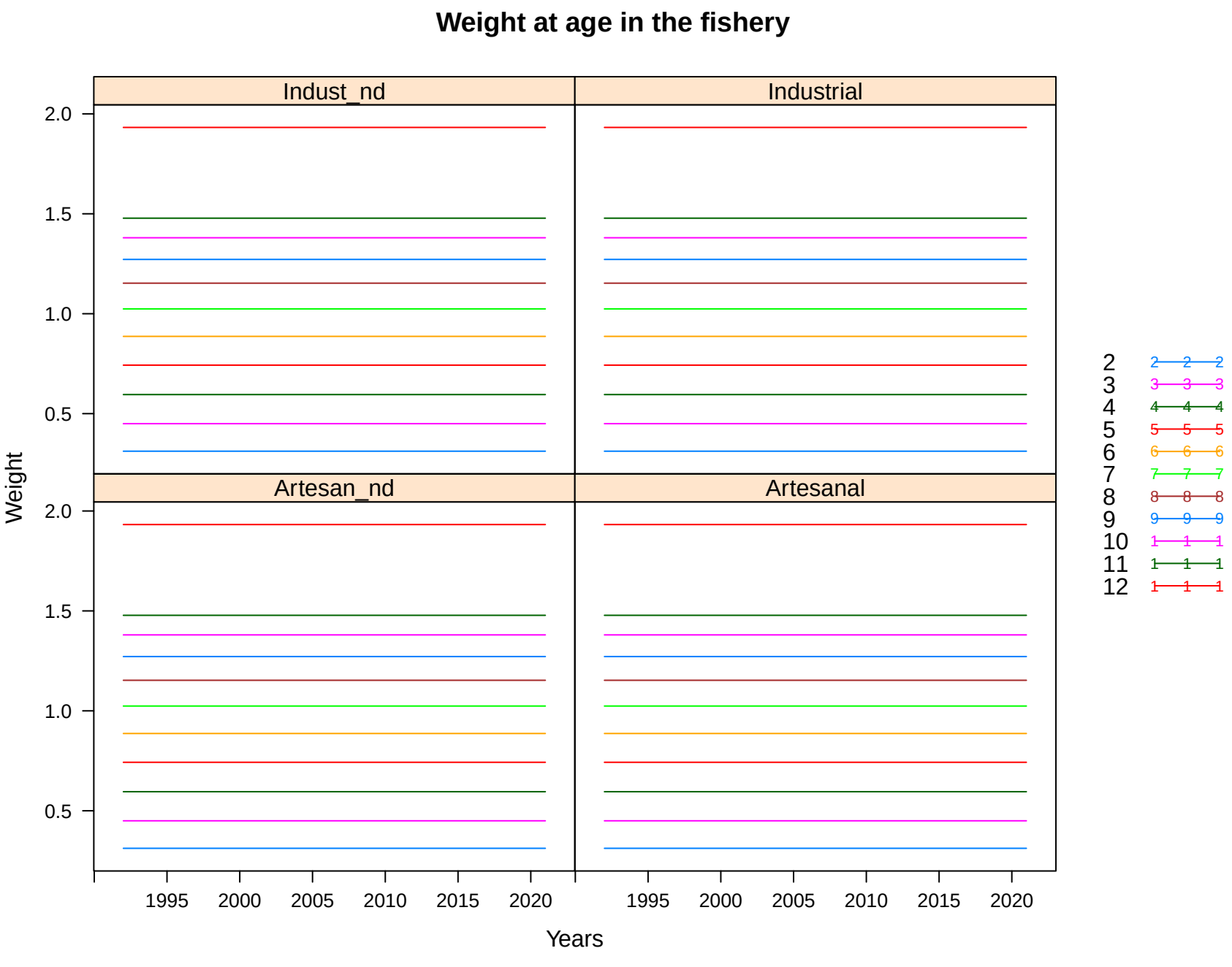
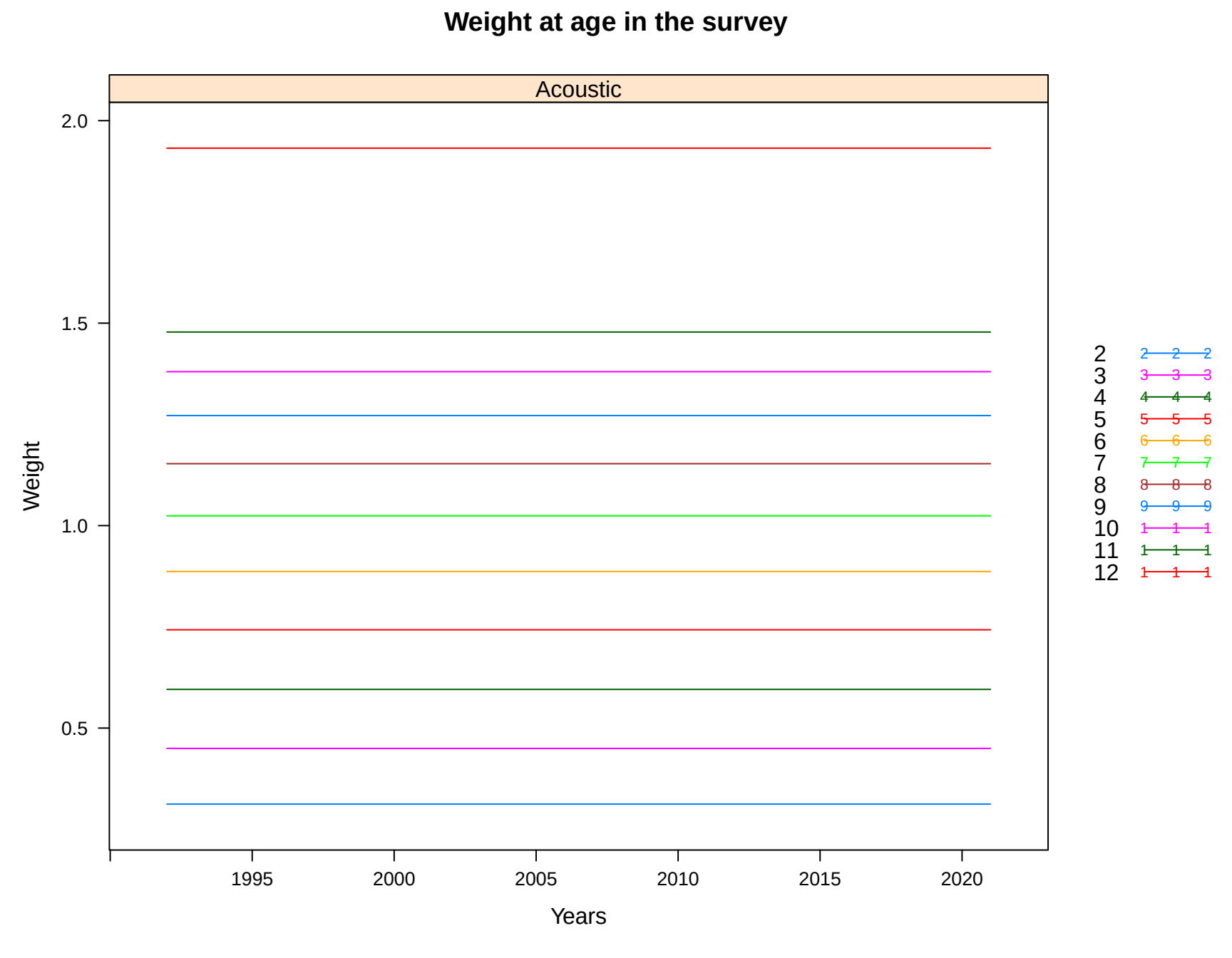
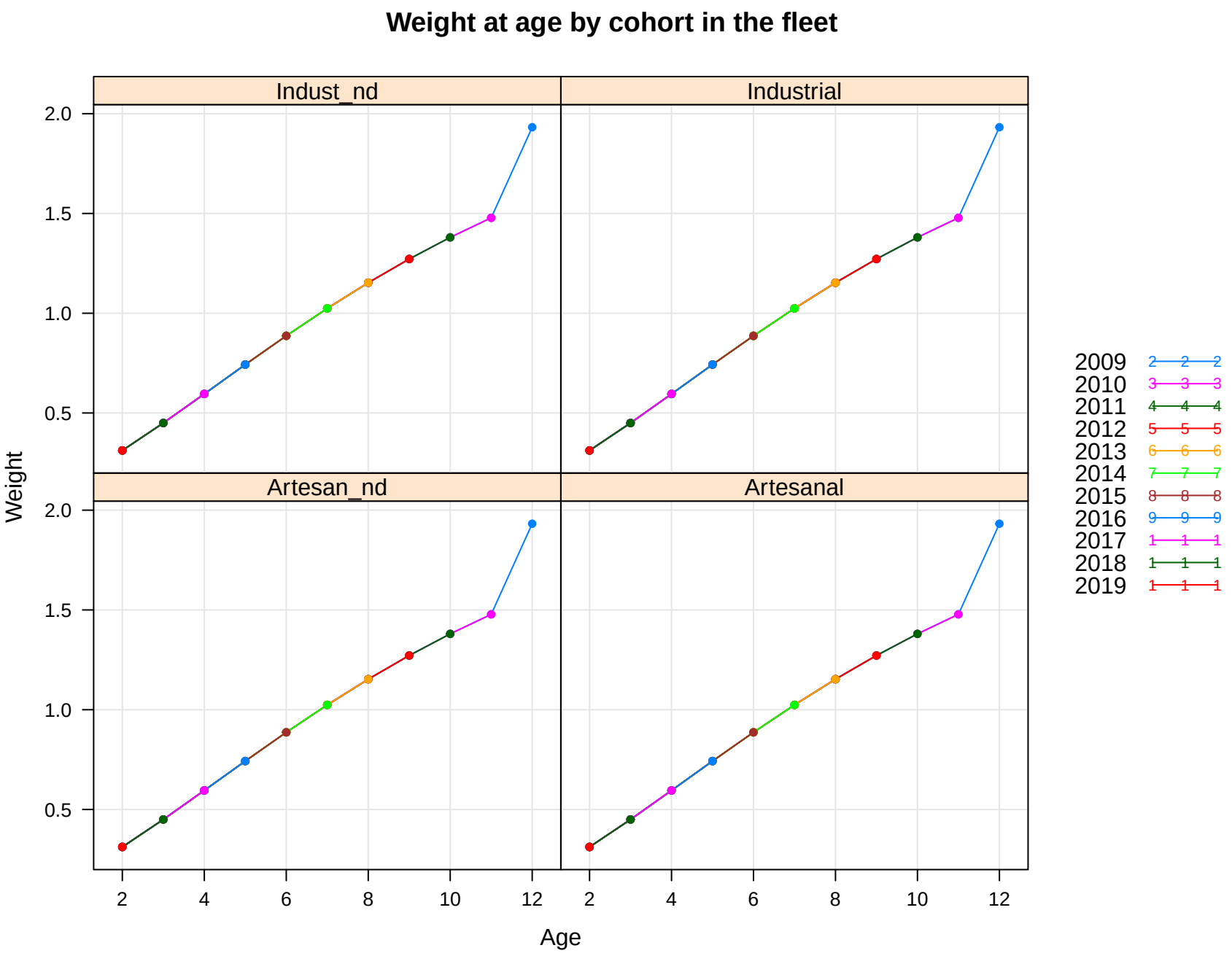
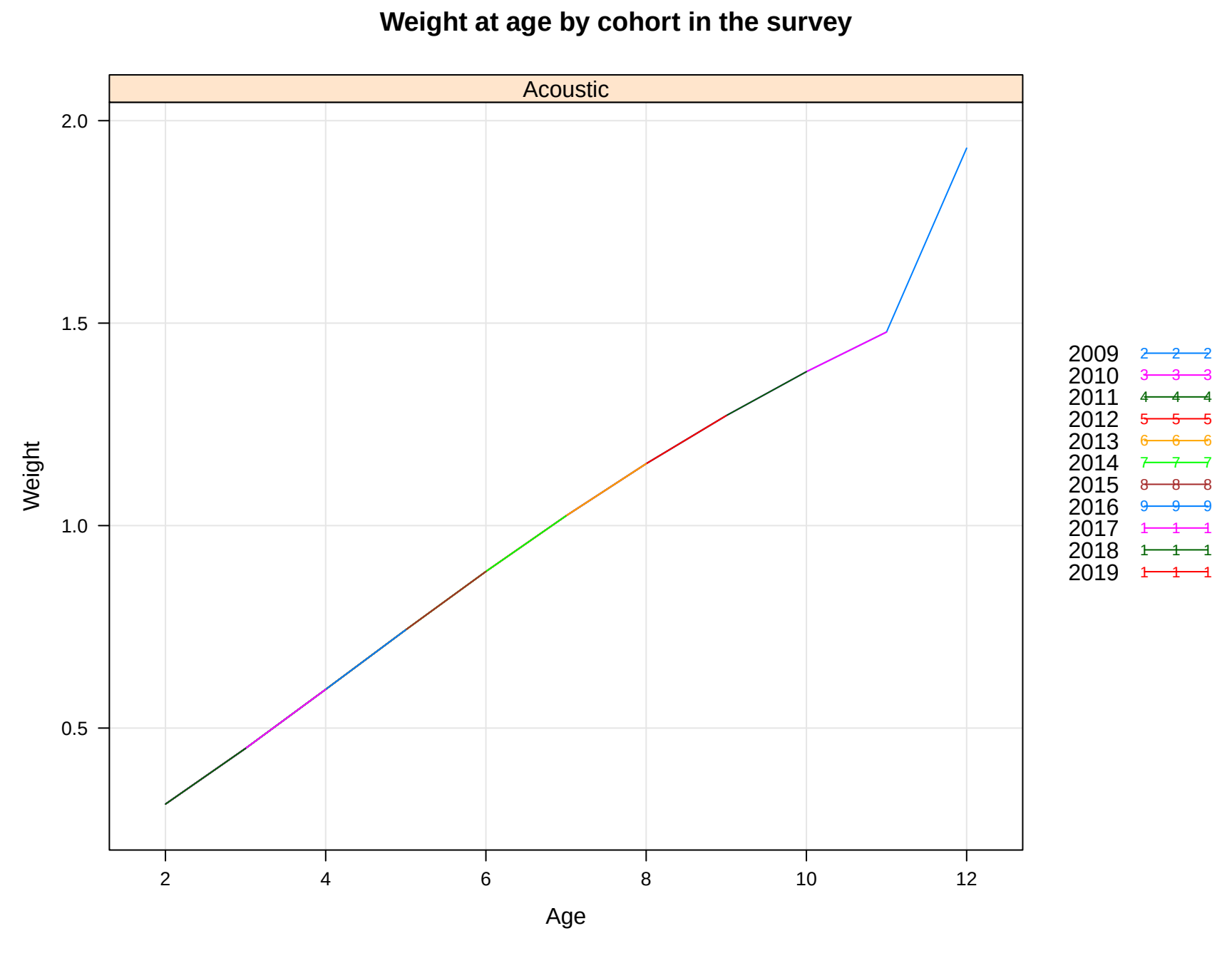
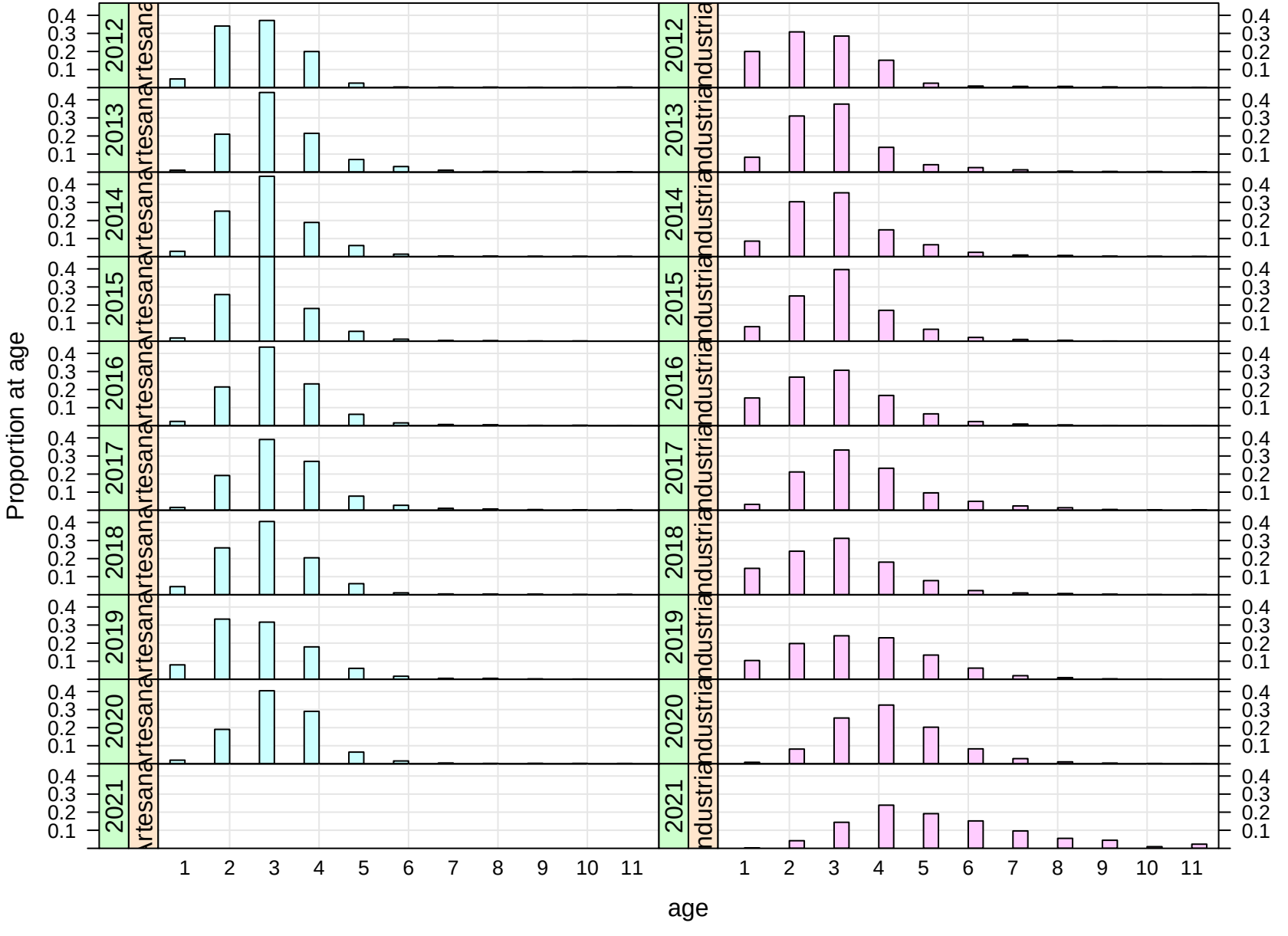
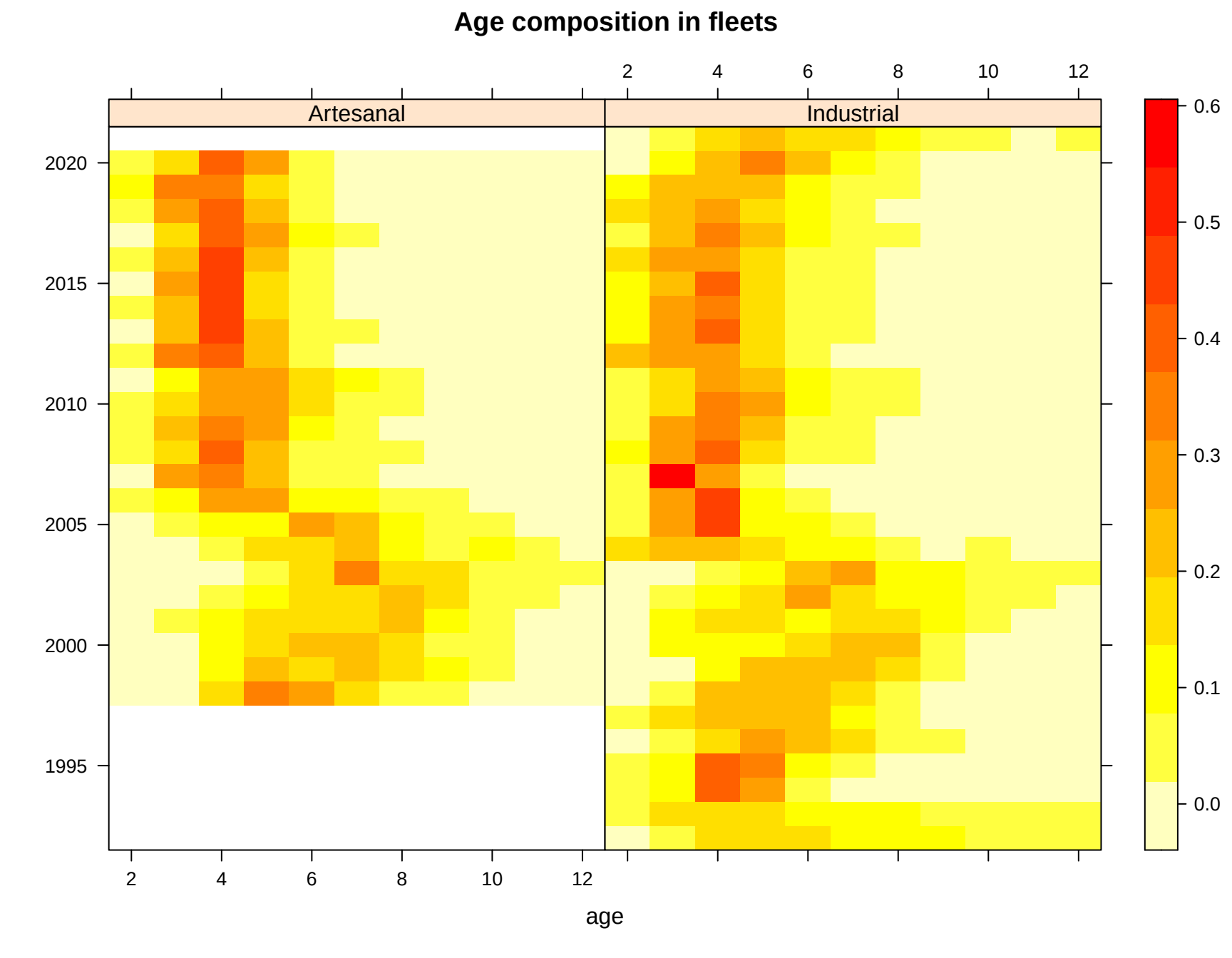

Weight at age in the fishery
Indust_nd
Industrial
Artesan_nd
Artesanal
Weight
2.0
1.5
1.0
0.5
1995
2000
2005
2010
2015
2020
Years
2
3
4
5
6
7
8
9
10
11
12

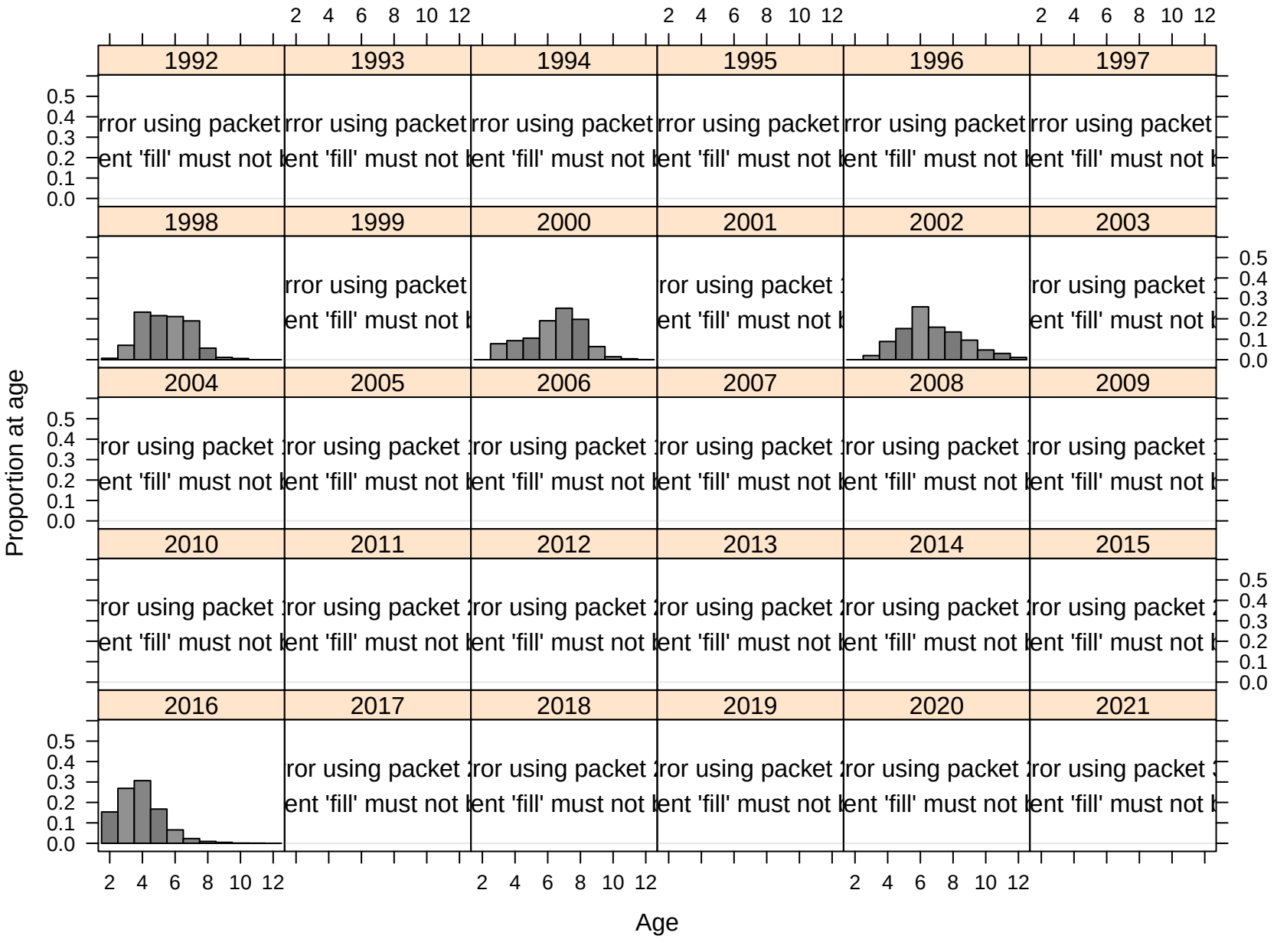

Weight at age in the survey
Acoustic
2.0
1.5
1.0
0.5
Weight
1995
2000
2005
2010
2015
2020
Years
2
3
4
5
6
7
8
9
10
11
12

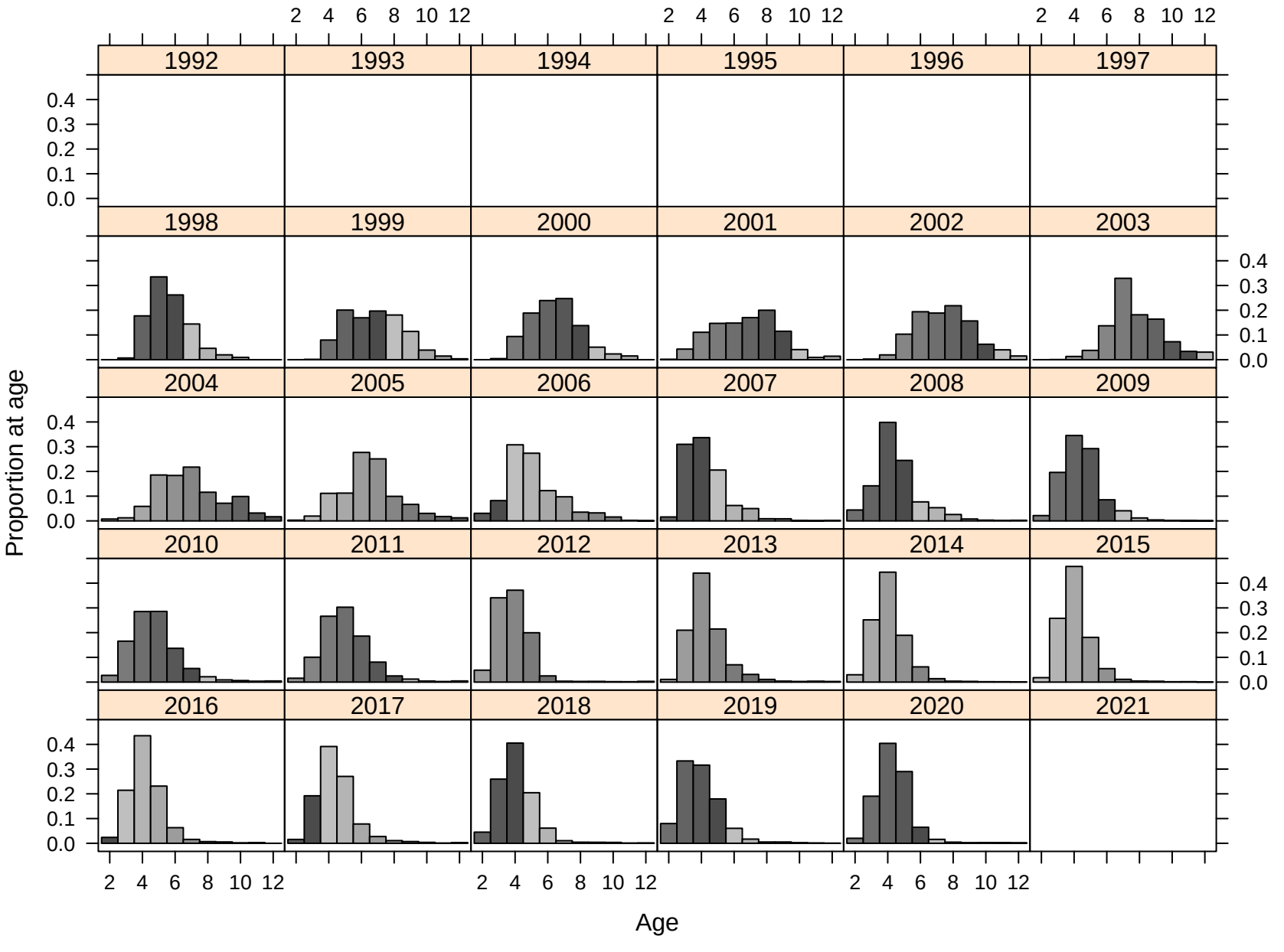

Weight at age by cohort in the fleet
Indust_nd
Industrial
Artesan_nd
Artesanal
Weight
Age
2.0
1.5
1.0
0.5
2
4
6
8
10
12
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019

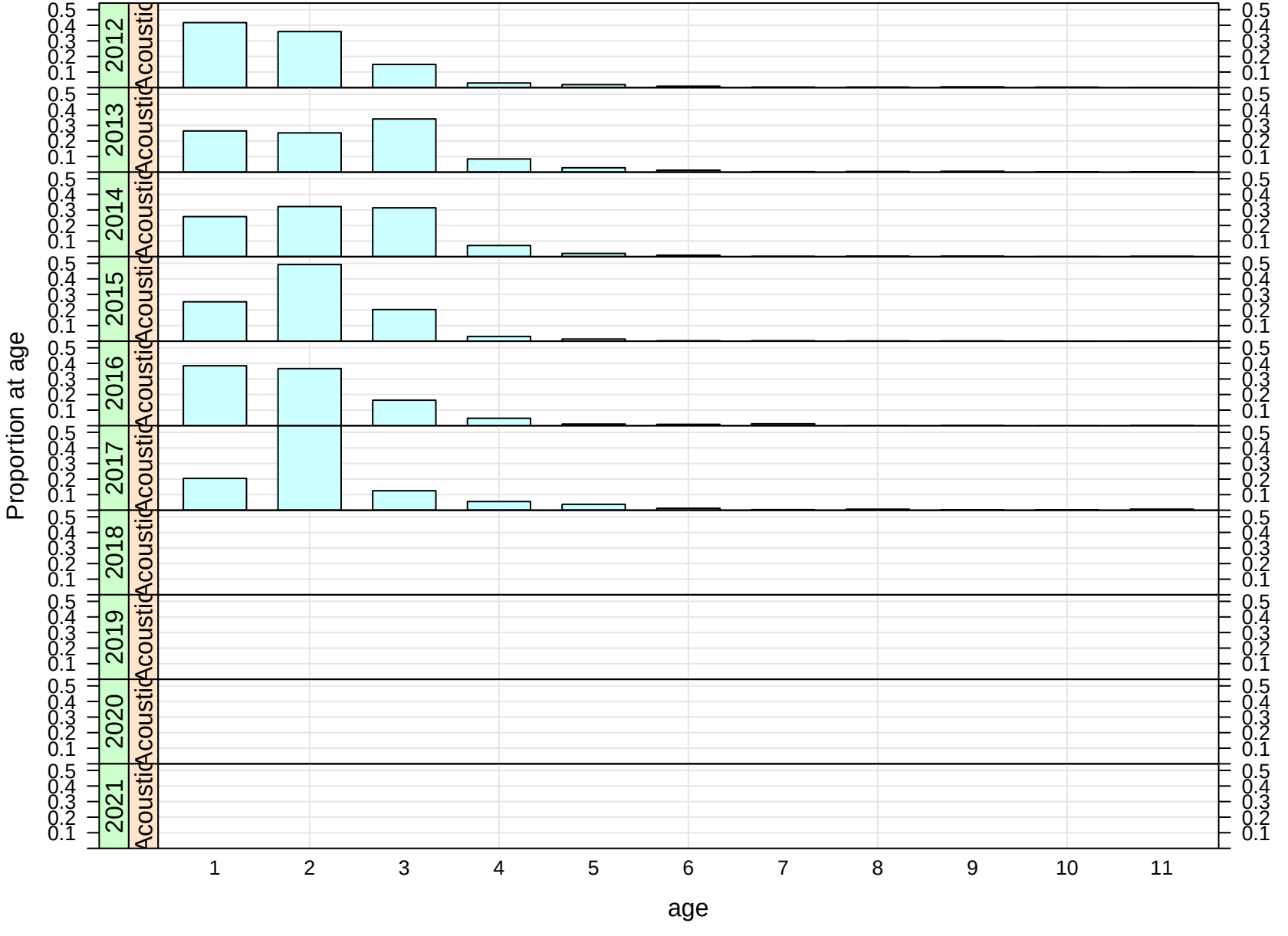

Weight at age by cohort in the survey
Acoustic
2.0
1.5
1.0
0.5
Weight
2
4
6
8
10
12
Age
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019

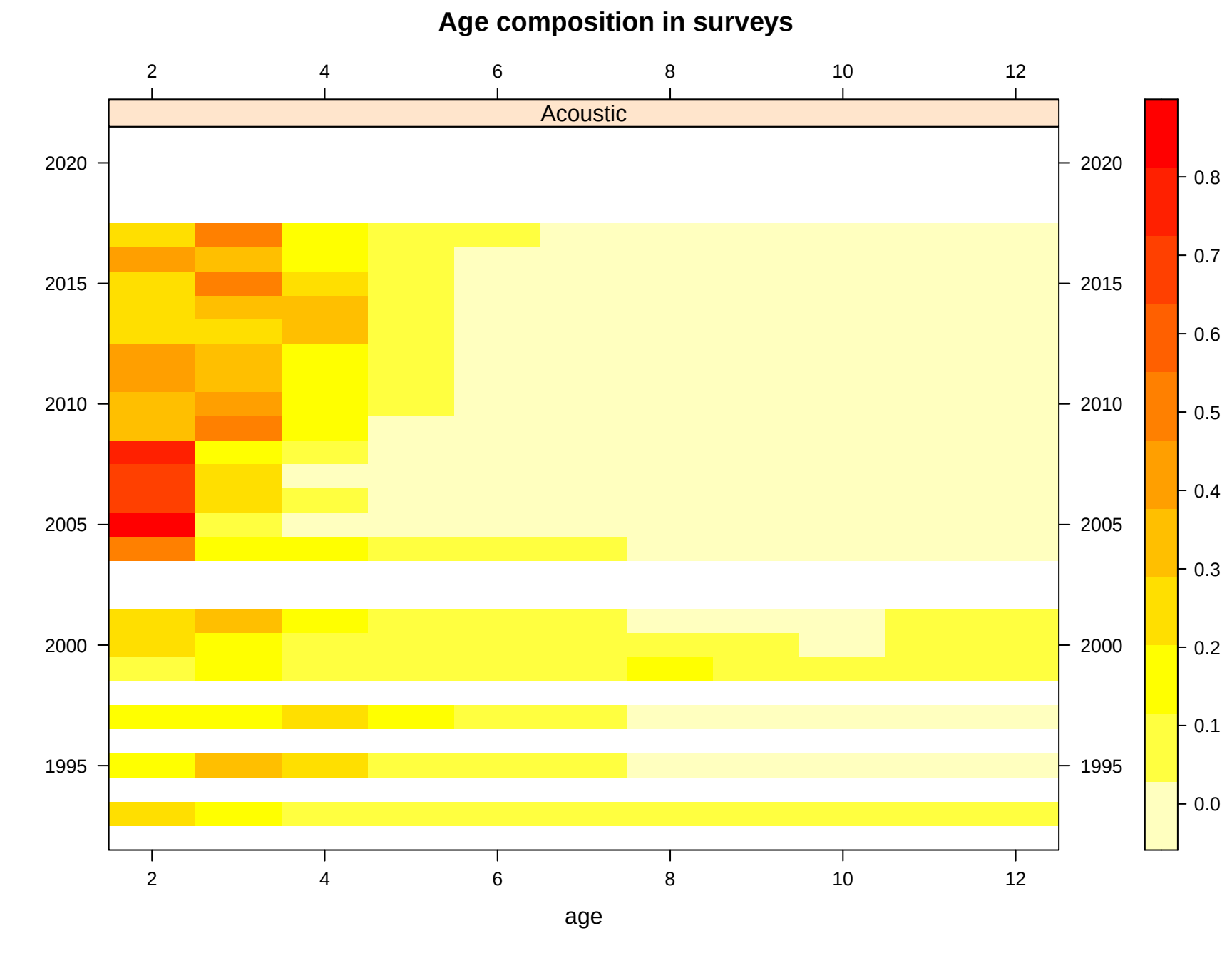

Age composition in fleets
Proportion at age
age
artesana
industria
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
0.1
0.2
0.3
0.4
1
2
3
4
5
6
7
8
9
10
11

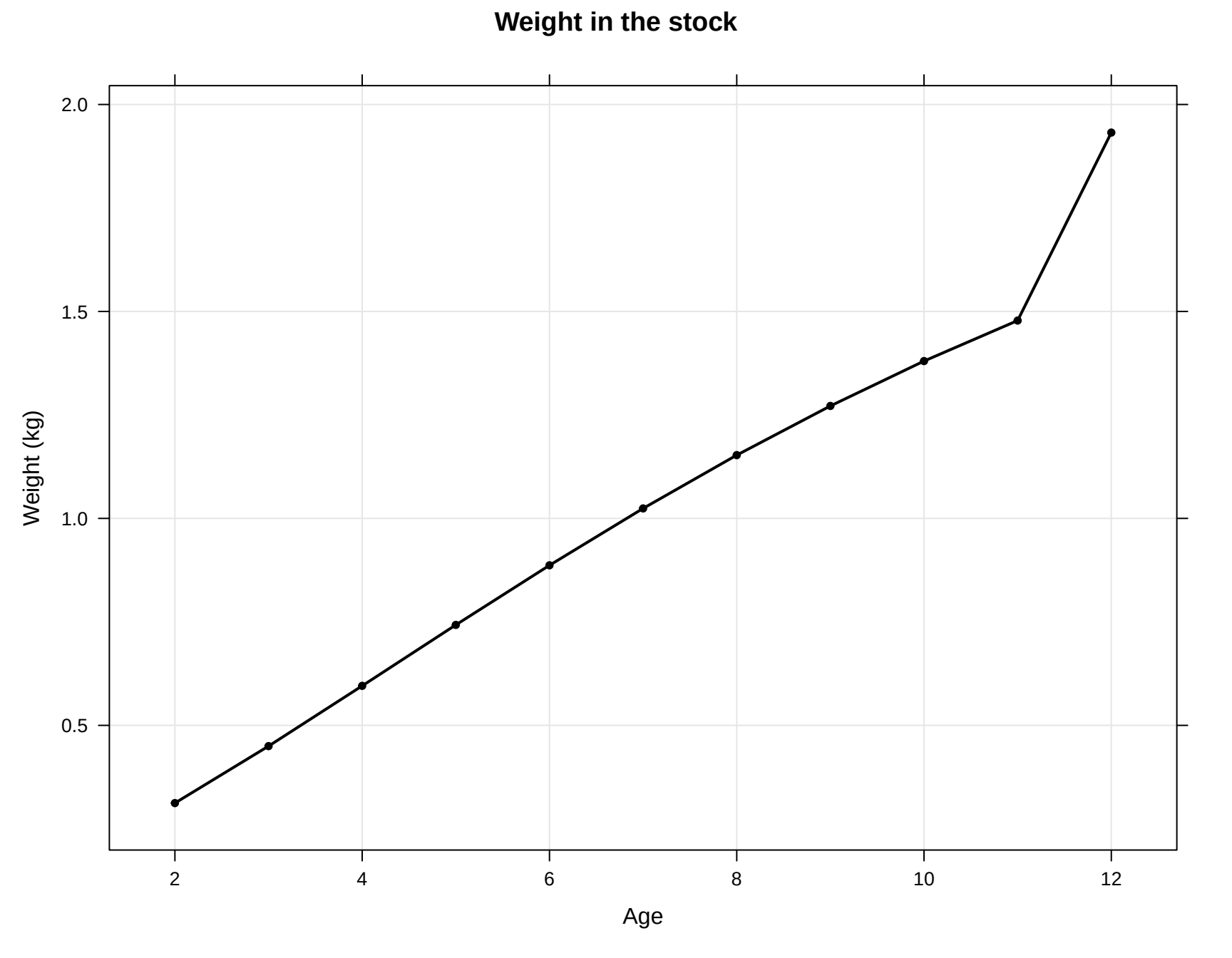

Age composition in fleets
Artesanal
Industrial
2020
2015
2010
2005
2000
1995
2
4
6
8
10
12
age
0.6
0.5
0.4
0.3
0.2
0.1
0.0

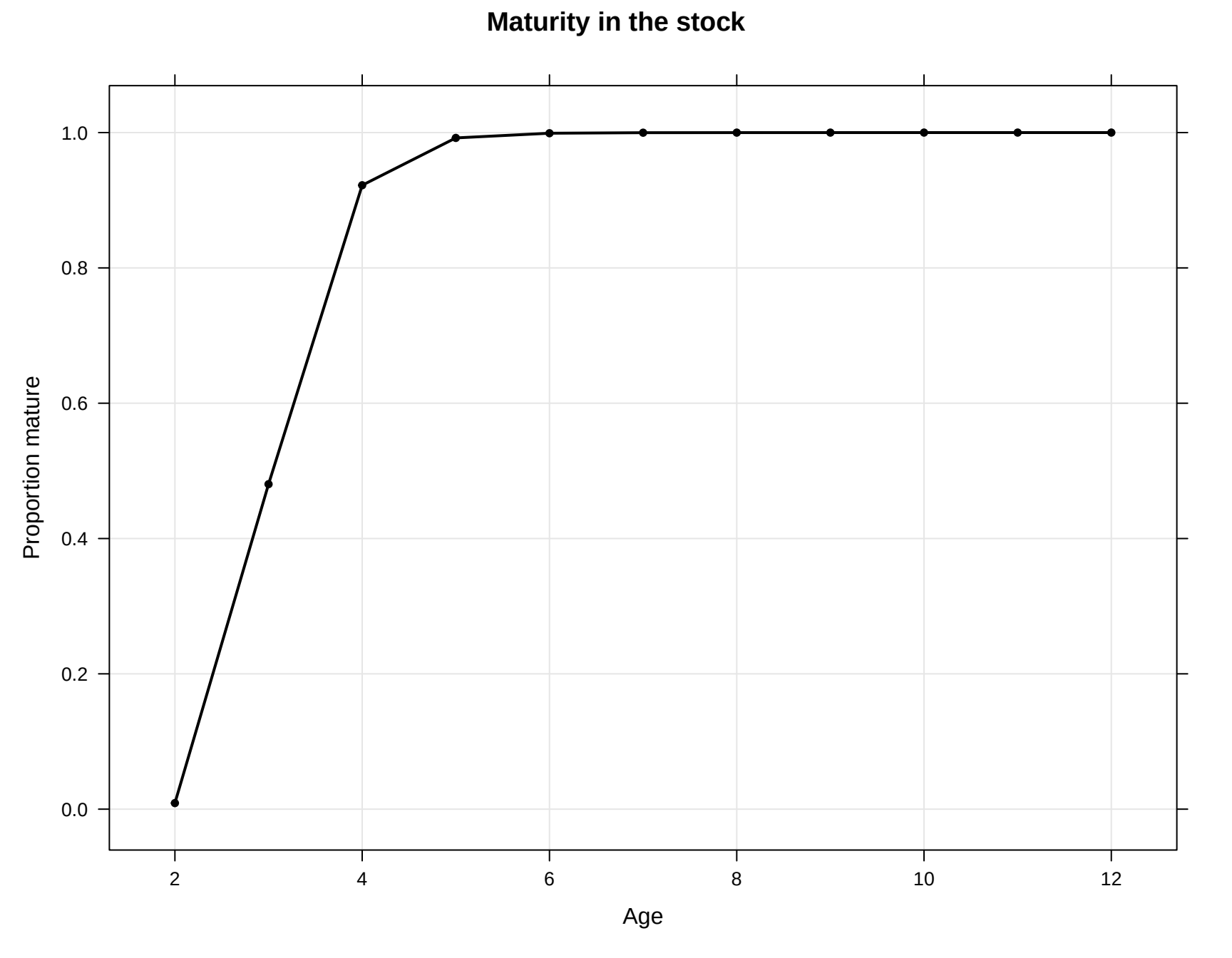

Age composition in fleets Industrial
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
Proportion at age
Age
0.0
0.1
0.2
0.3
0.4
0.5
2
4
6
8
10
12

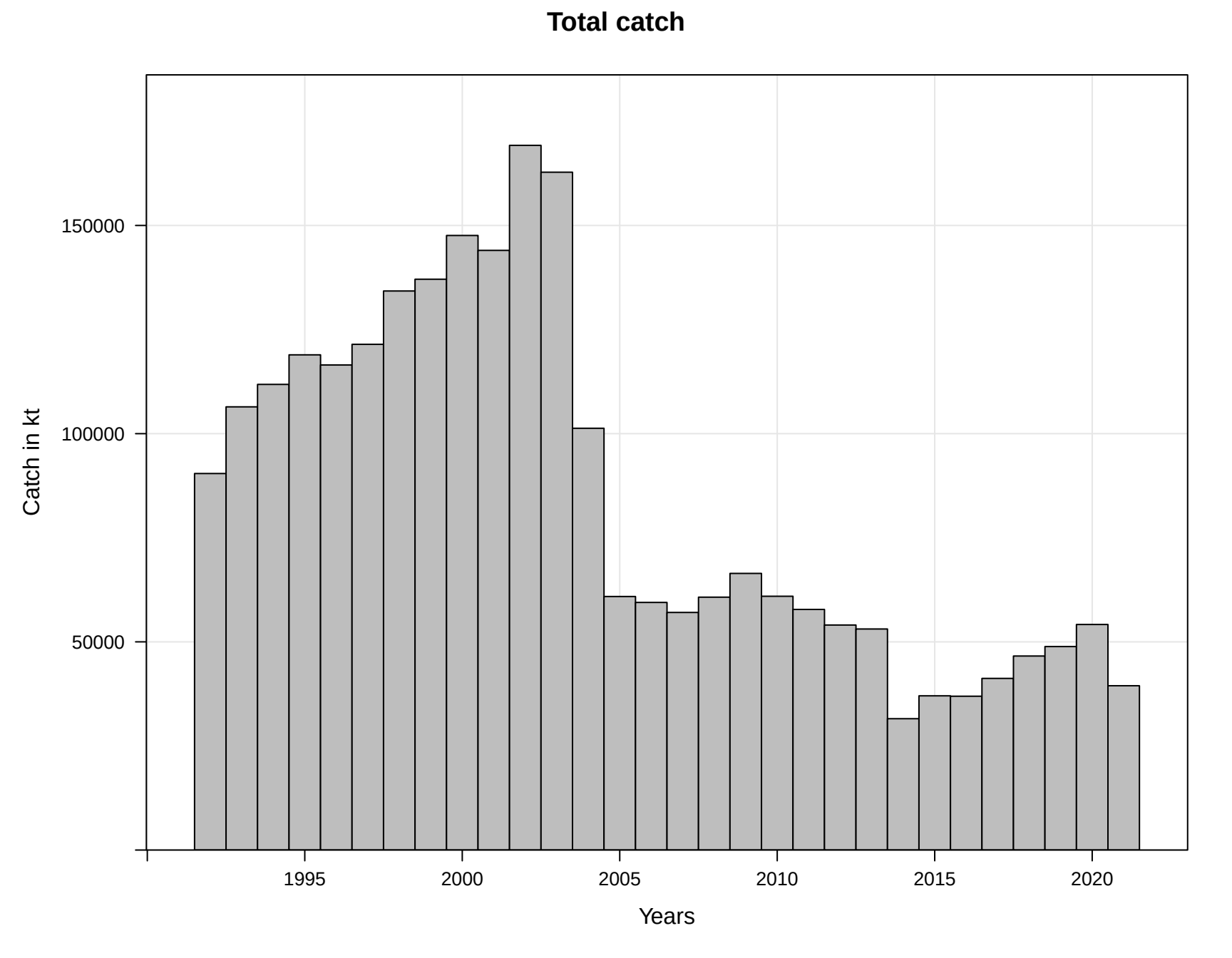

Age composition in fleets Artesanal
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
Proportion at age
Age
0.0
0.1
0.2
0.3
0.4
2
4
6
8
10
12

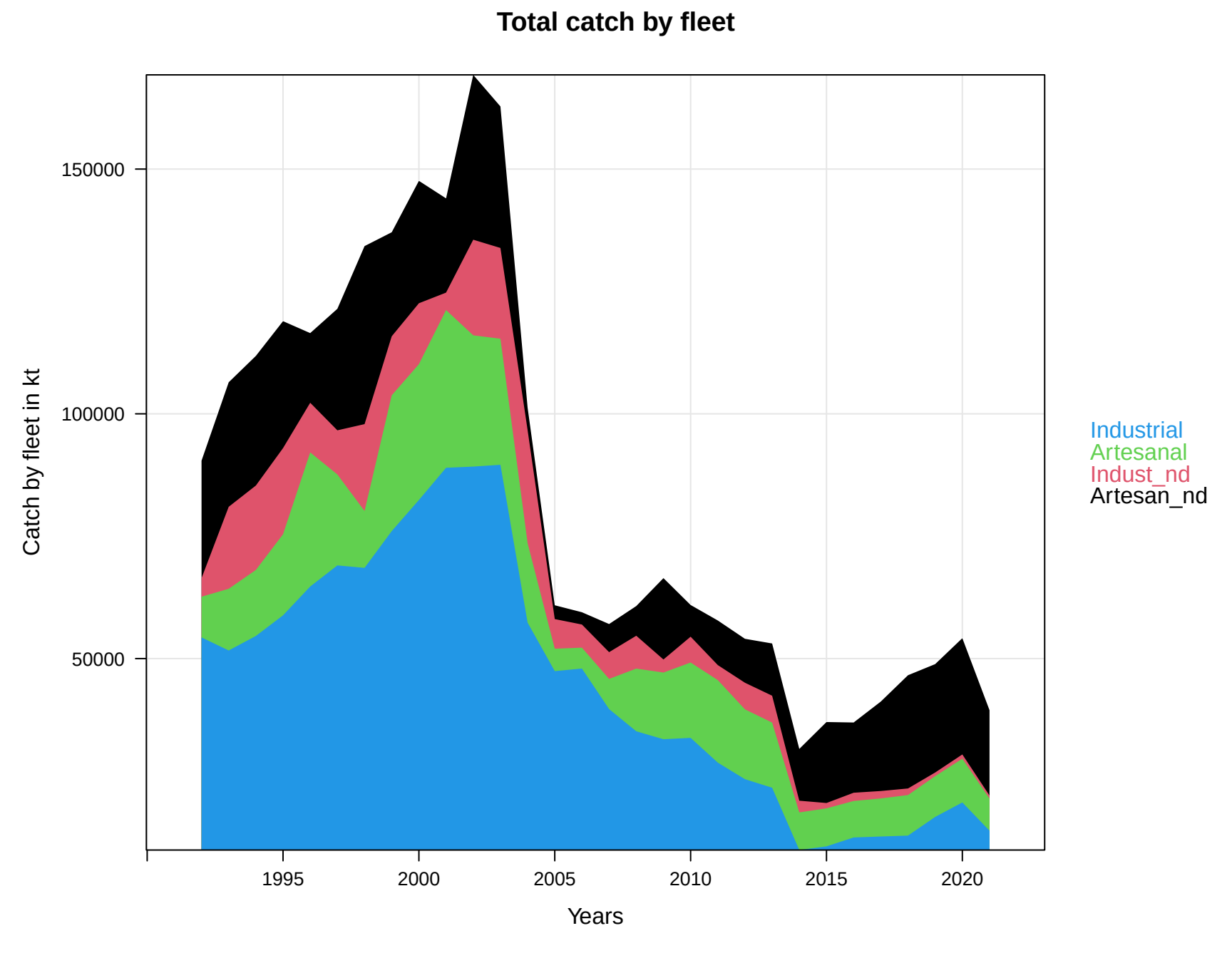

Age composition in surveys
Proportion at age
age
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
Acoustic
0.5
0.4
0.3
0.2
0.1
1
2
3
4
5
6
7
8
9
10
11

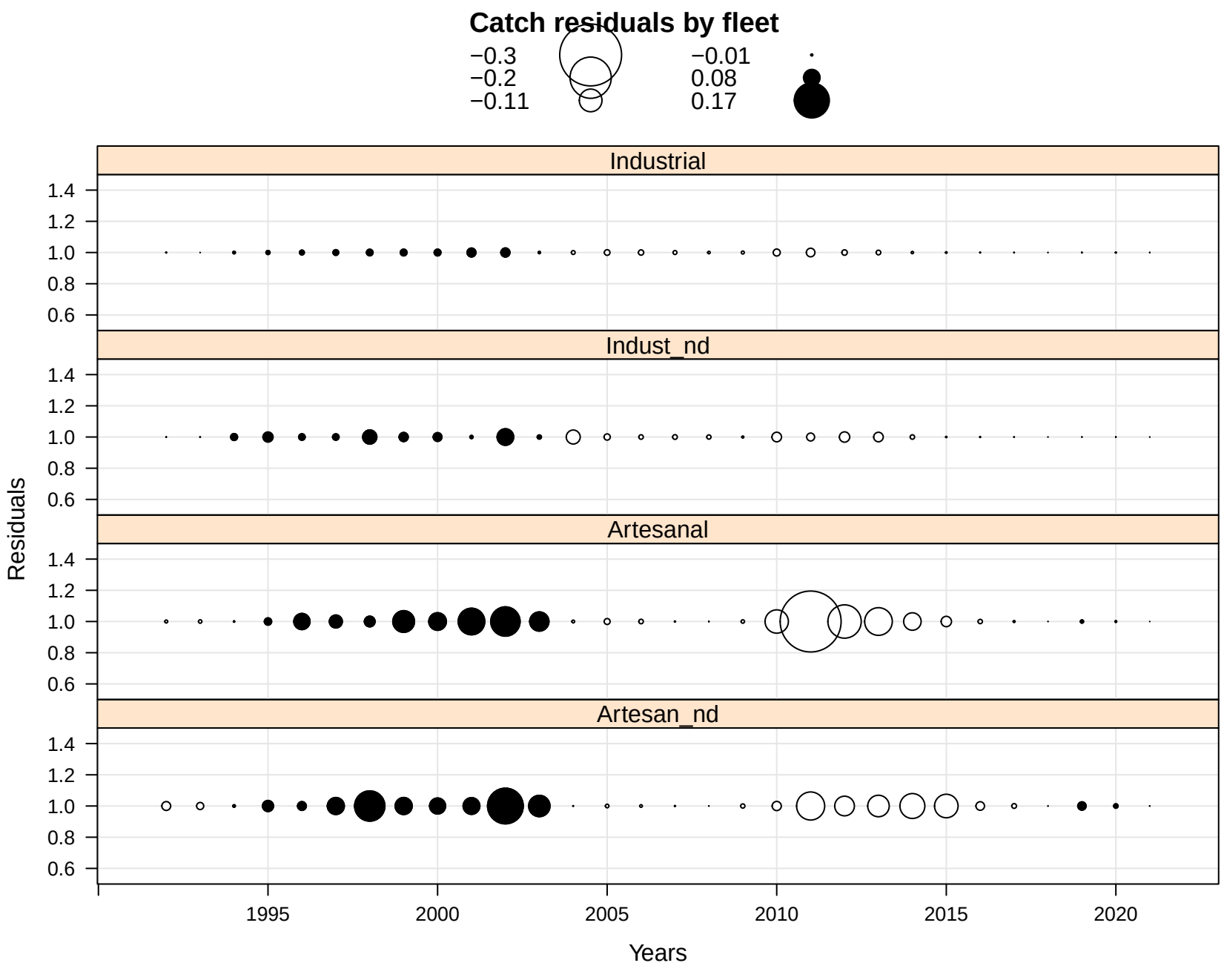

Age composition in surveys
Acoustic
2020
2015
2010
2005
2000
1995
2
4
6
8
10
12
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
age

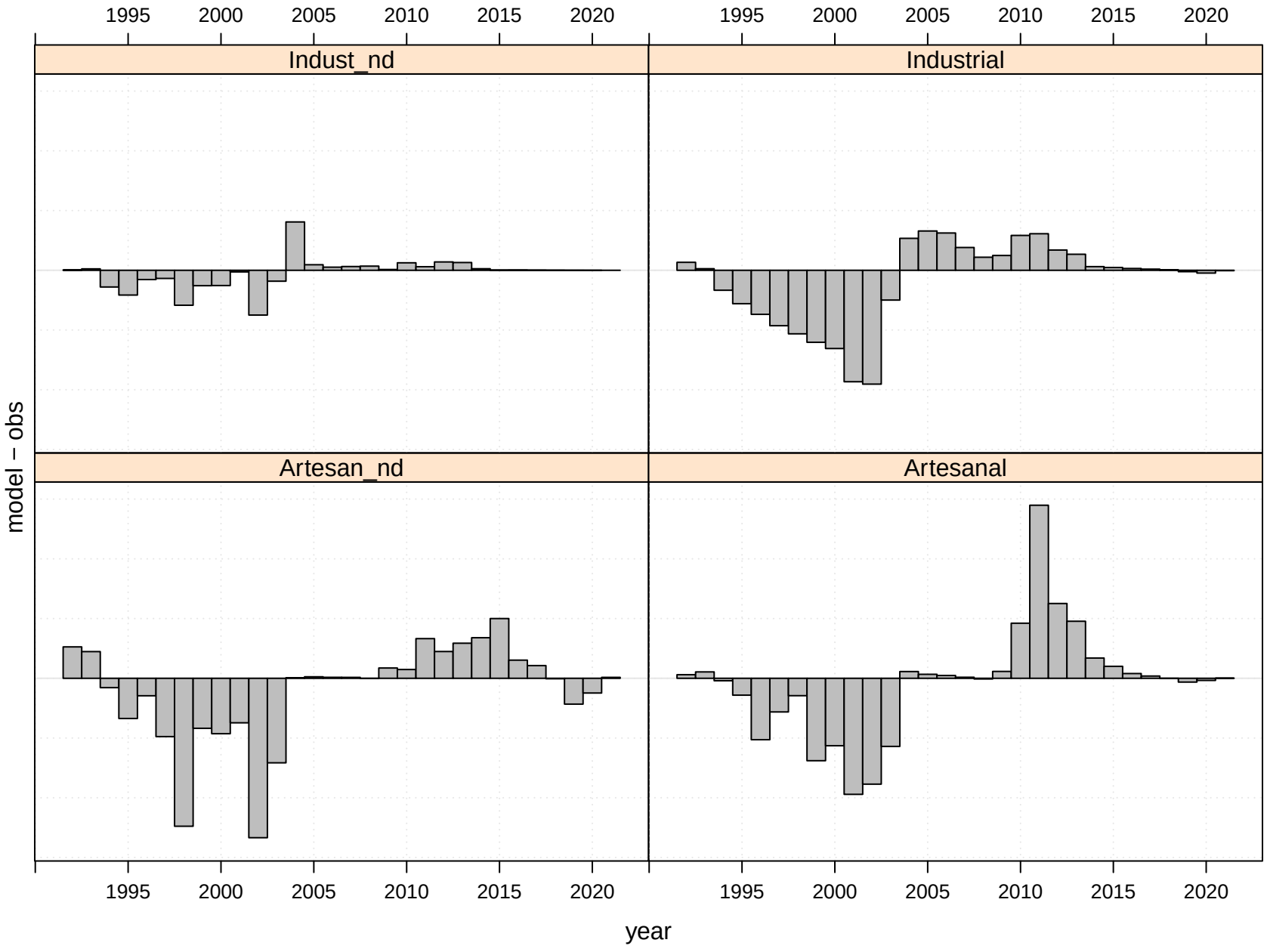

Weight in the stock
2.0
1.5
1.0
0.5
Weight (kg)
2
4
6
8
10
12
Age

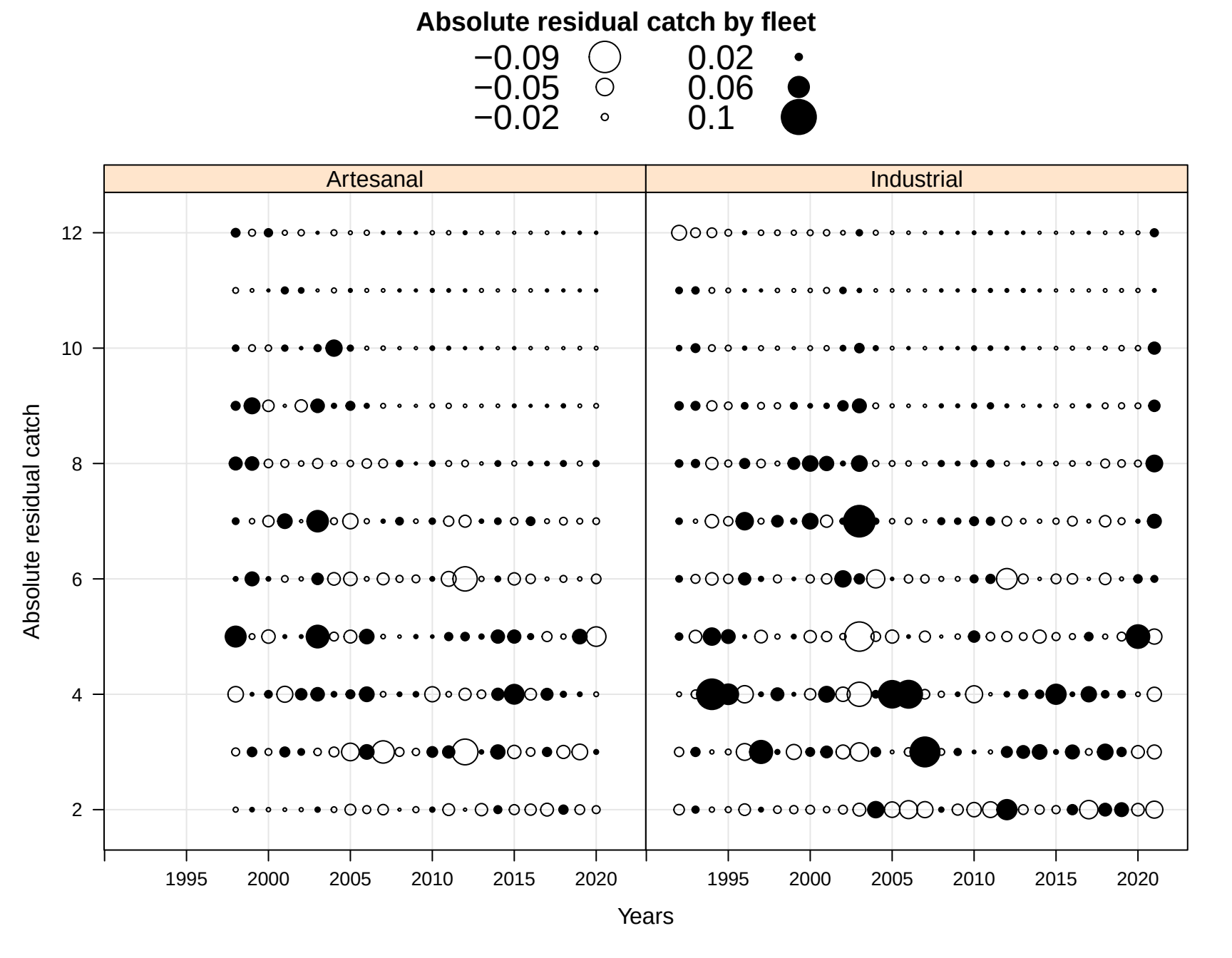

Maturity in the stock
Proportion mature
1.0
0.8
0.6
0.4
0.2
0.0
2
4
6
8
10
12
Age

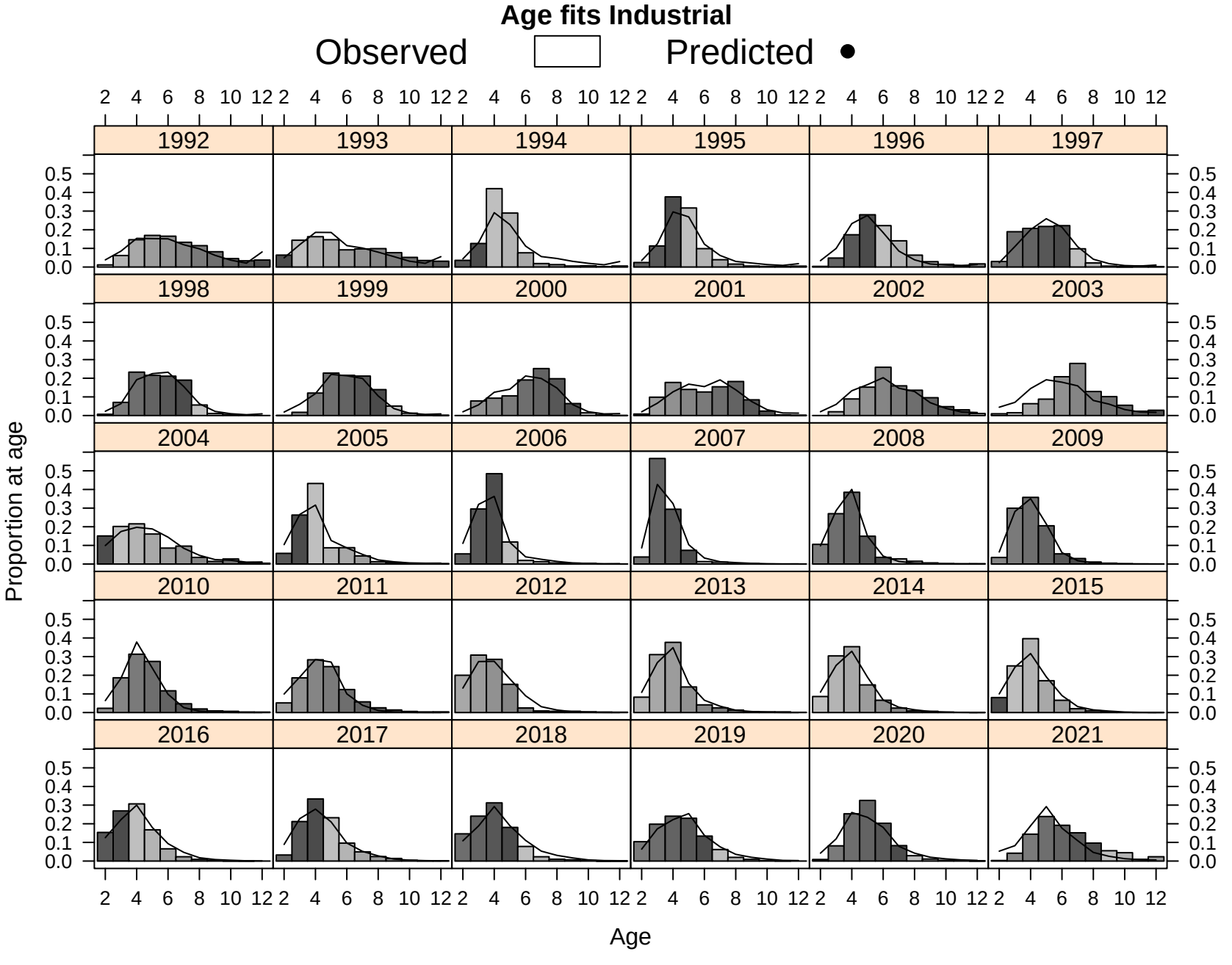

Total catch
150000
100000
50000
Catch in kt
1995
2000
2005
2010
2015
2020
Years

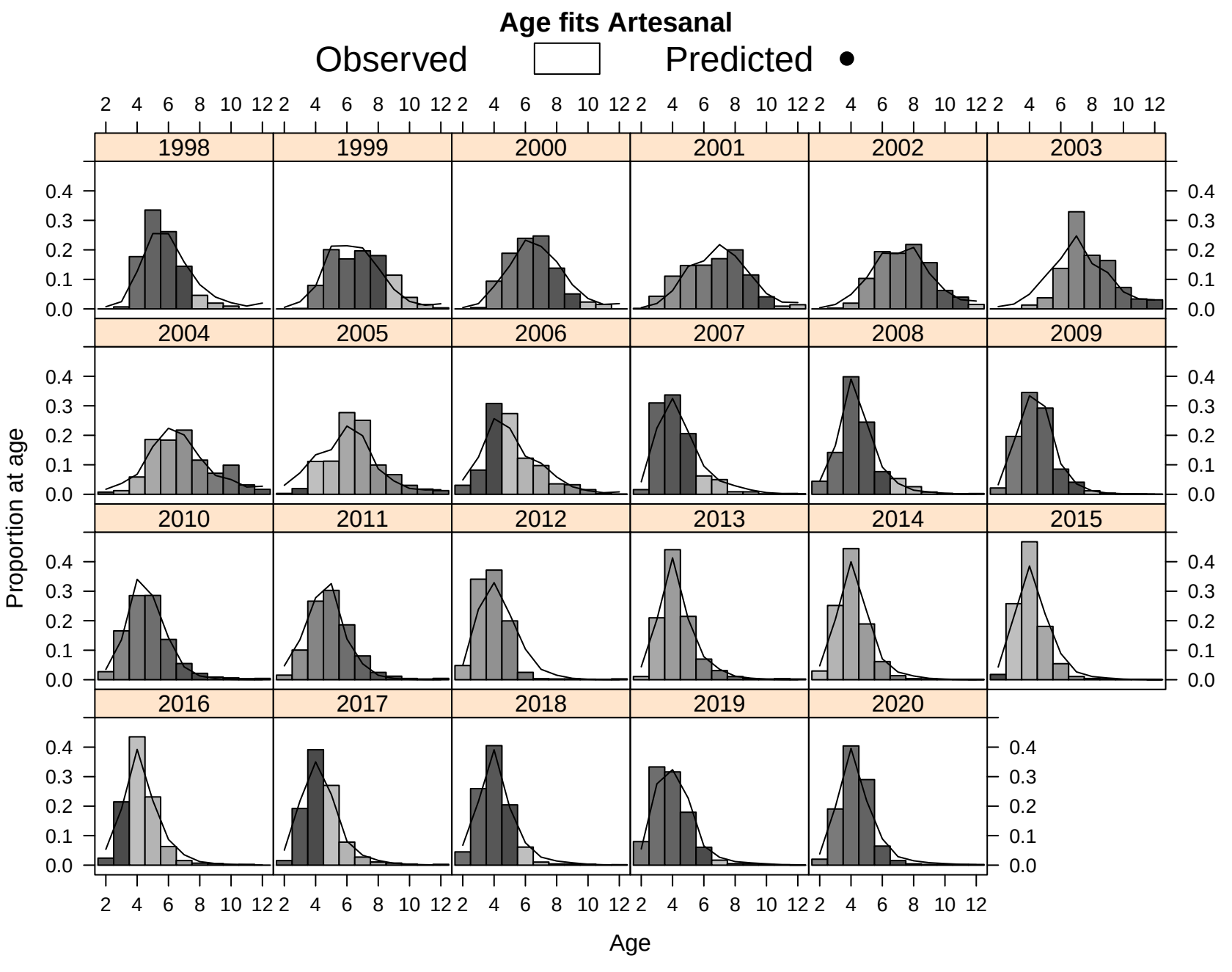

Total catch by fleet
Catch by fleet in kt
150000
100000
50000
1995
2000
2005
2010
2015
2020
Years
Industrial
Artesanal
Indust_nd
Artesan_nd

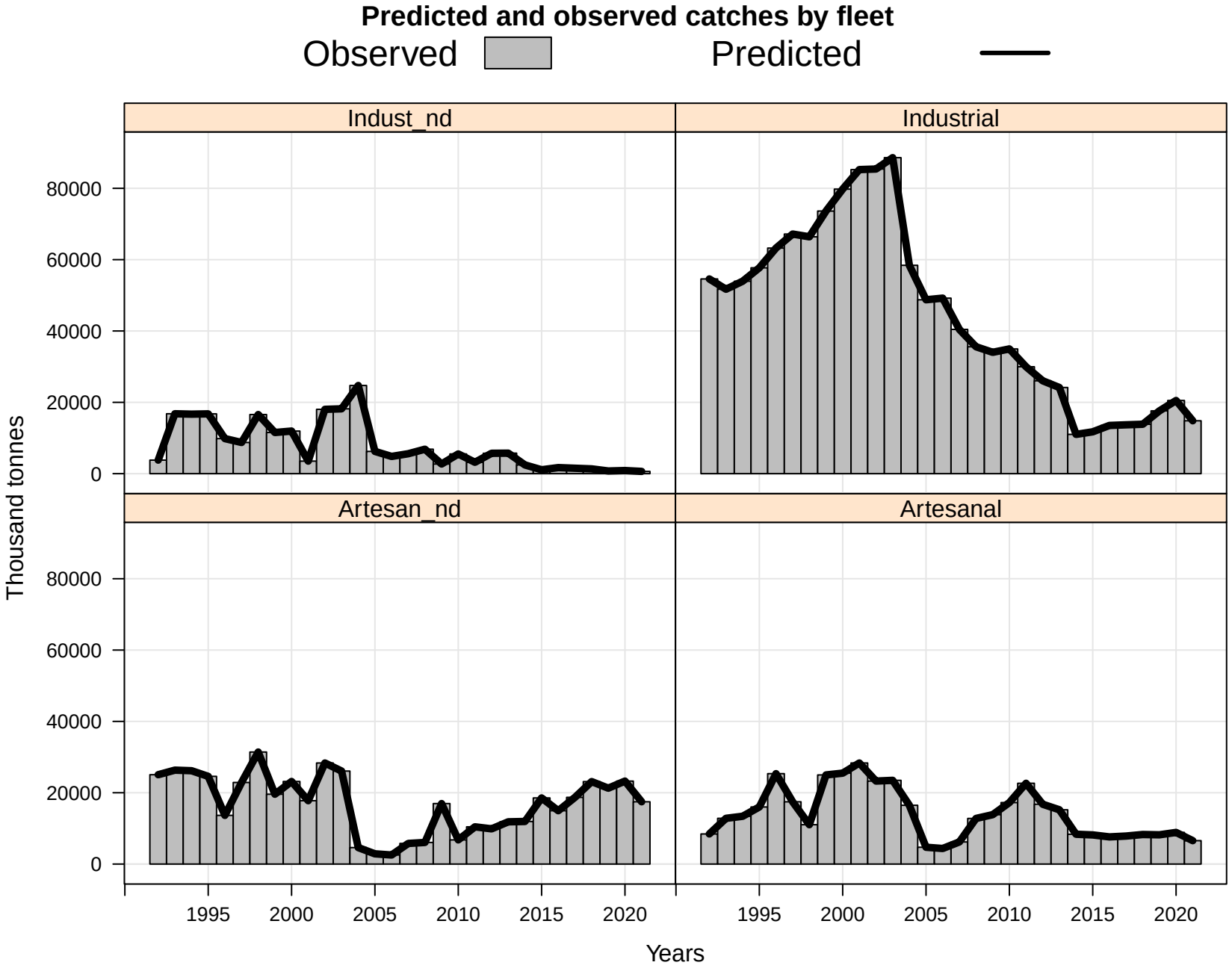

Catch residuals by fleet
−0.3
−0.2
−0.11
−0.01
0.08
0.17
Industrial
Indust_nd
Artesanal
Artesan_nd
Residuals
1.4
1.2
1.0
0.8
0.6
1995
2000
2005
2010
2015
2020
Years

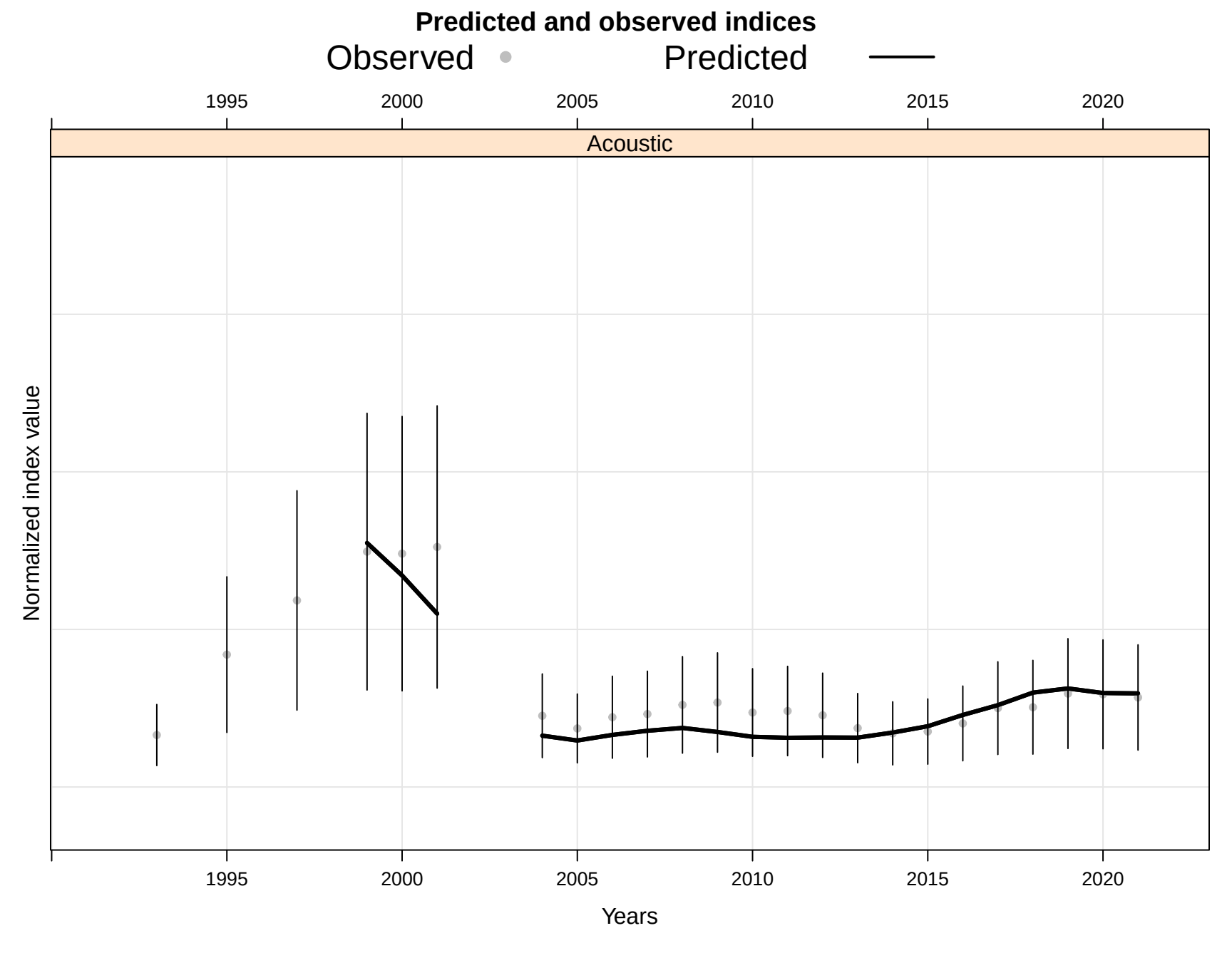

Indust_nd
Industrial
Artesan_nd
Artesanal
1995
2000
2005
2010
2015
2020
model – obs
year

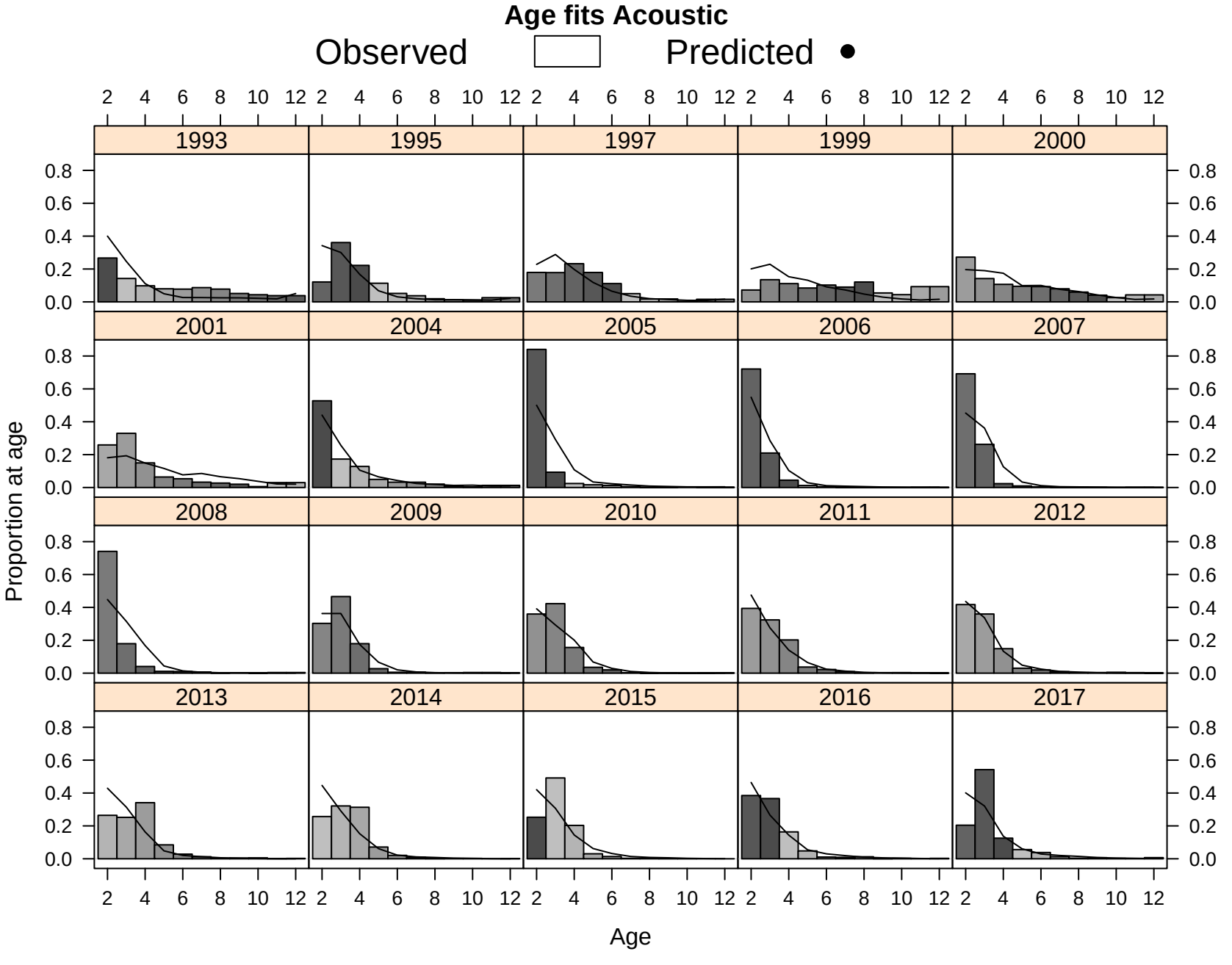

Absolute residual catch by fleet
−0.09
−0.05
−0.02
0.02
0.06
0.1
Artesanal
Industrial
Absolute residual catch
12
10
8
6
4
2
1995
2000
2005
2010
2015
2020
Years

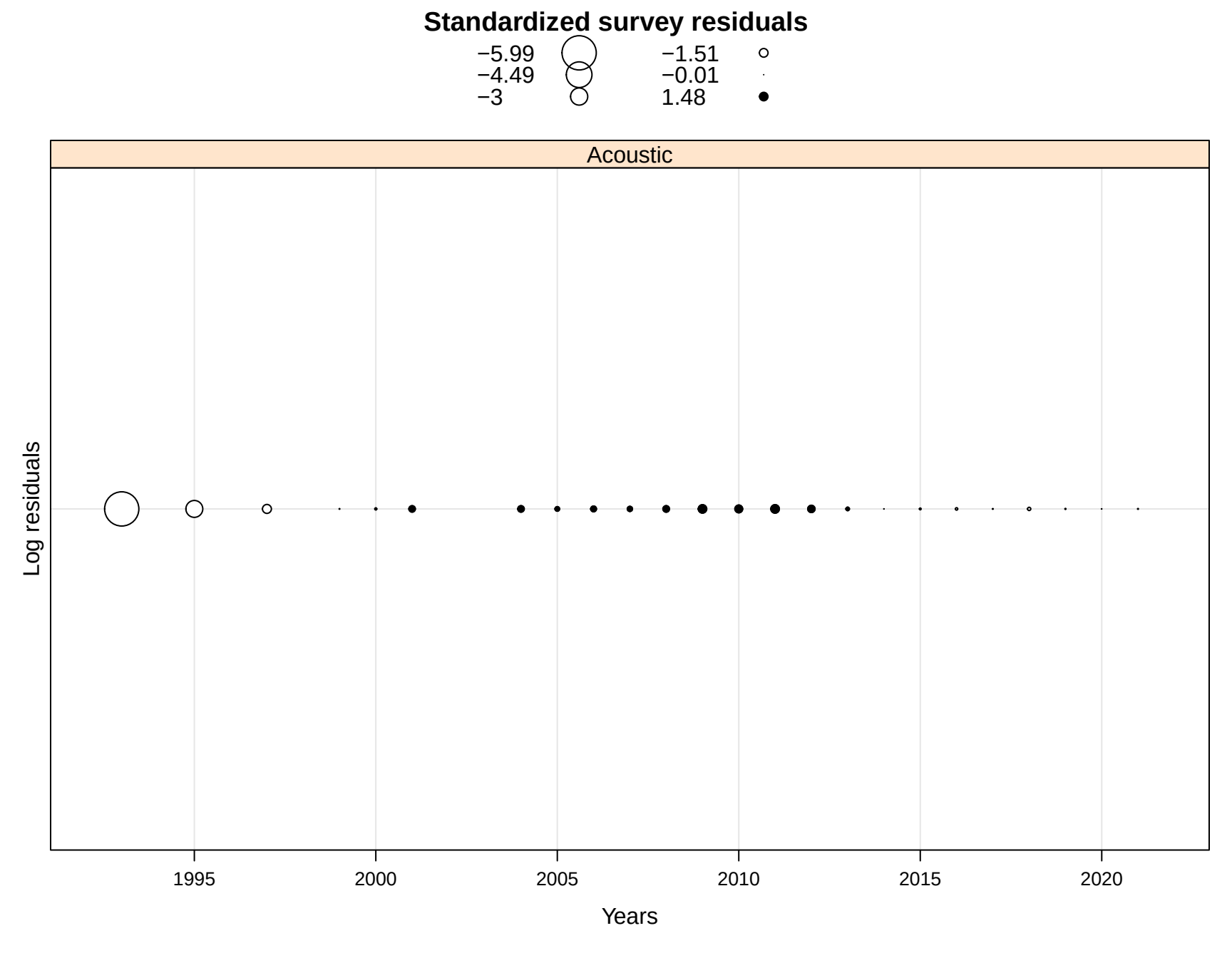

Age fits Industrial
Observed
Predicted
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
Proportion at age
Age

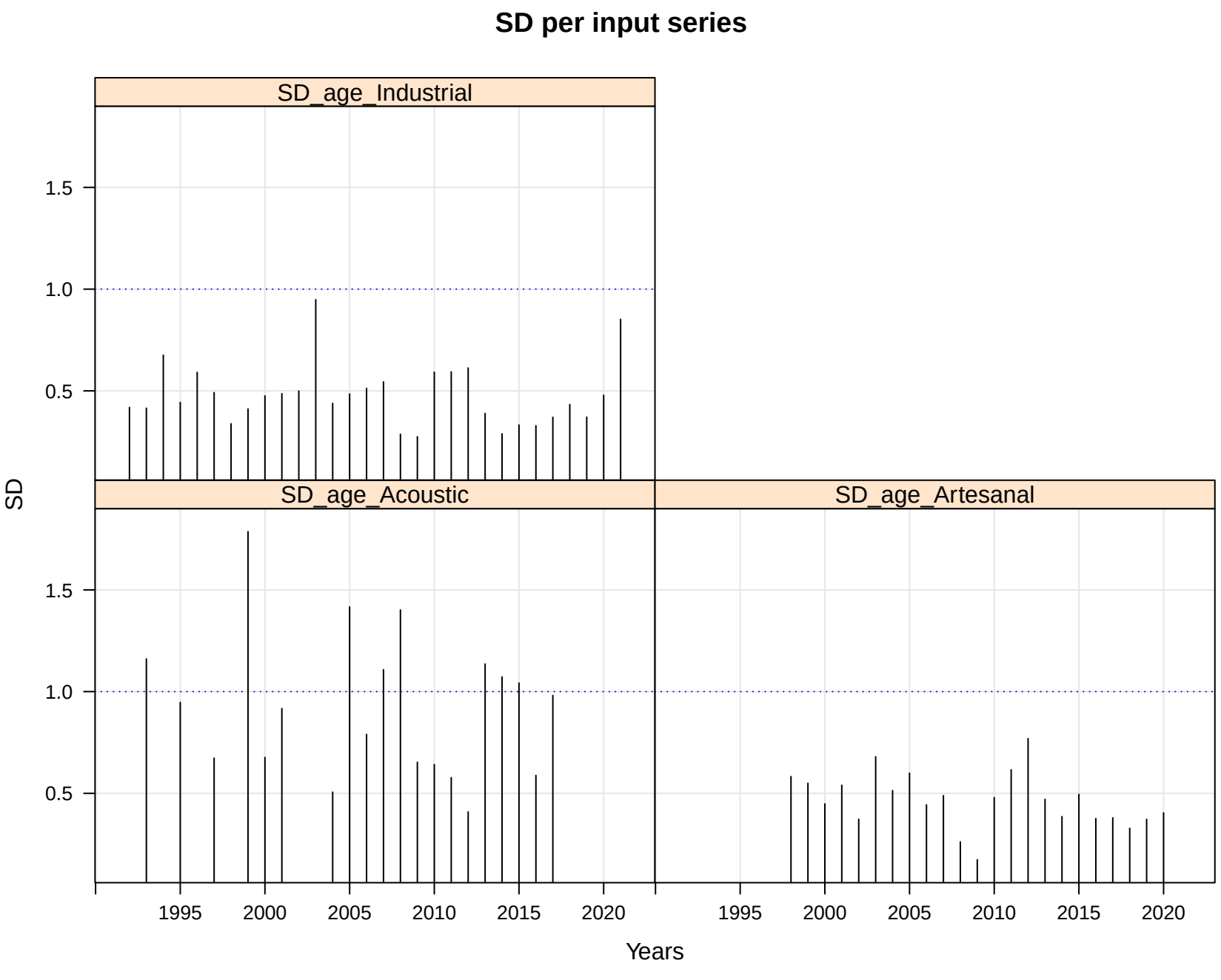

Age fits Artesanal
Observed
Predicted
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
Proportion at age
Age

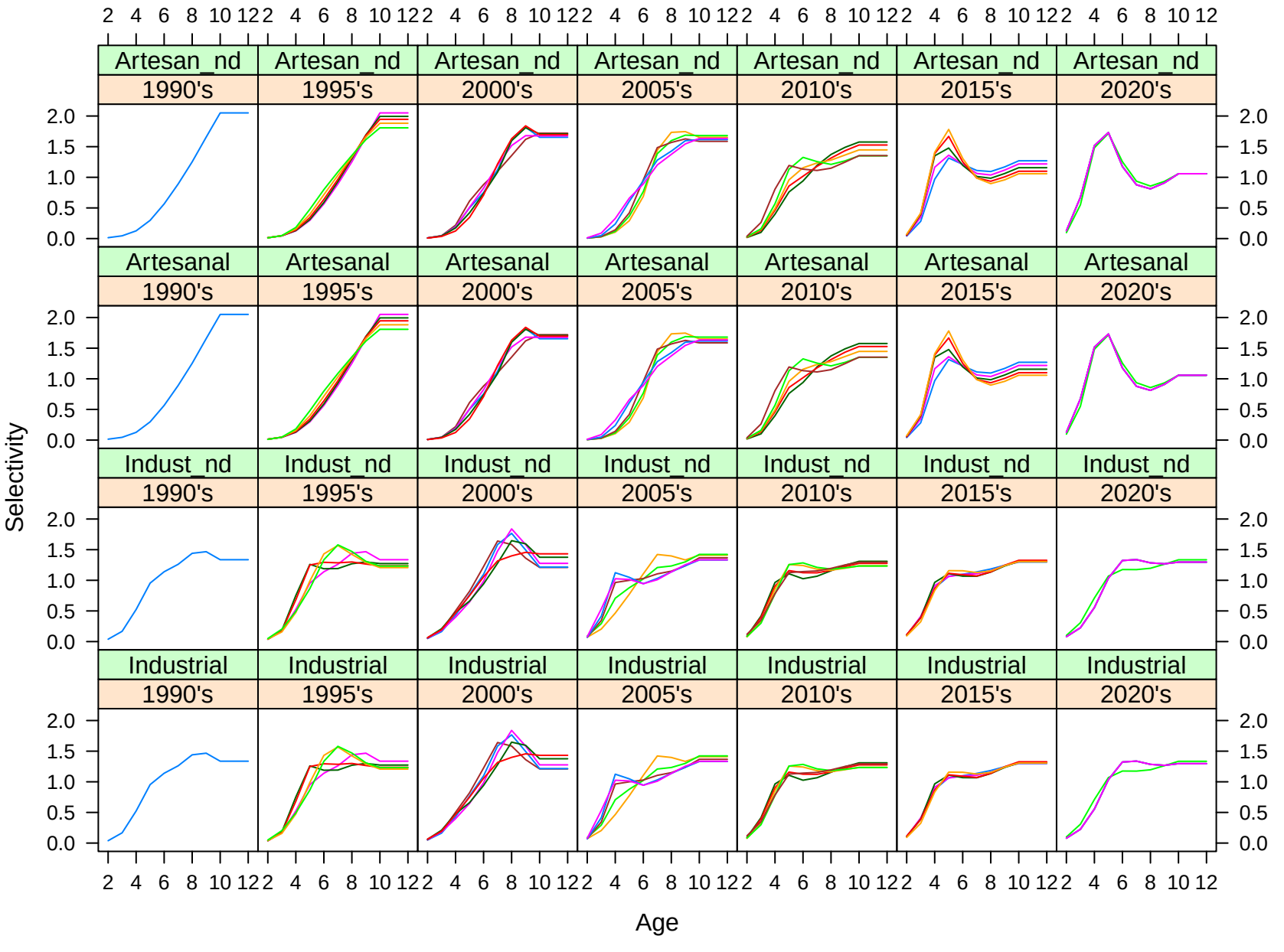

Predicted and observed catches by fleet
Observed
Predicted
Indust_nd
Industrial
Artesan_nd
Artesanal
Thousand tonnes
0
20000
40000
60000
80000
1995
2000
2005
2010
2015
2020
Years

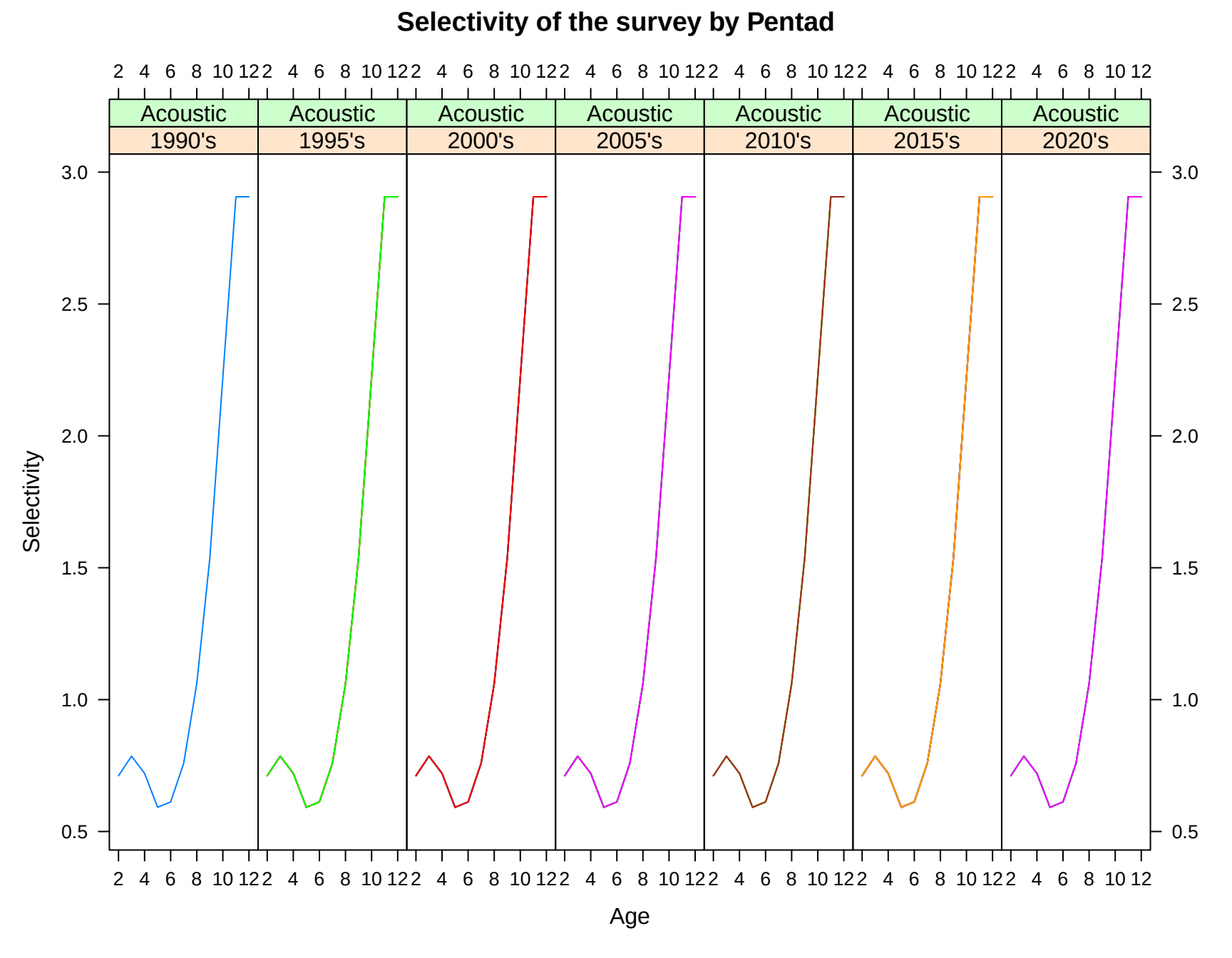

Predicted and observed indices
Observed
Predicted
1995
2000
2005
2010
2015
2020
Acoustic
Normalized index value
Years

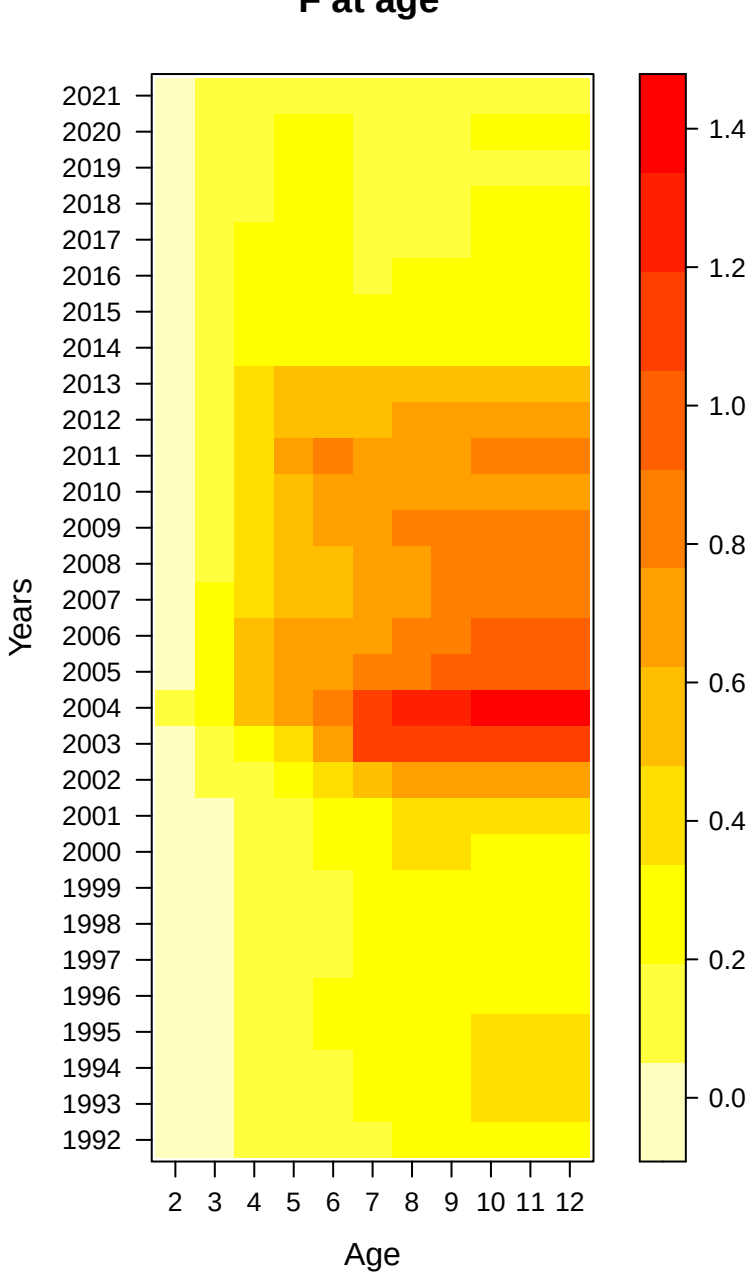

Age fits Acoustic
Observed
Predicted
1993
1995
1997
1999
2000
2001
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
Proportion at age
Age

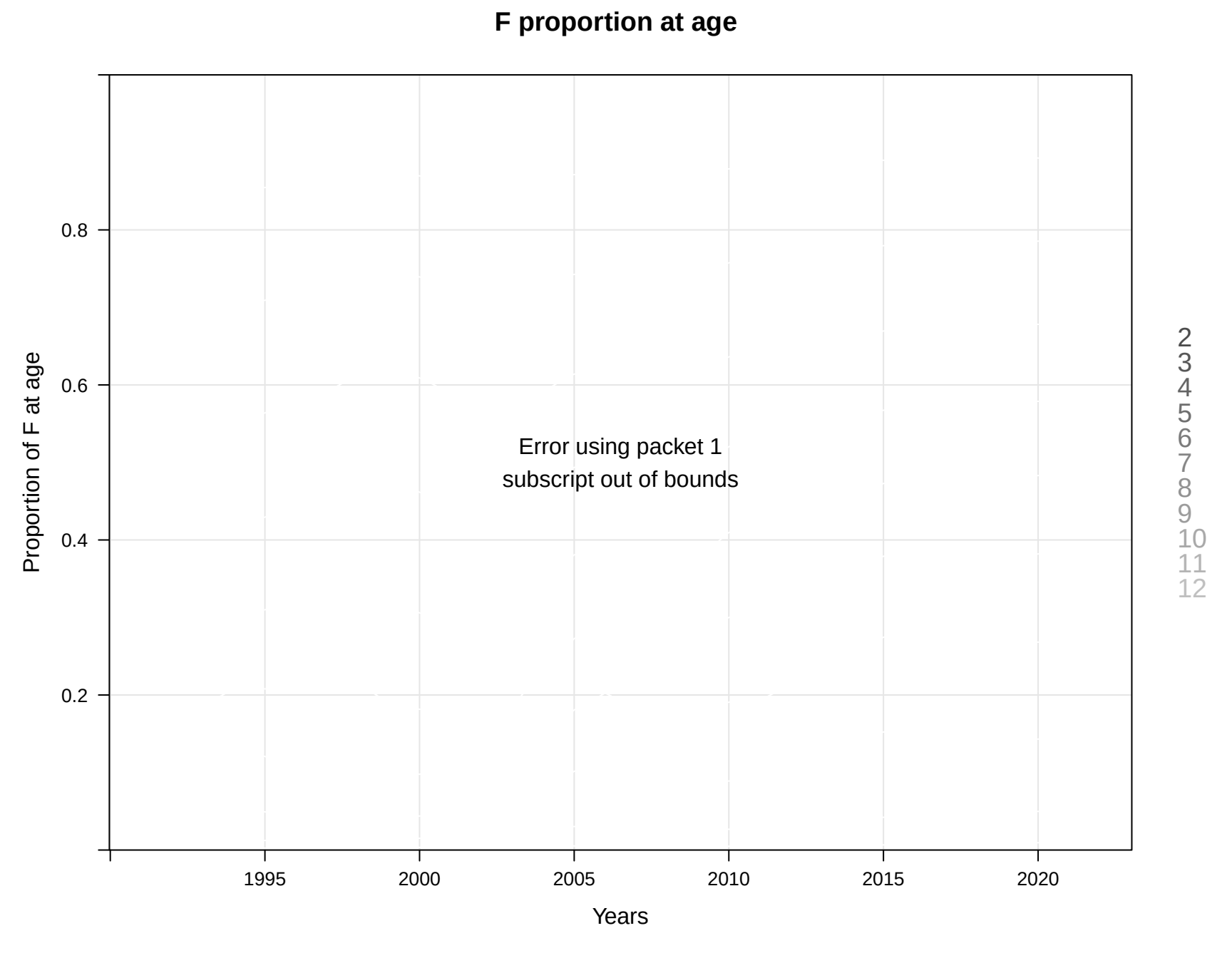

Standardized survey residuals
−5.99
−4.49
−3
−1.51
−0.01
1.48
Acoustic
Log residuals
1995
2000
2005
2010
2015
2020
Years

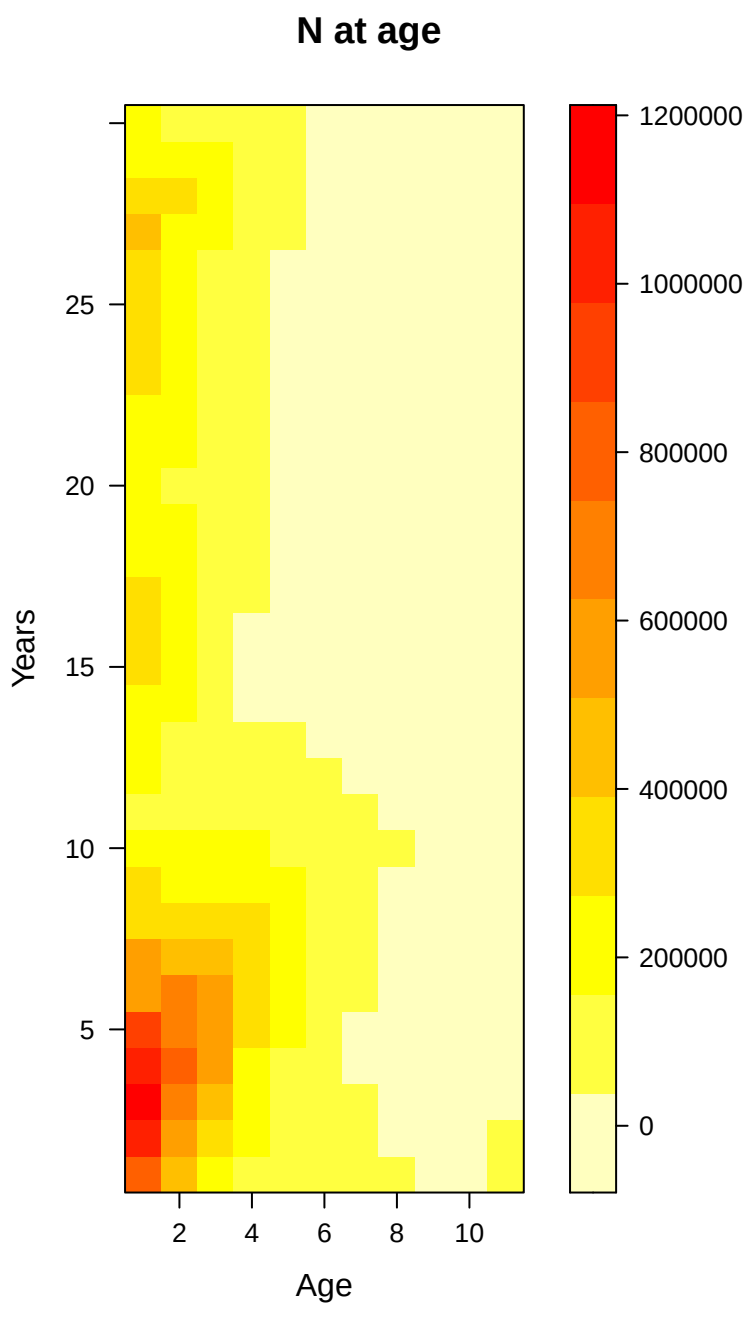

SD per input series
SD_age_Industrial
SD_age_Acoustic
SD_age_Artesanal
SD
Years
1.5
1.0
0.5
1995
2000
2005
2010
2015
2020

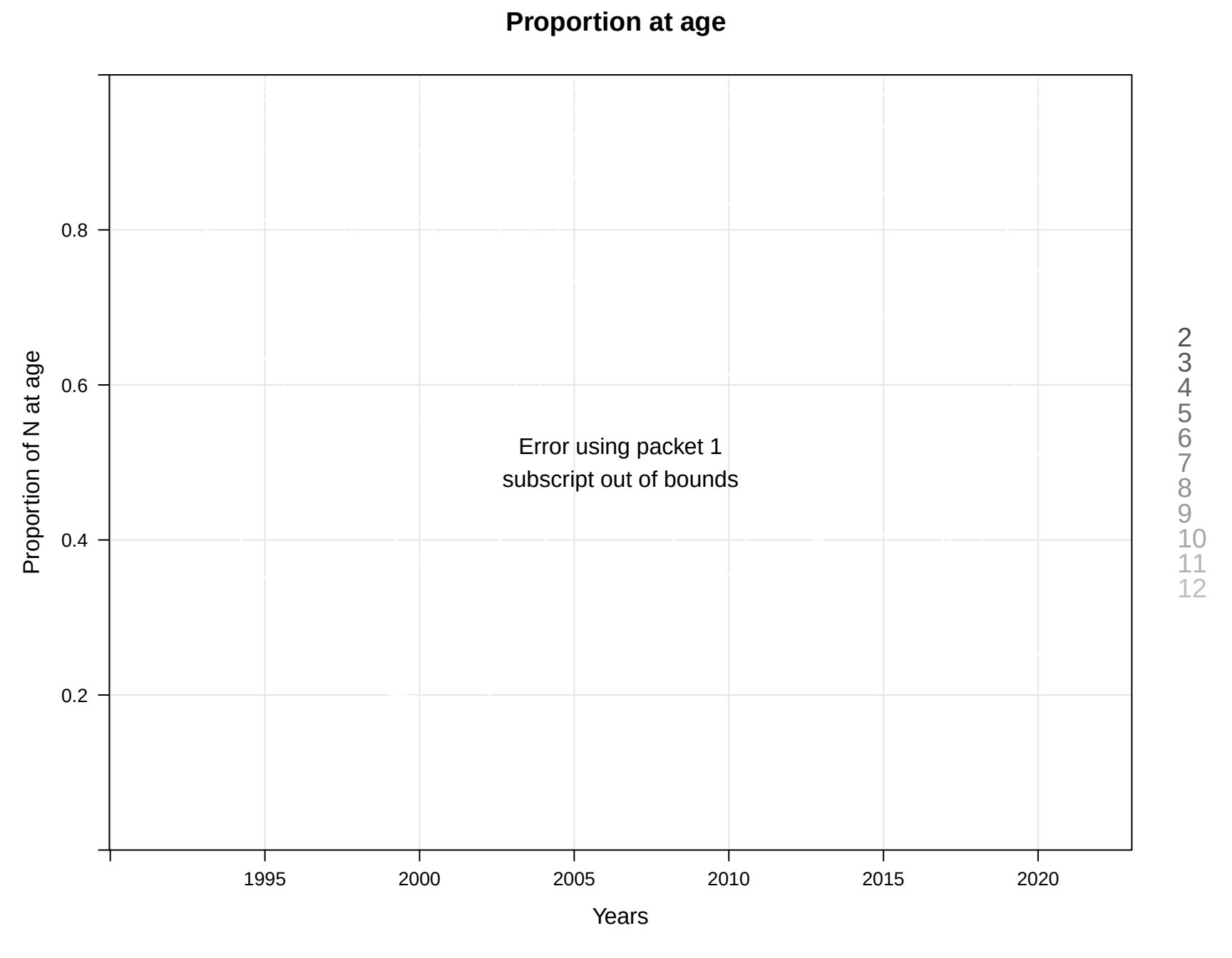

Selectivity of the Fishery by Pentad
Artesan_nd
Artesanal
Indust_nd
Industrial
1990's
1995's
2000's
2005's
2010's
2015's
2020's
Selectivity
Age

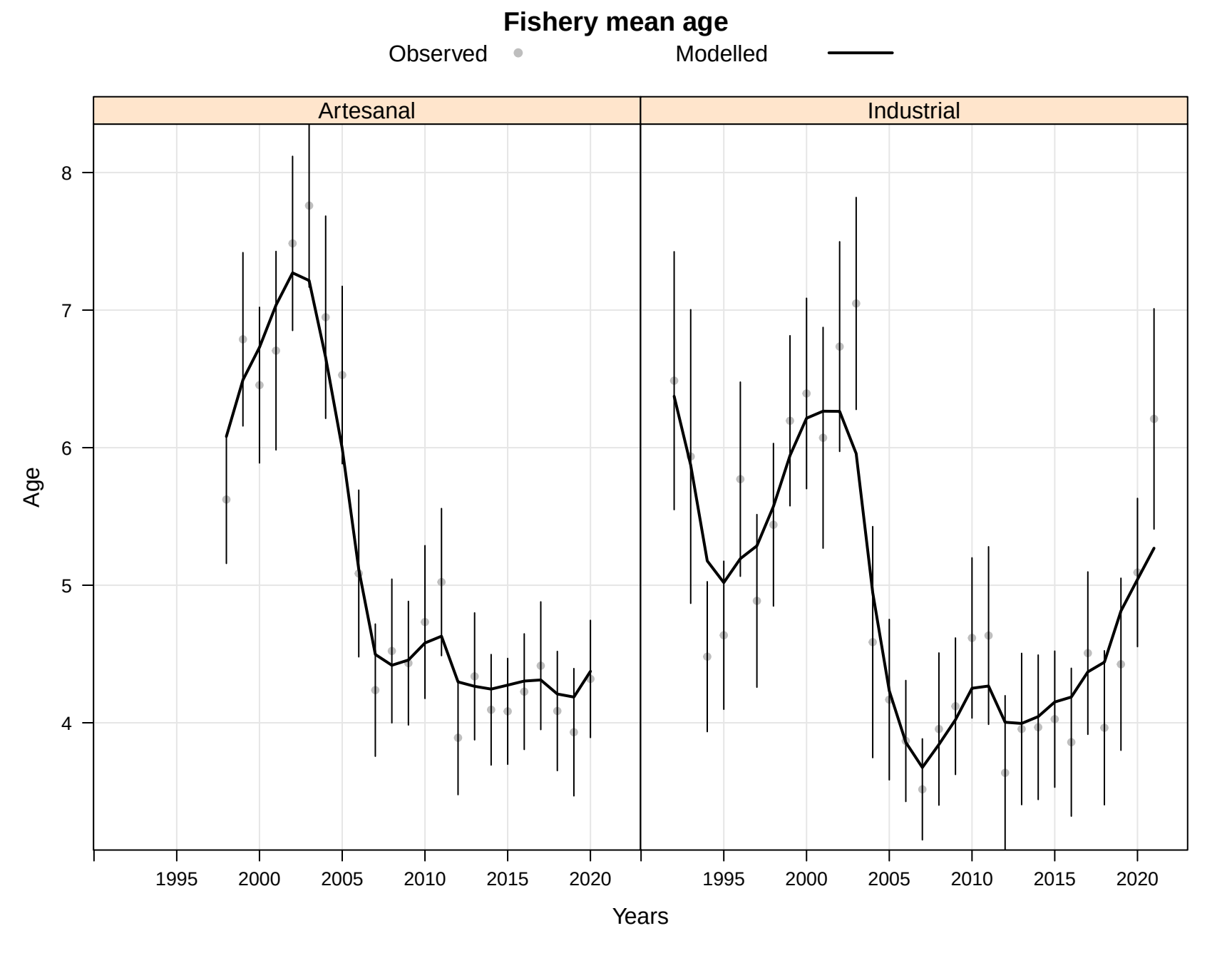

Selectivity of the survey by Pentad
Acoustic
1990's
1995's
2000's
2005's
2010's
2015's
2020's
Selectivity
Age
0.5
1.0
1.5
2.0
2.5
3.0
2 4 6 8 10 12

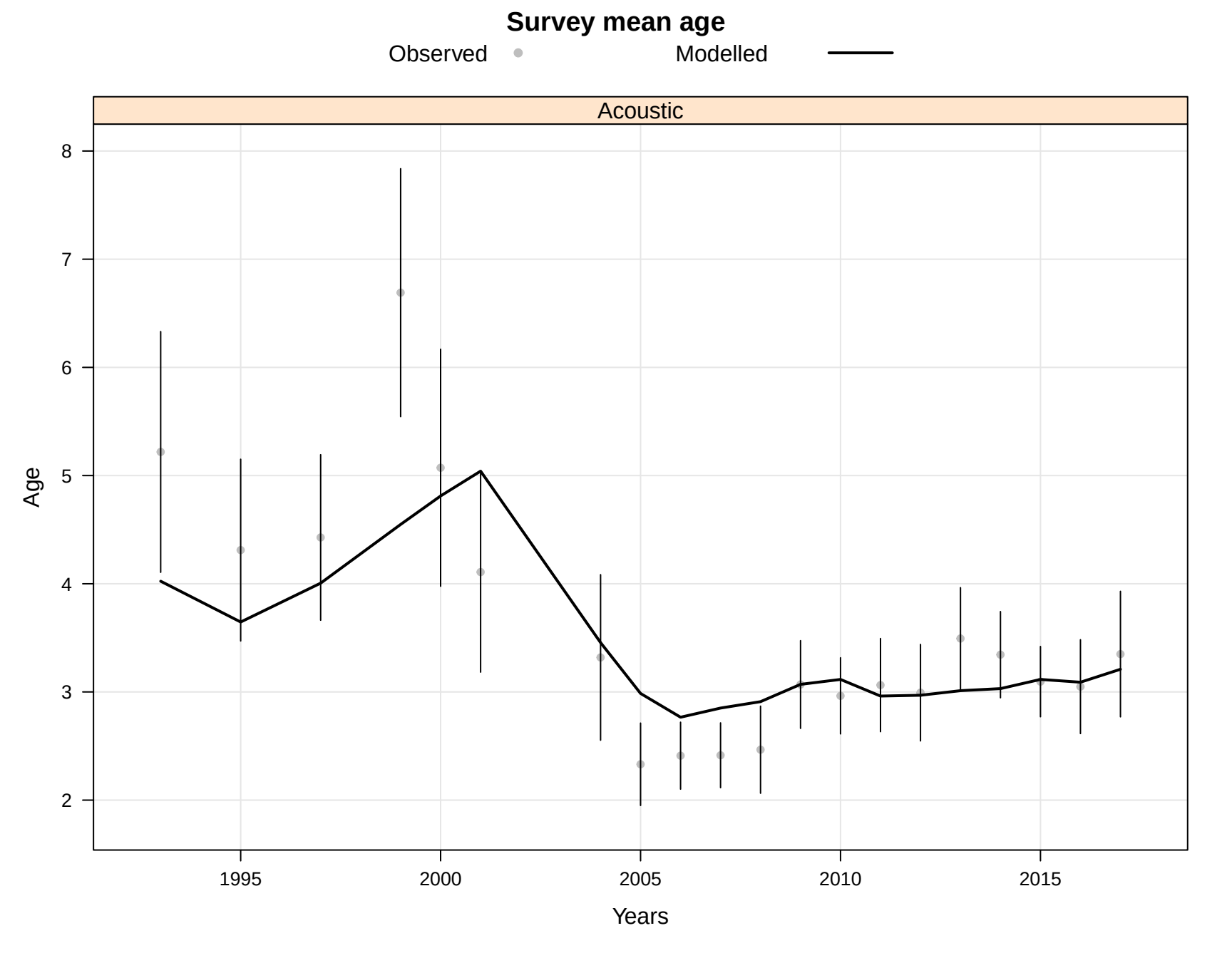

F at age
Years
2021
2020
2019
2018
2017
2016
2015
2014
2013
2012
2011
2010
2009
2008
2007
2006
2005
2004
2003
2002
2001
2000
1999
1998
1997
1996
1995
1994
1993
1992
2 3 4 5 6 7 8 9 10 11 12
Age
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0

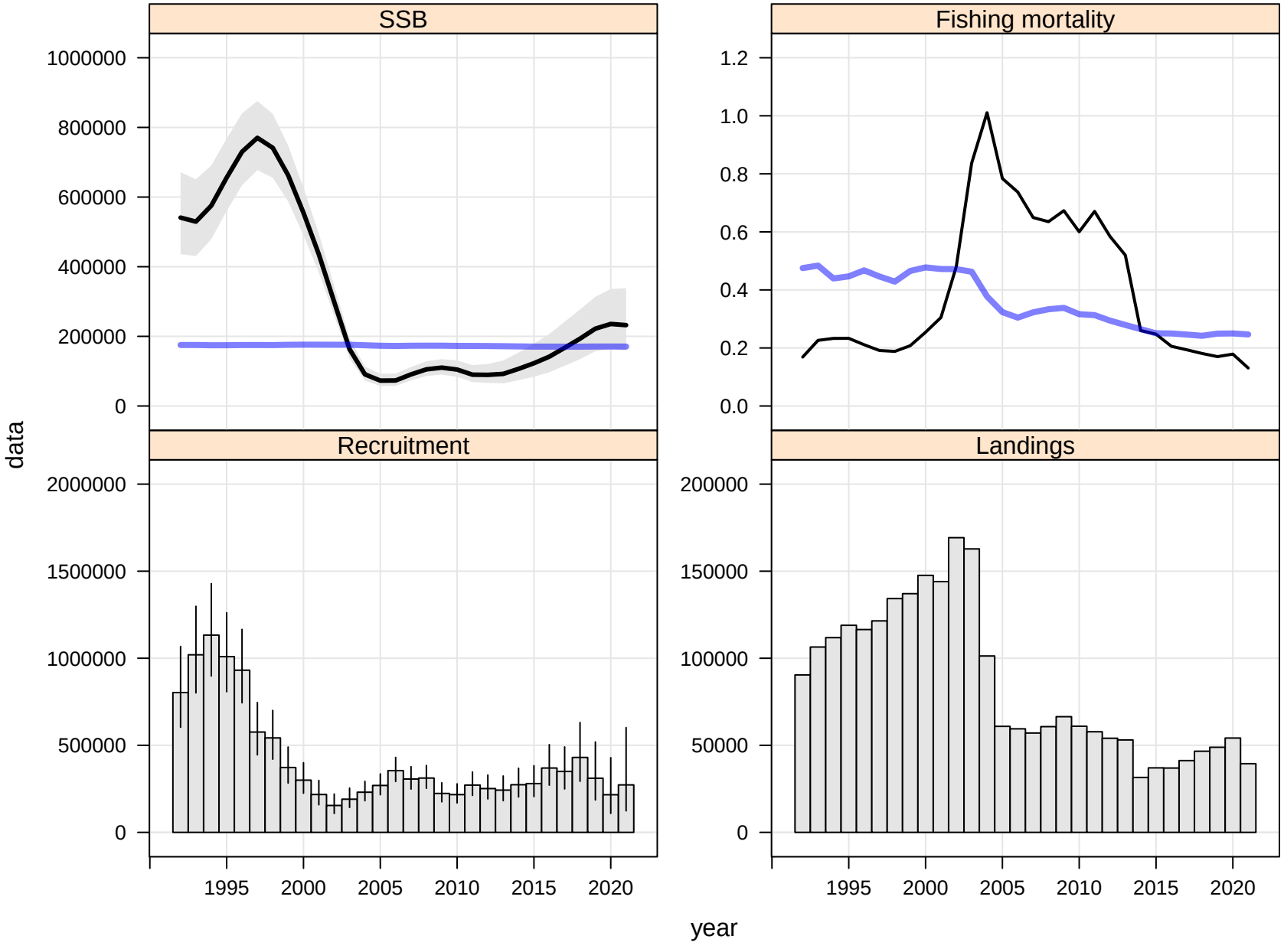

F proportion at age
Proportion of F at age
0.8
0.6
0.4
0.2
Error using packet 1
subscript out of bounds
1995
2000
2005
2010
2015
2020
Years
2
3
4
5
6
7
8
9
10
11
12

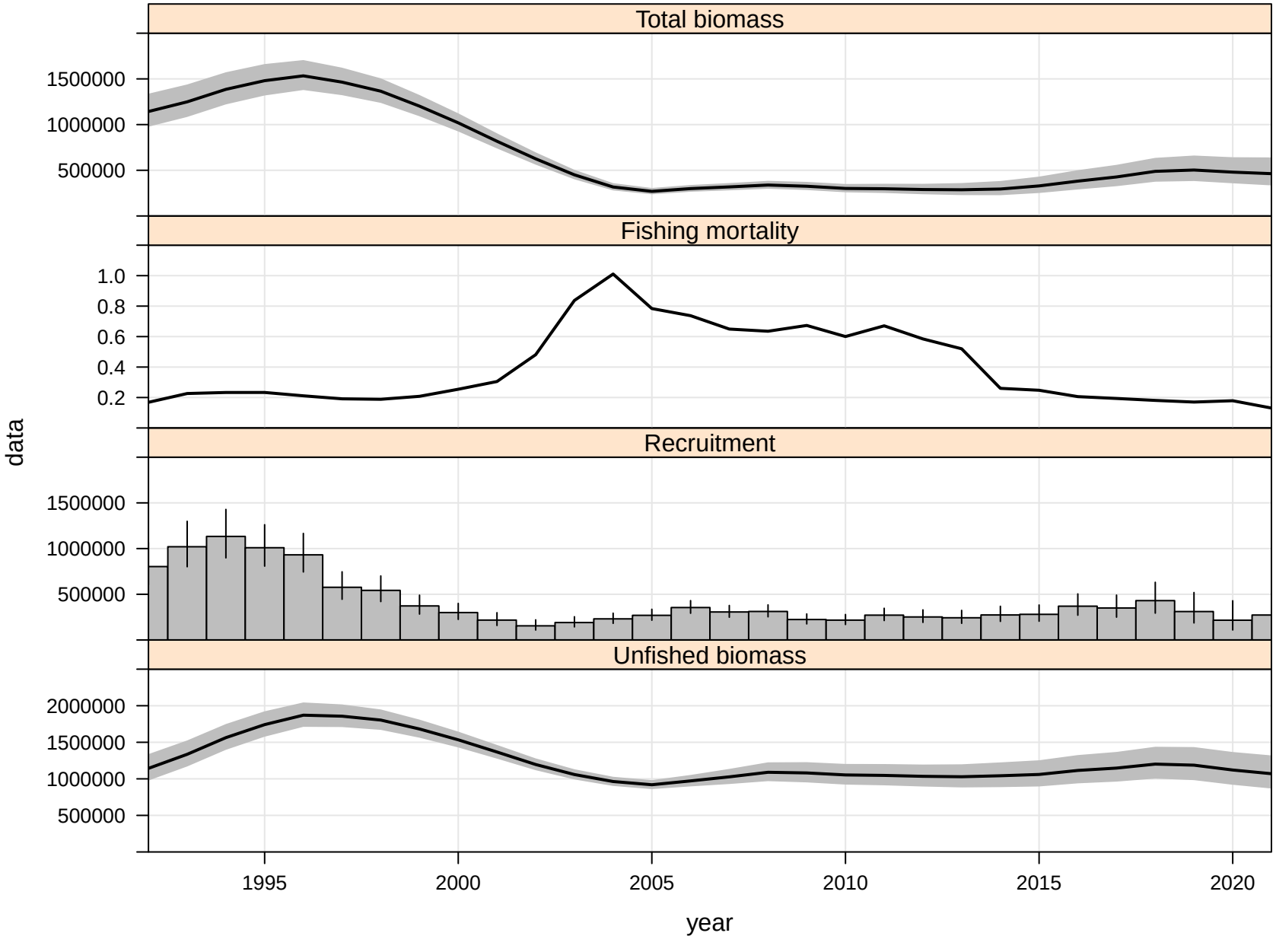

N at age
Years
25
20
15
10
5
2
4
6
8
10
Age
1200000
1000000
800000
600000
400000
200000
0

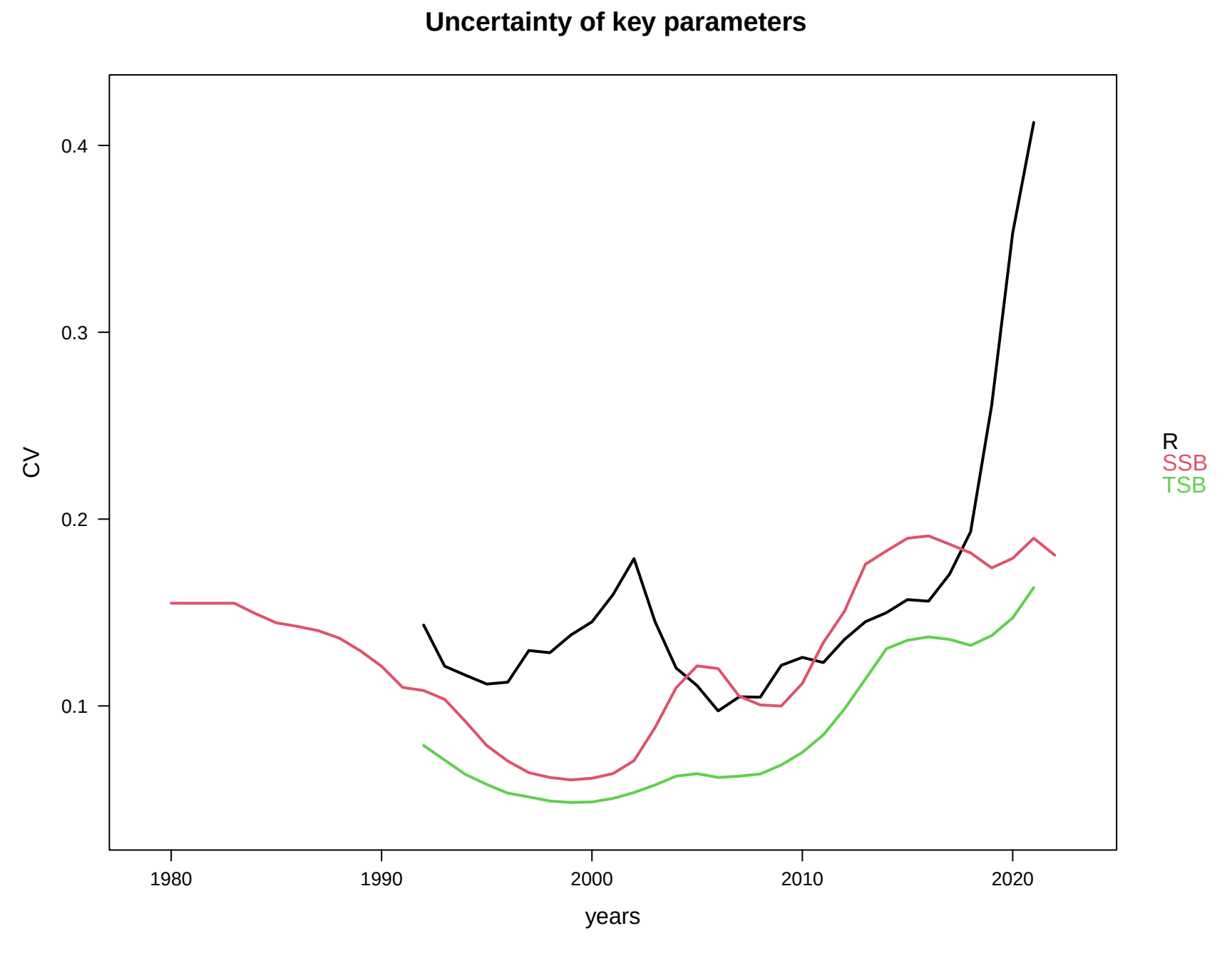

Proportion at age
Proportion of N at age
0.8
0.6
0.4
0.2
Error using packet 1
subscript out of bounds
1995
2000
2005
2010
2015
2020
Years
2
3
4
5
6
7
8
9
10
11
12

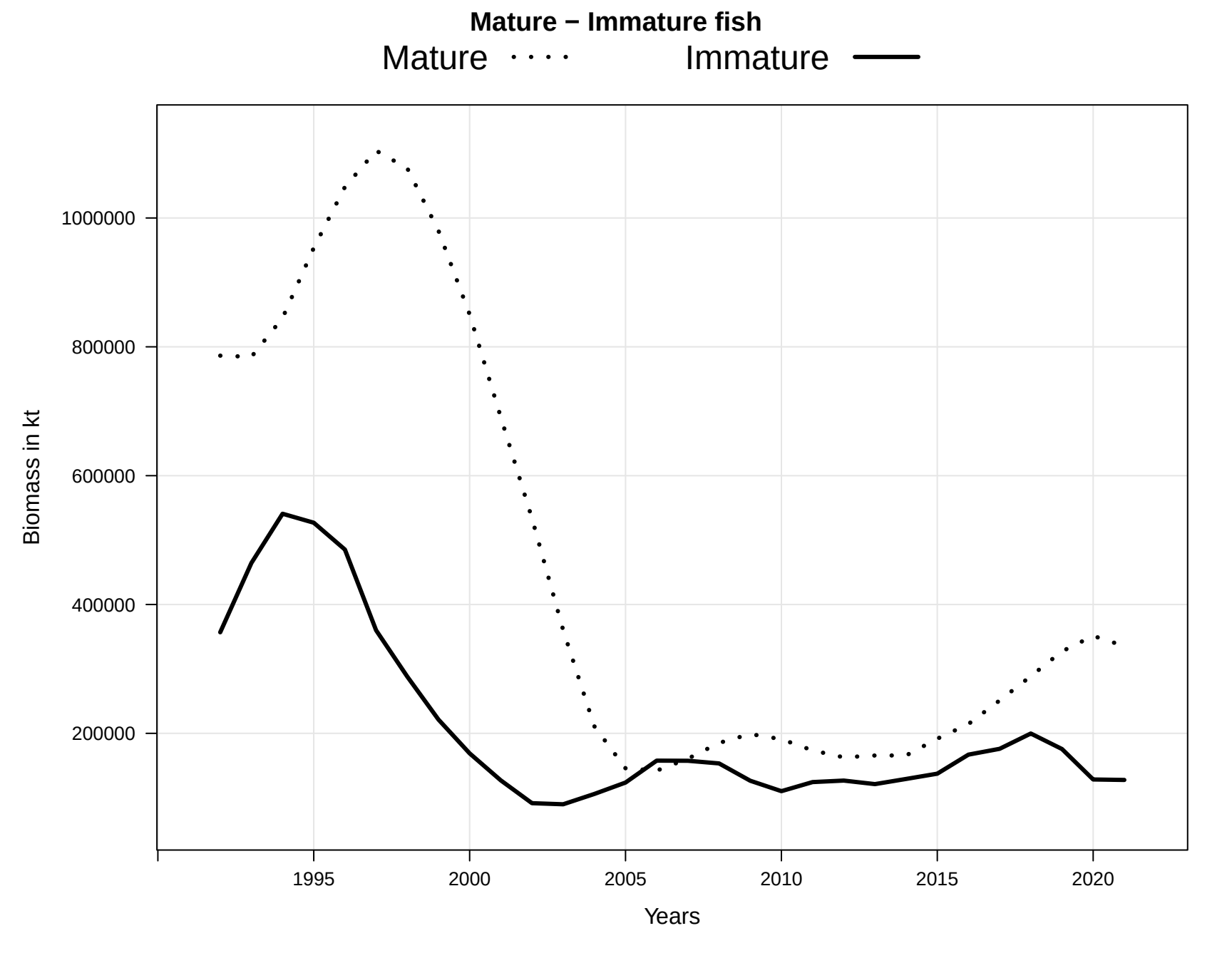

Fishery mean age
Observed
Modelled
Artesanal
Industrial
Age
8
7
6
5
4
1995
2000
2005
2010
2015
2020
Years


Survey mean age
Observed
Modelled
Acoustic
Age
8
7
6
5
4
3
2
1995
2000
2005
2010
2015
Years

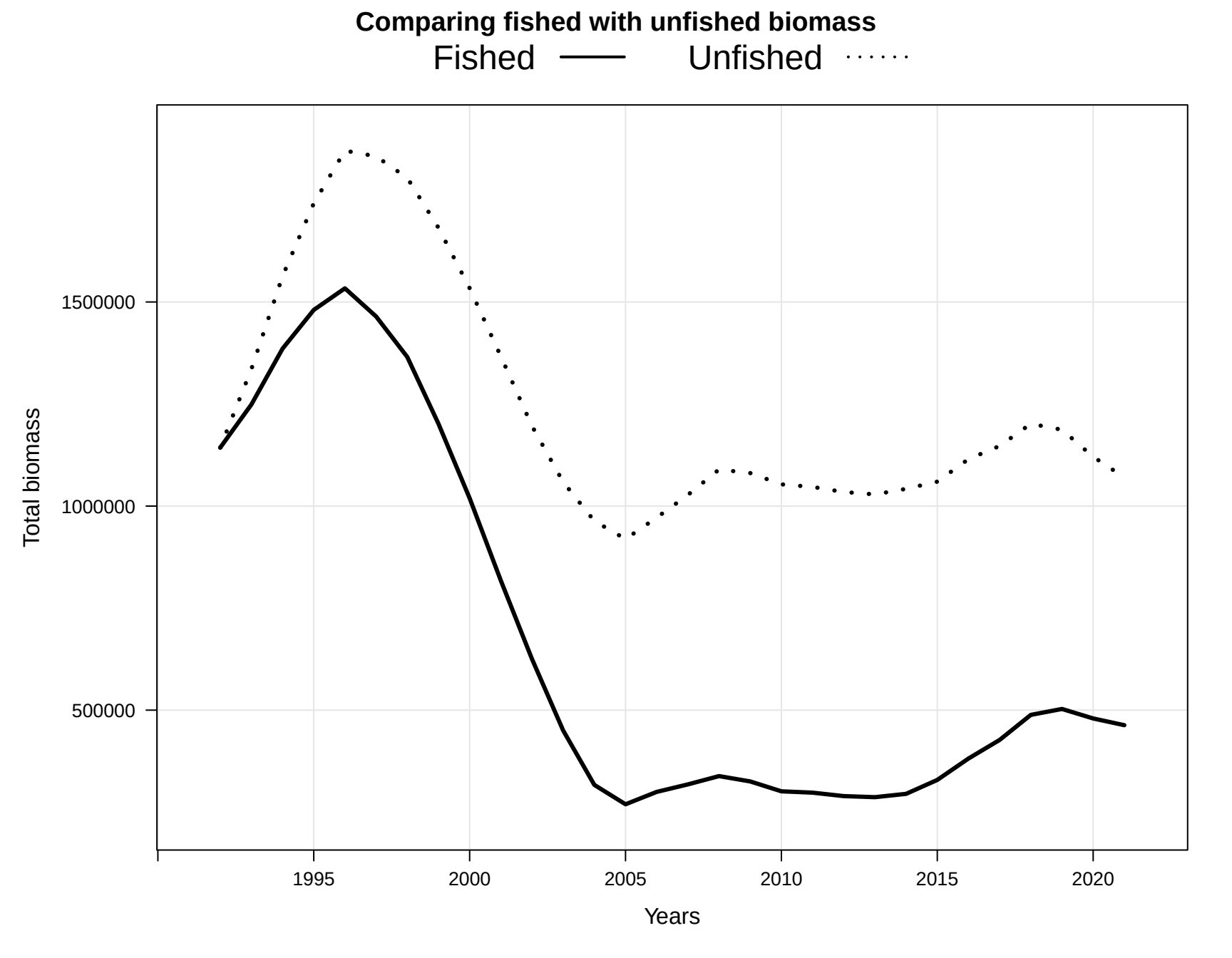

SSB
Fishing mortality
Recruitment
Landings
data
year
1000000
800000
600000
400000
200000
0
1.2
1.0
0.8
0.6
0.4
0.2
0.0
2000000
1500000
1000000
500000
150000
100000
50000
1995
2000
2005
2010
2015
2020

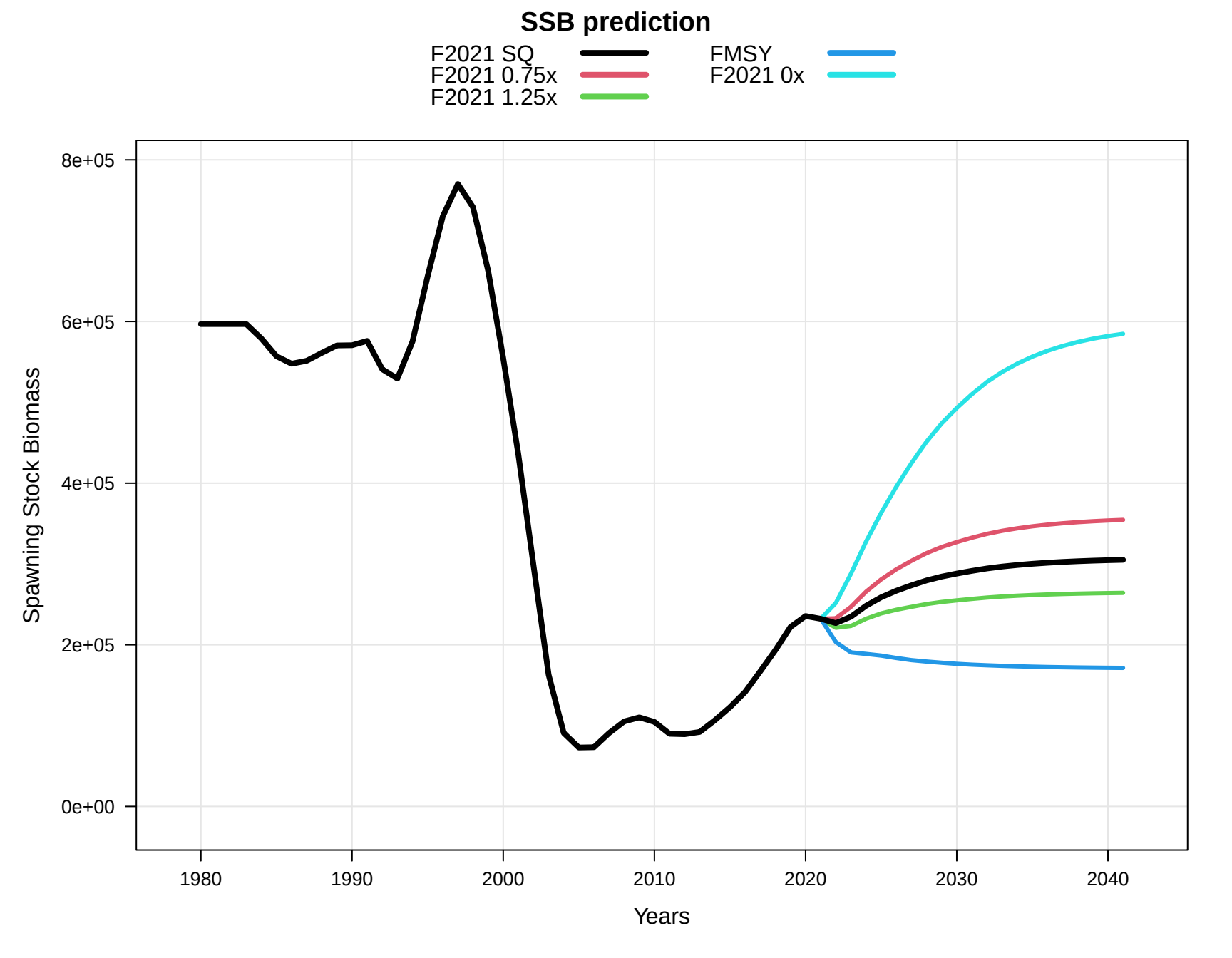

Total biomass
1500000
1000000
500000
Fishing mortality
1.0
0.8
0.6
0.4
0.2
Recruitment
1500000
1000000
500000
Unfished biomass
2000000
1500000
1000000
500000
data
1995
2000
2005
2010
2015
2020
year

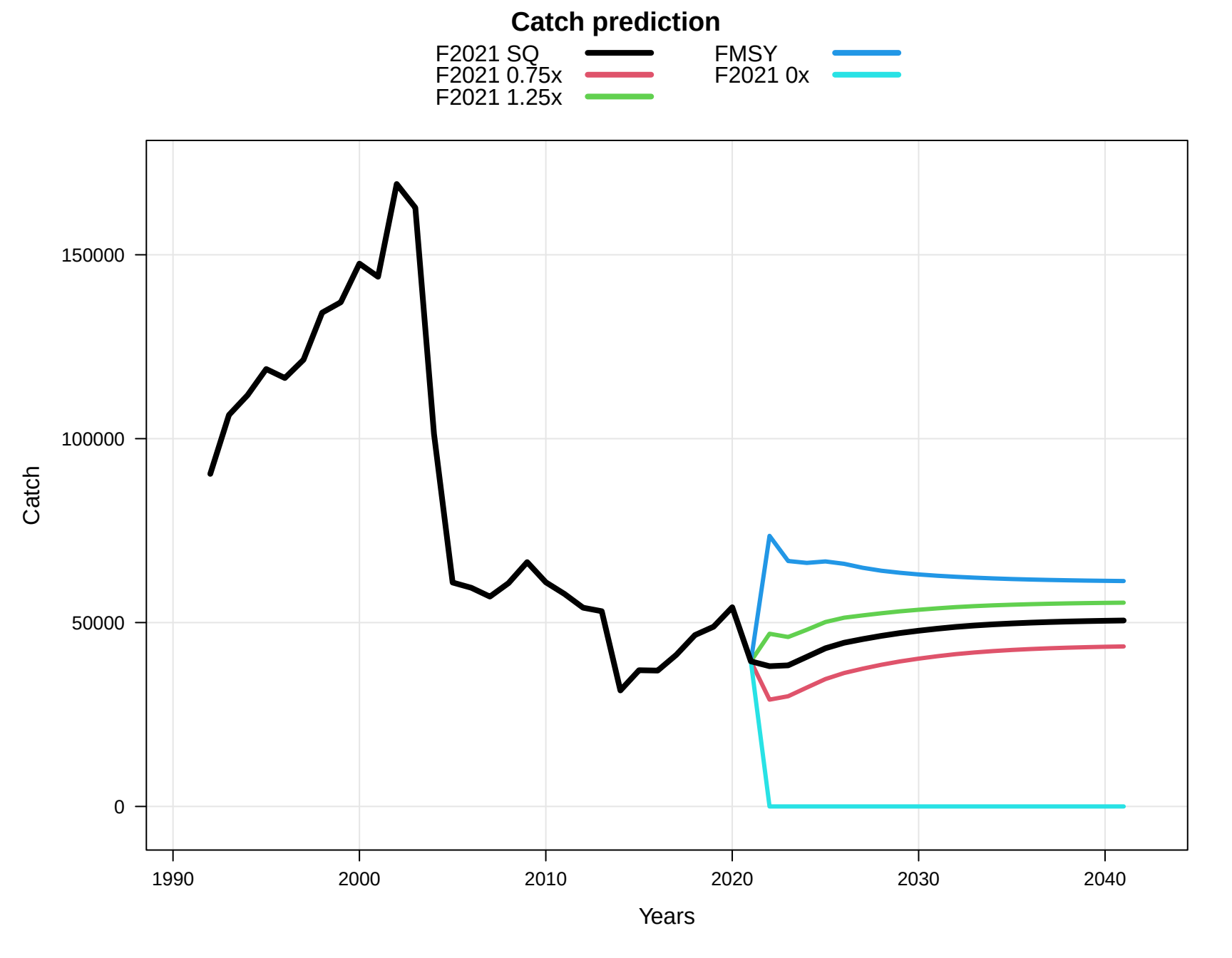

Uncertainty of key parameters
0.4
0.3
0.2
0.1
CV
1980
1990
2000
2010
2020
years
R
SSB
TSB

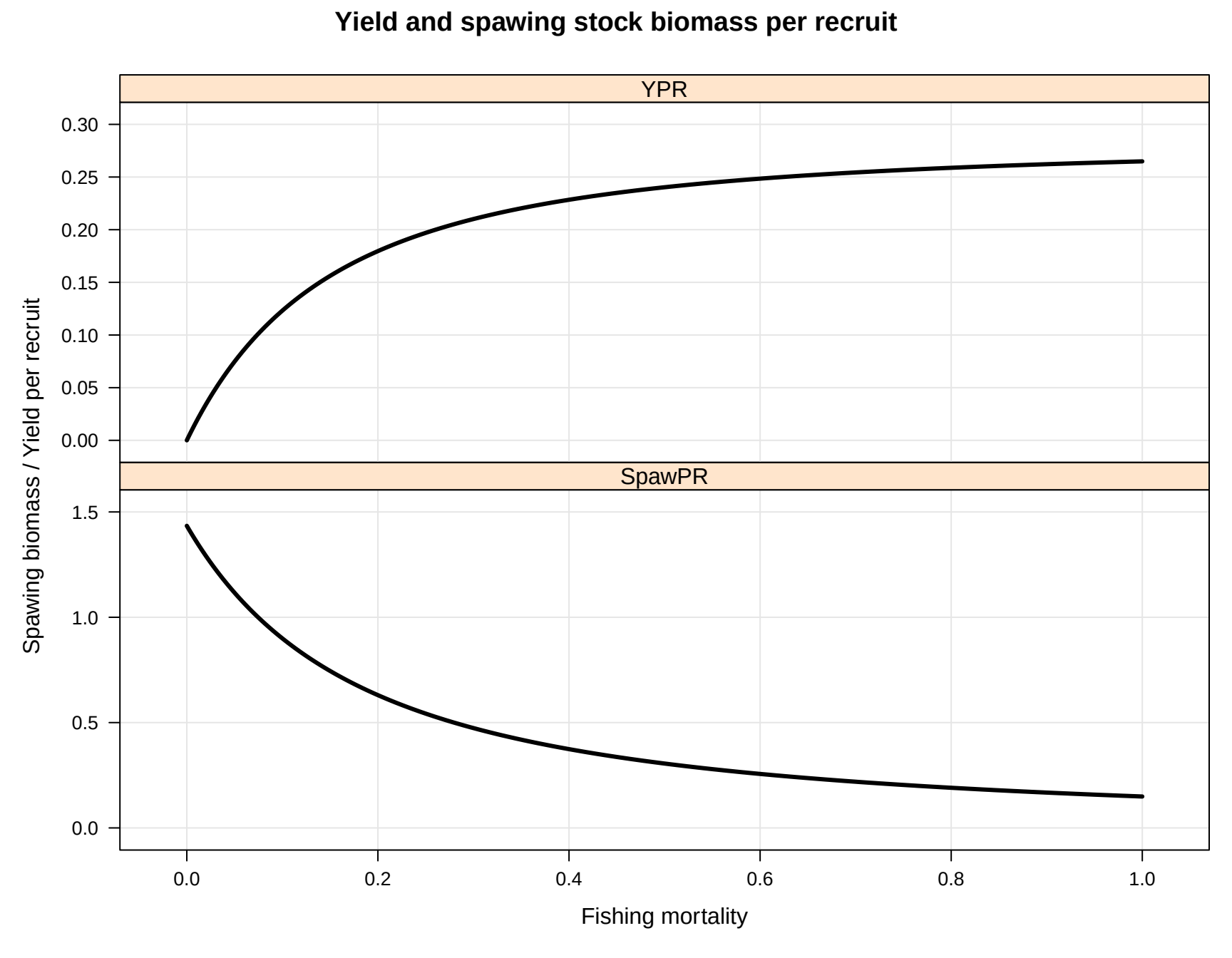

Mature − Immature fish
Mature
Immature
Biomass in kt
1000000
800000
600000
400000
200000
1995
2000
2005
2010
2015
2020
Years

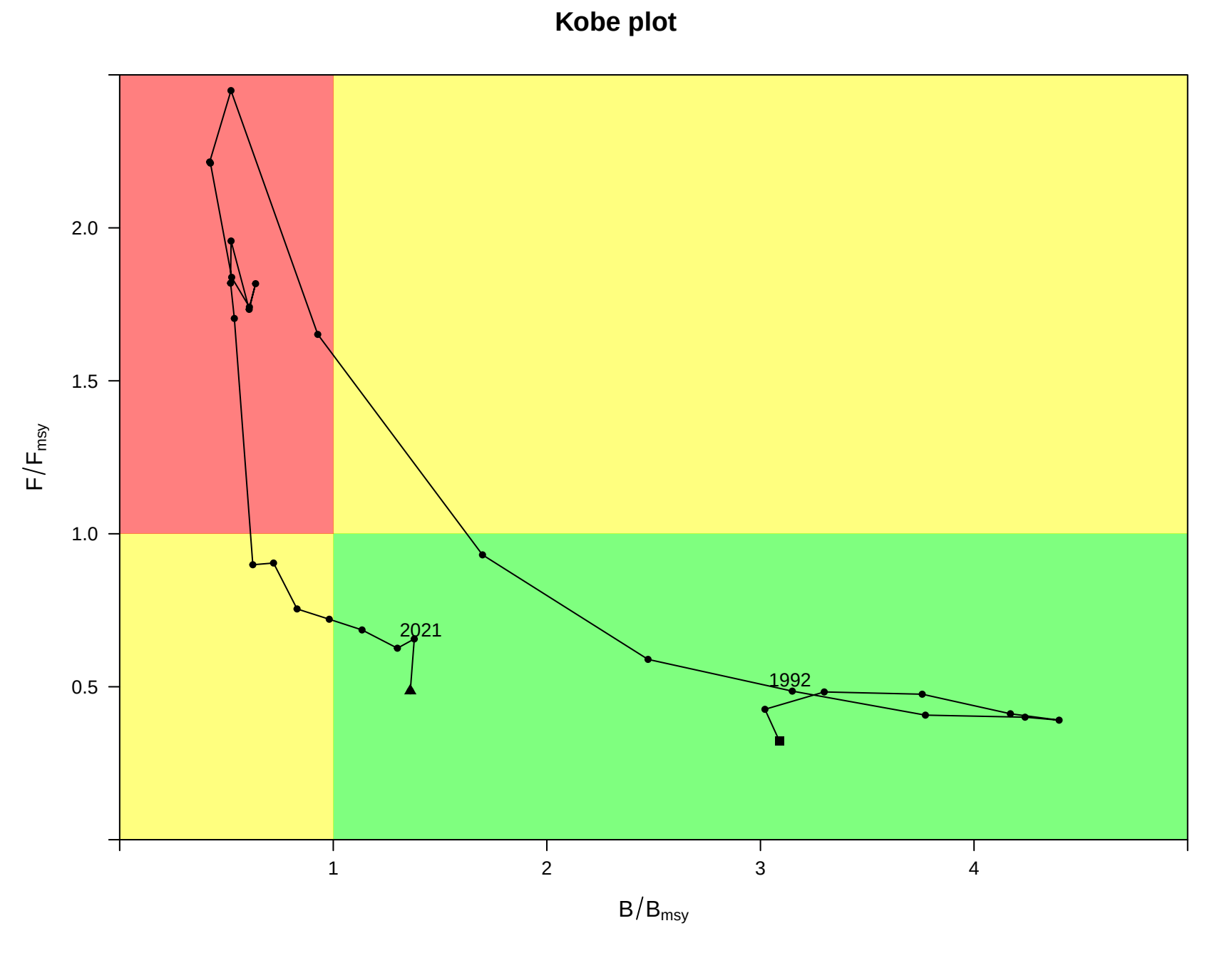

Stock Recruitment
Simulated
1992 − 2015
Recruitment
Spawning Stock Biomass
0
200000
400000
600000
800000
1000000
0e+00
2e+05
4e+05
6e+05
8e+05
1994
1995
1993
1996
1992
1991
1997
1998
1999
2000
2001
2002
2003
2004
2020
2019
2018
2017
2016
1990
1986
1985
1984
1983

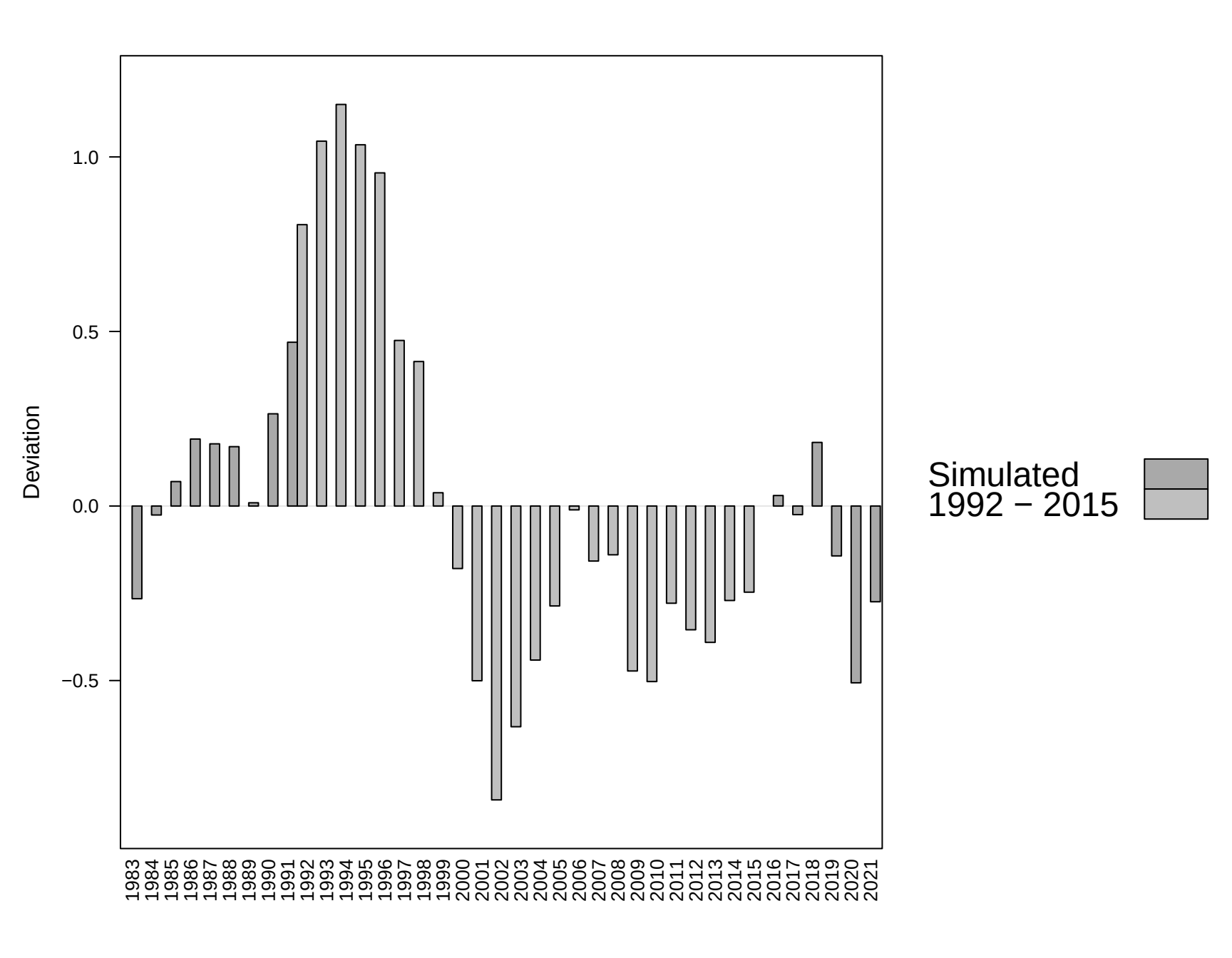

Comparing fished with unfished biomass
Fished
Unfished
1500000
1000000
500000
Total biomass
1995
2000
2005
2010
2015
2020
Years

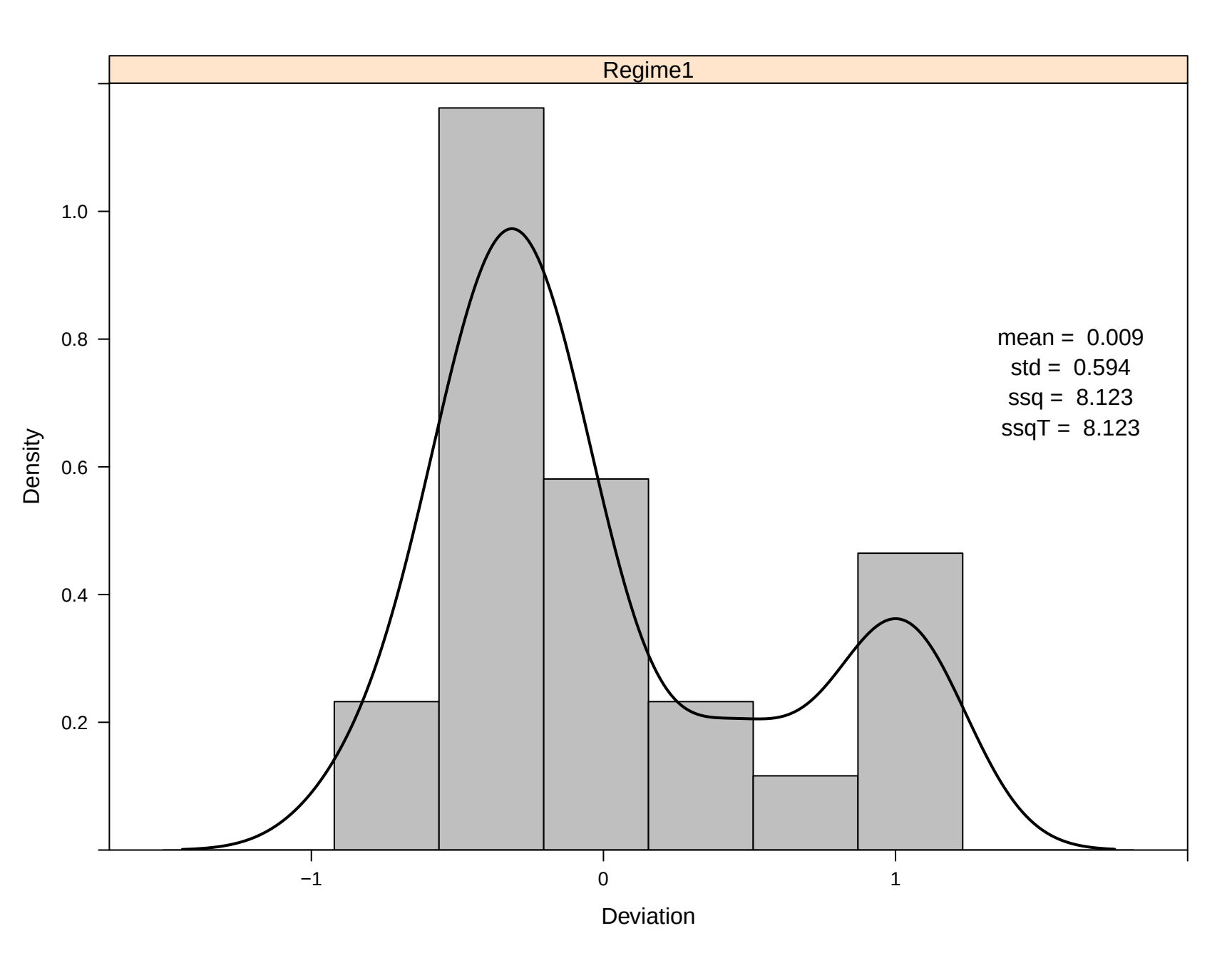

SSB prediction
F2021 SQ
F2021 0.75x
F2021 1.25x
FMSY
F2021 0x
Spawning Stock Biomass
8e+05
6e+05
4e+05
2e+05
0e+00
1980
1990
2000
2010
2020
2030
2040
Years


Catch prediction
F2021 SQ
F2021 0.75x
F2021 1.25x
FMSY
F2021 0x
150000
100000
50000
0
Catch
1990
2000
2010
2020
2030
2040
Years


Yield and spawing stock biomass per recruit
YPR
SpawPR
Spawing biomass / Yield per recruit
Fishing mortality
0.00
0.05
0.10
0.15
0.20
0.25
0.30
0.0
0.5
1.0
1.5
0.0
0.2
0.4
0.6
0.8
1.0


Kobe plot
2.0
1.5
1.0
0.5
F/Fmsy
1
2
3
4
B/Bmsy
2021
1992


Deviation
1.0
0.5
0.0
−0.5
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
Simulated
1992 − 2015


Regime1
mean = 0.009
std = 0.594
ssq = 8.123
ssqT = 8.123
Density
1.0
0.8
0.6
0.4
0.2
−1
0
1
Deviation