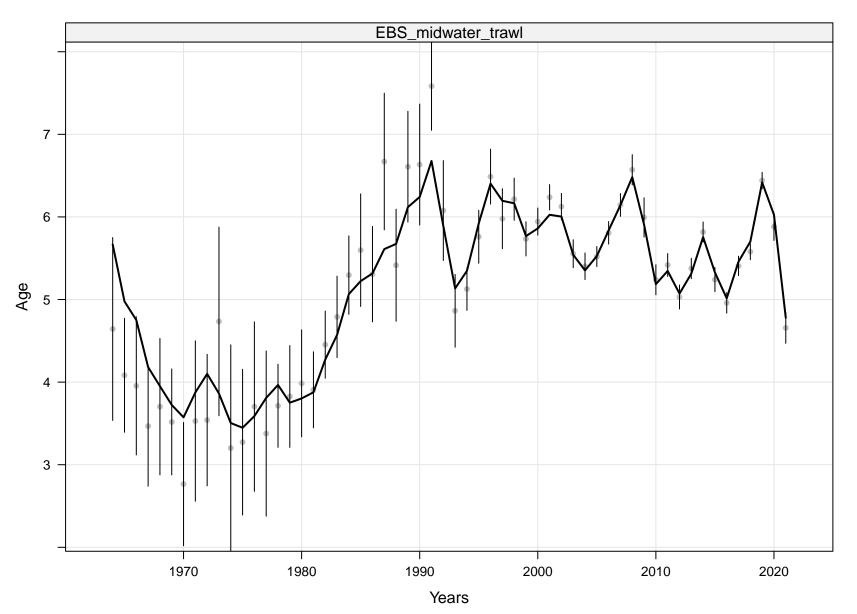


# **Proportion at age**



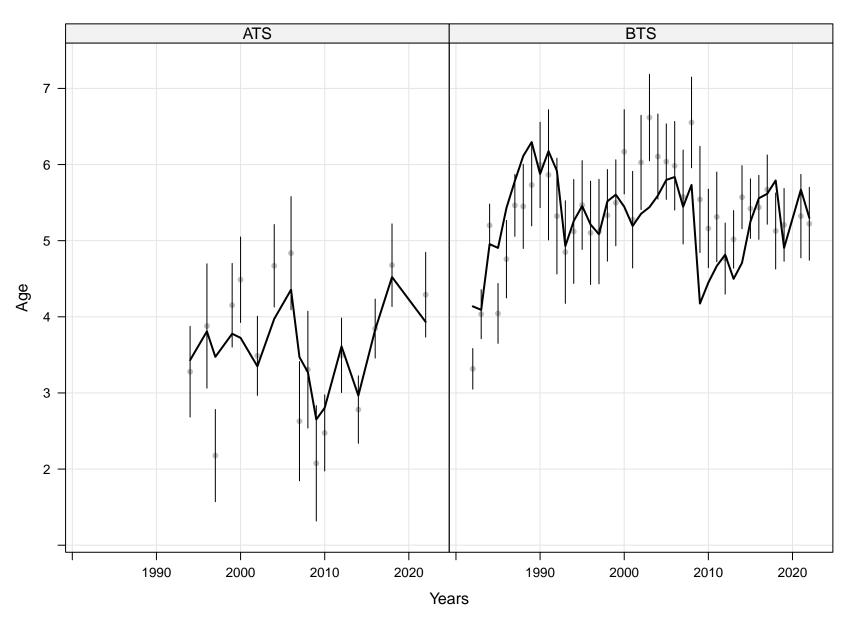
Fishery mean age

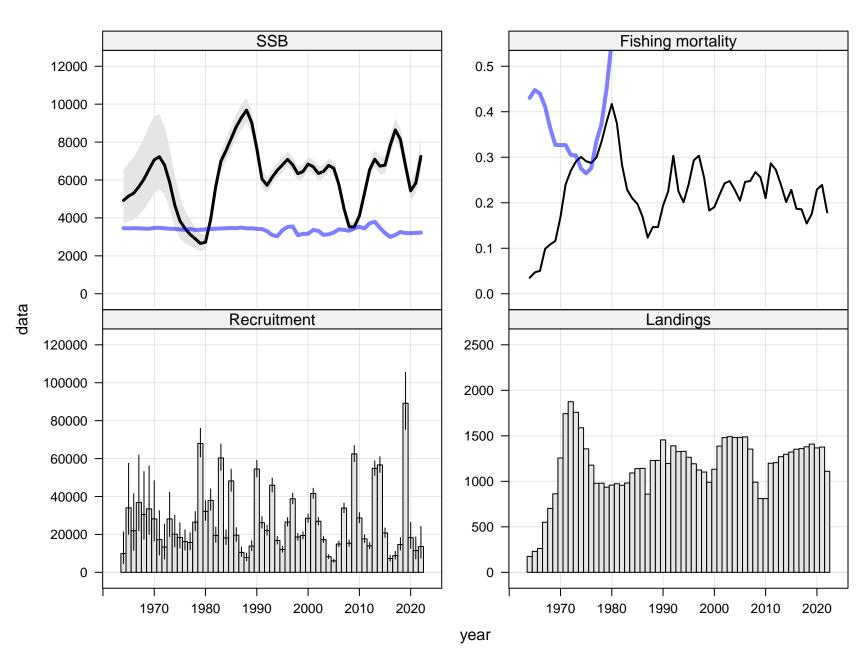
Observed • Modelled

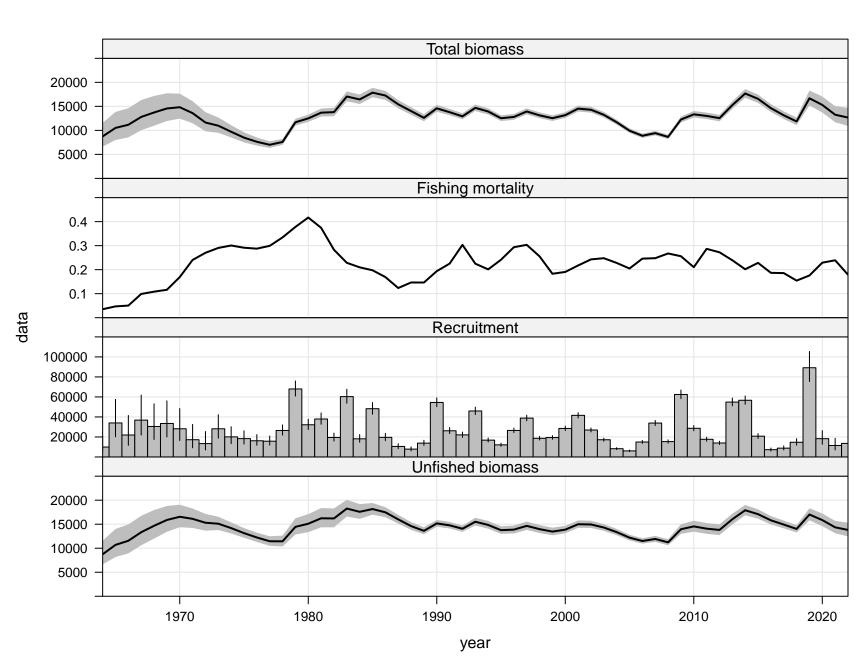


Survey mean age

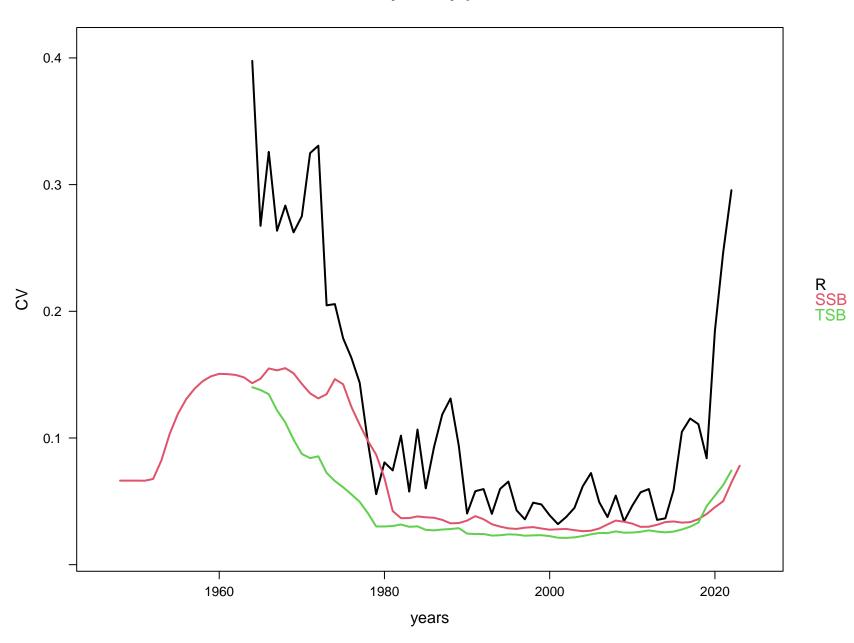






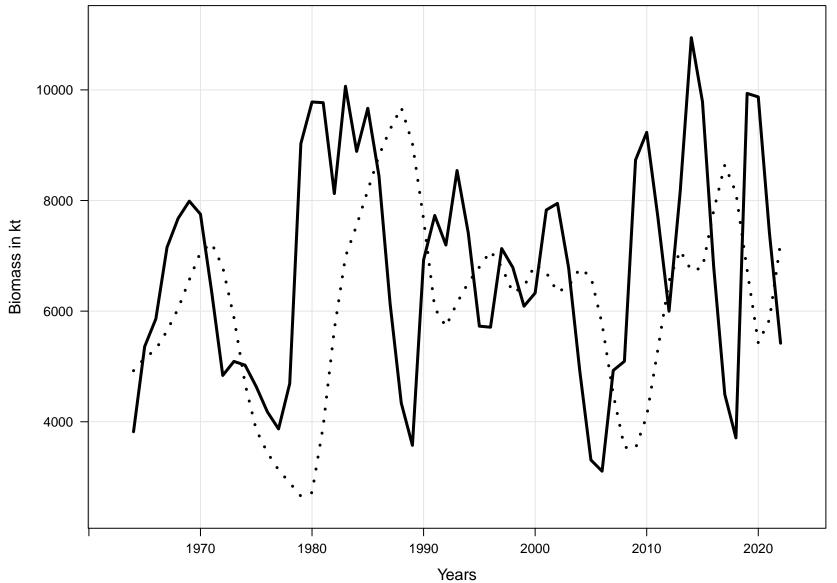


# **Uncertainty of key parameters**

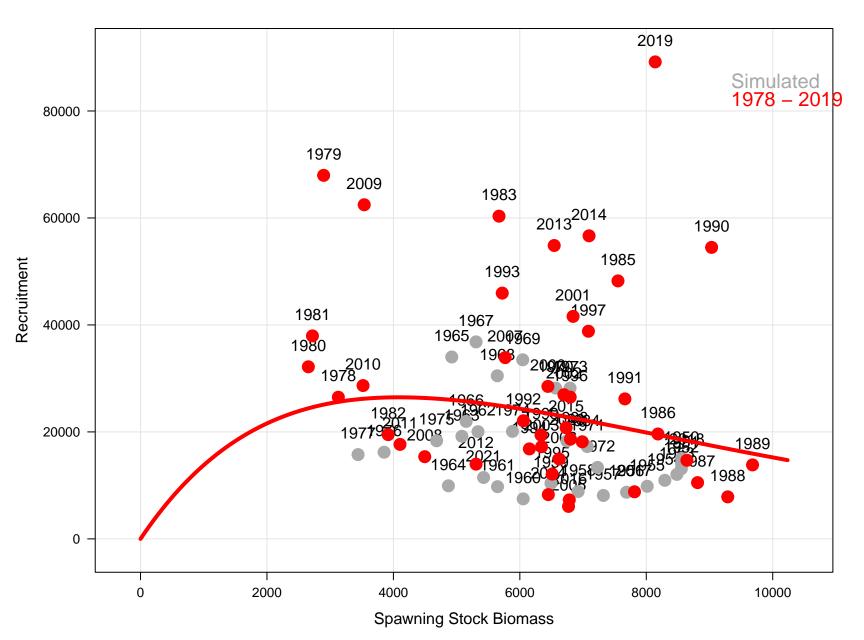


Mature - Immature fish

Mature - Immature ----

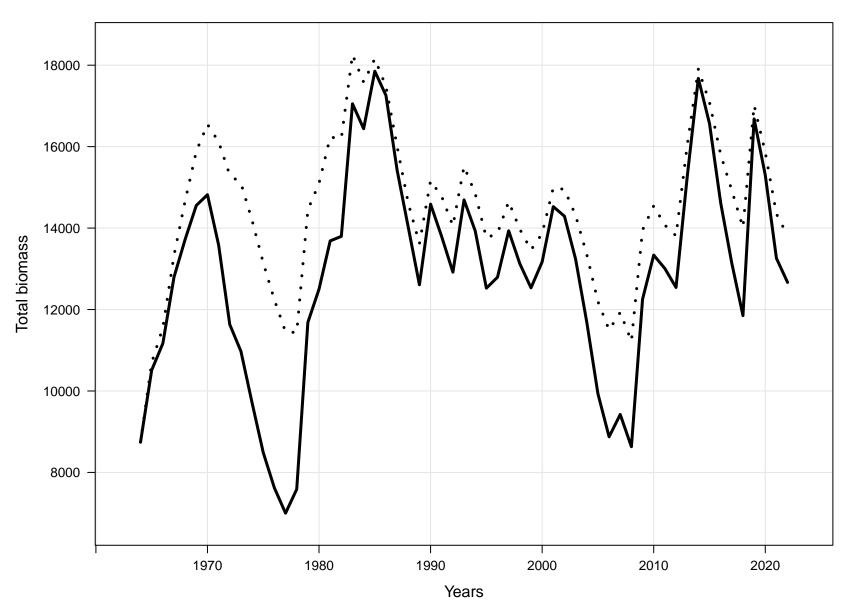


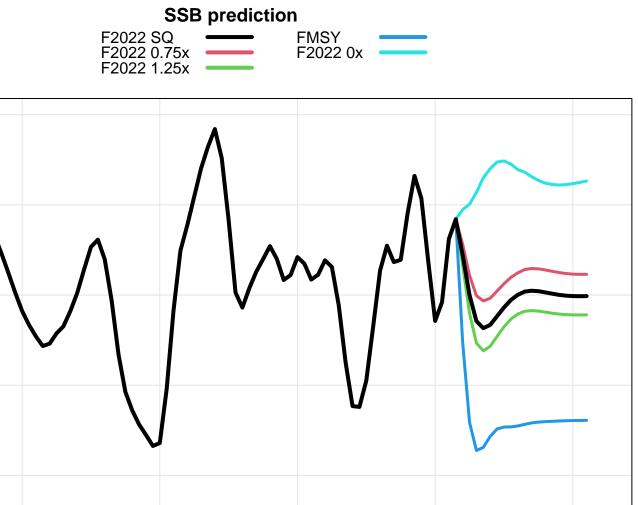
#### **Stock Recruitment**

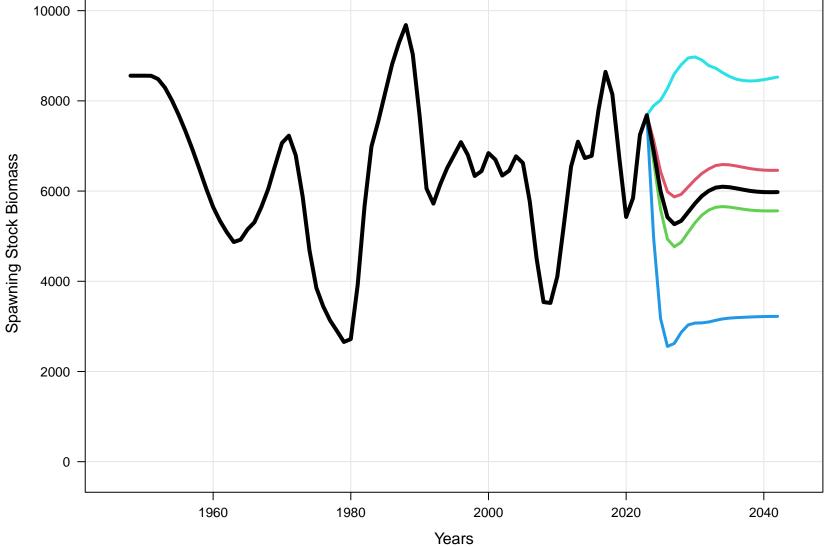


Comparing fished with unfished biomass



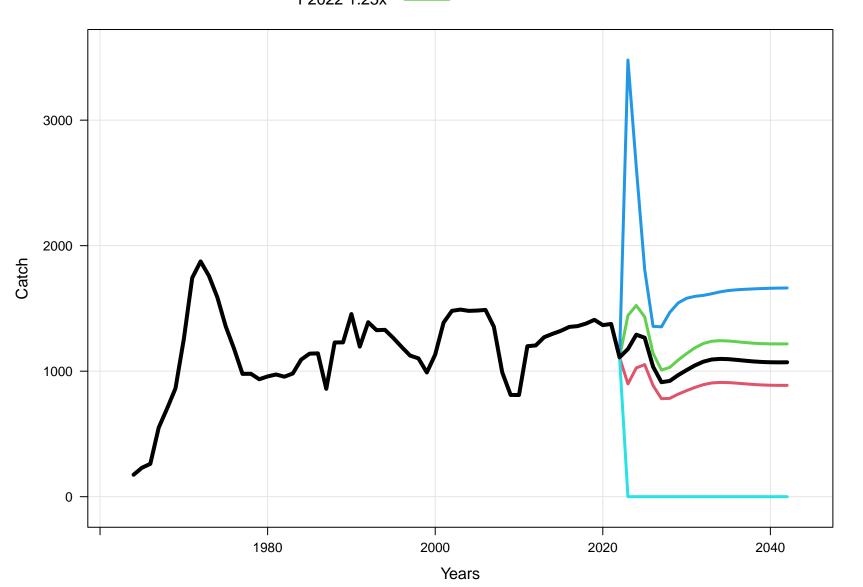




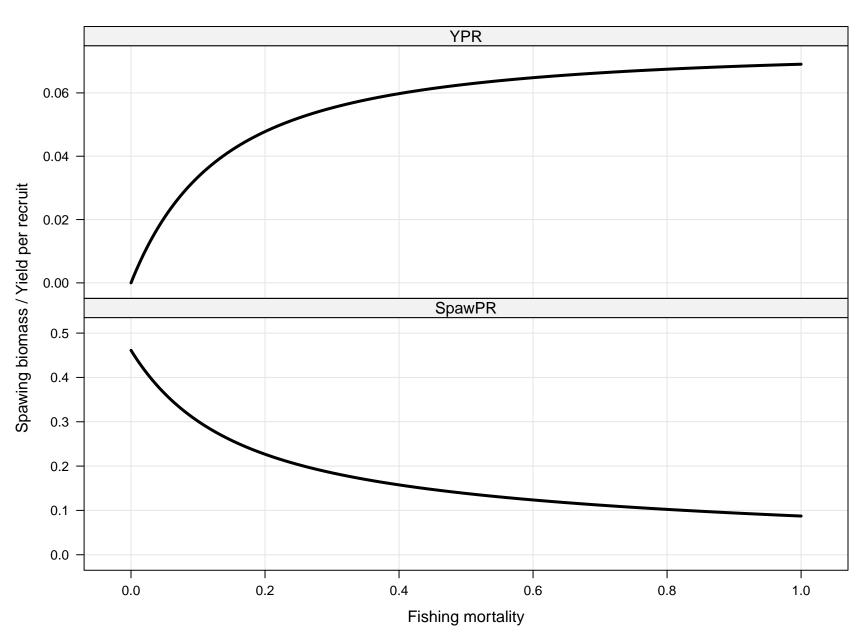




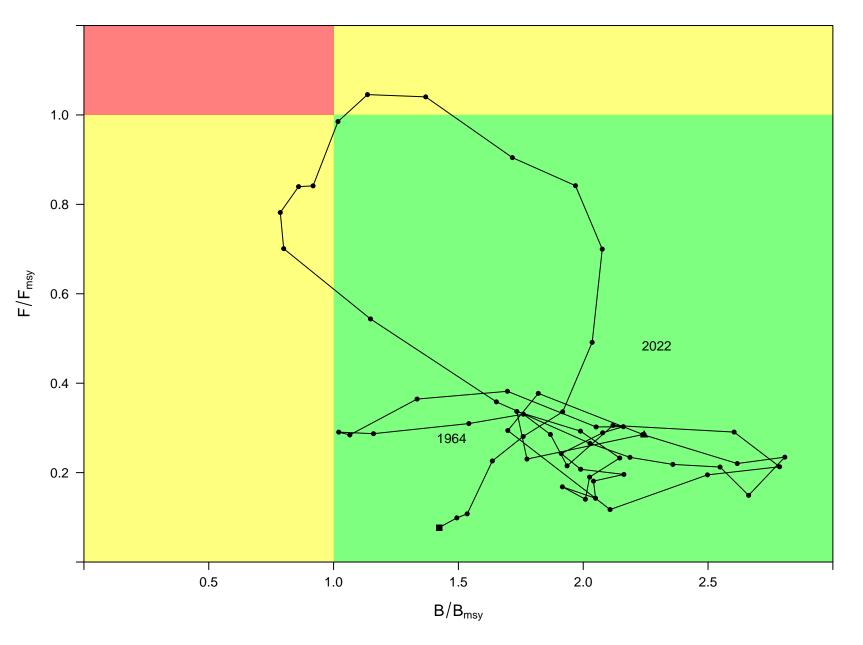


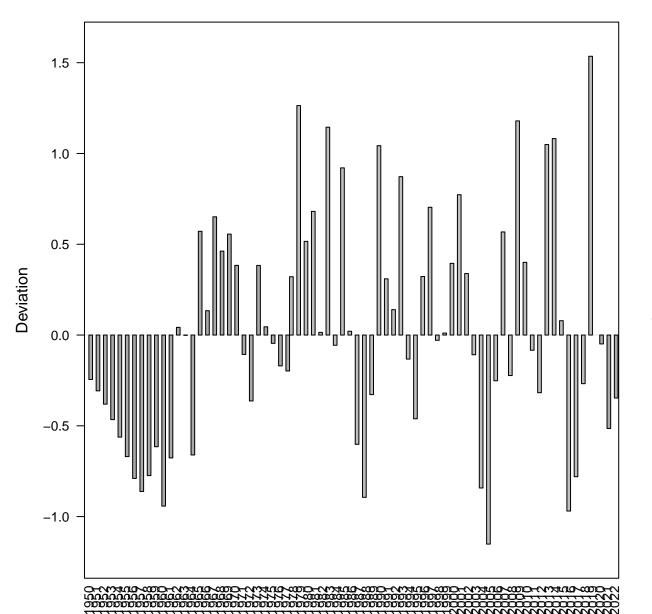


# Yield and spawing stock biomass per recruit



Kobe plot





Simulated 1978 – 2019

