

pDevsLnC[1][38]

1.00
0.75
0.50
0.25
0.00

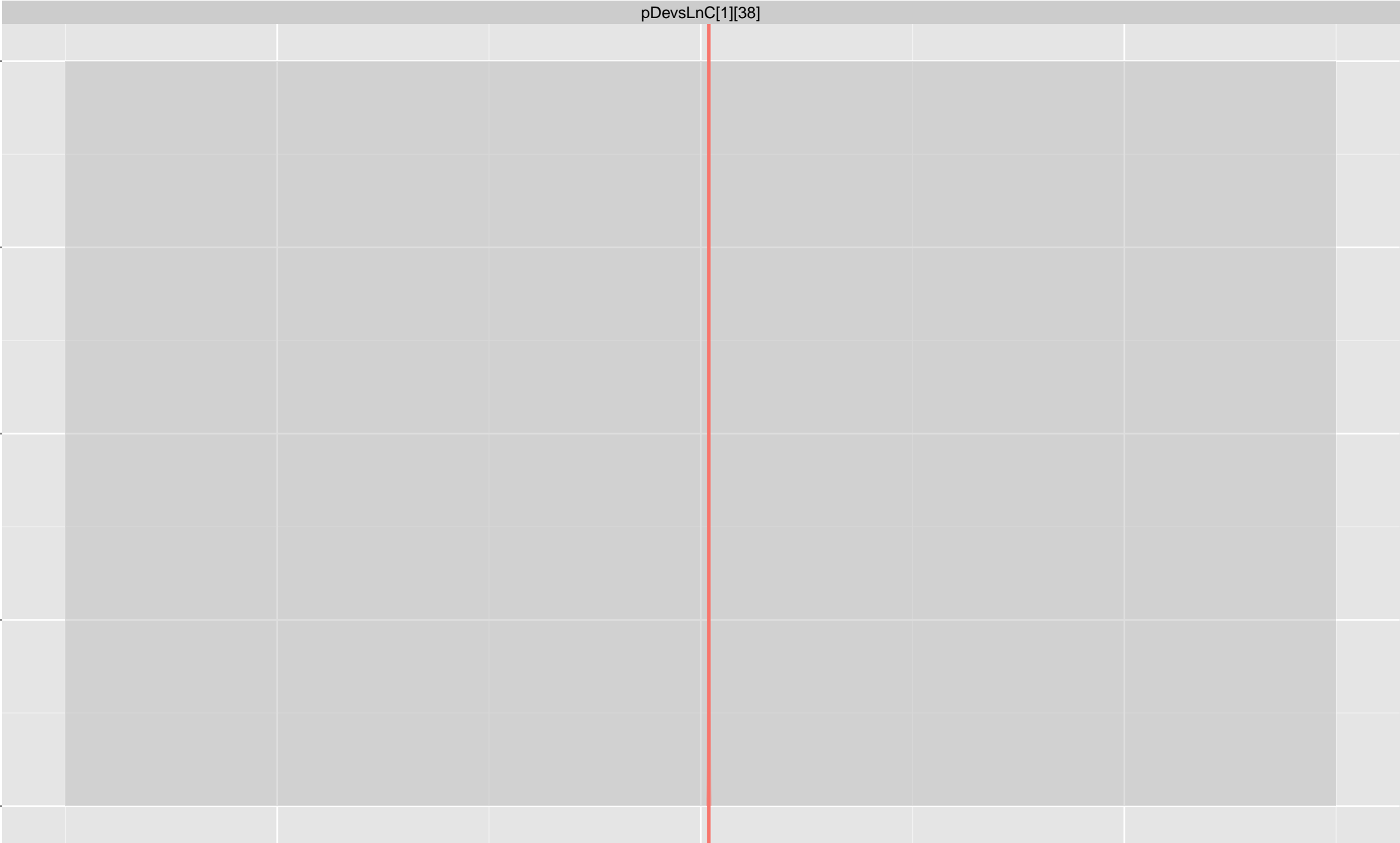
-10

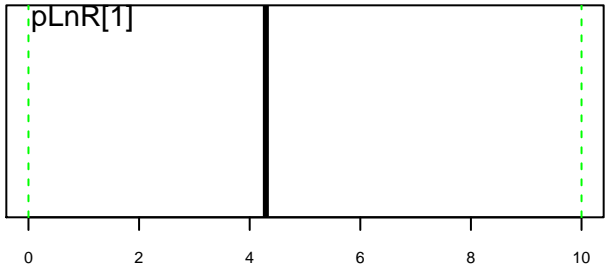
0

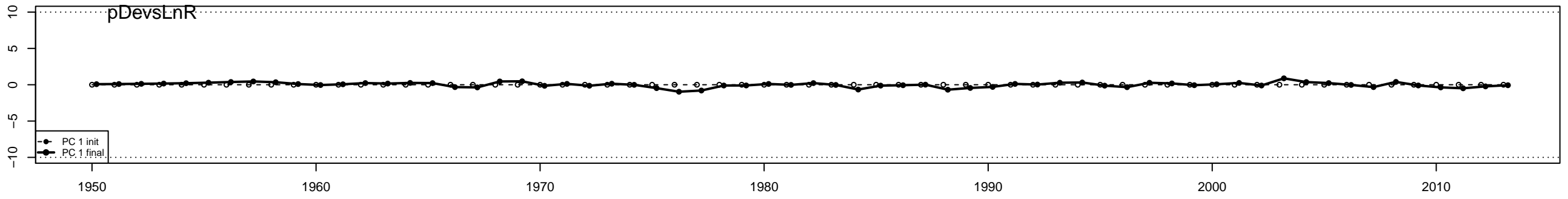
10

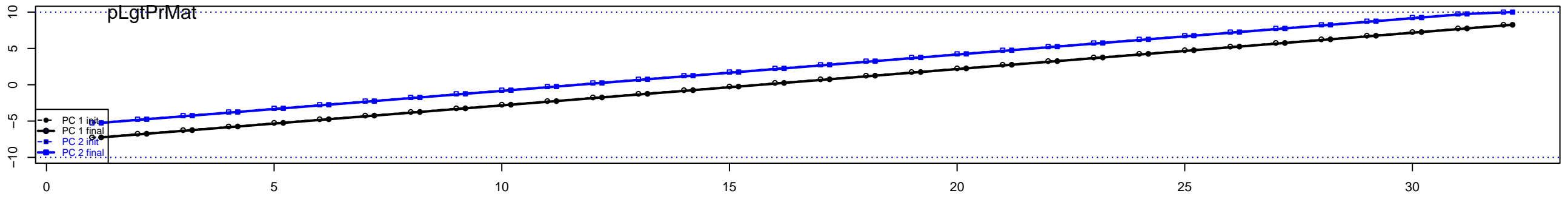
parameter value

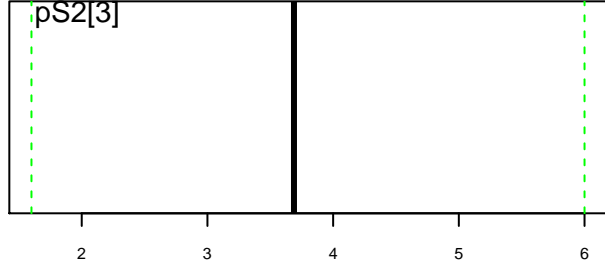
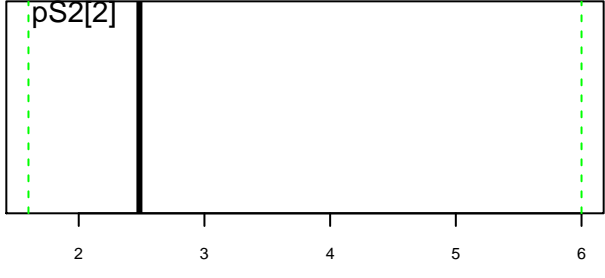
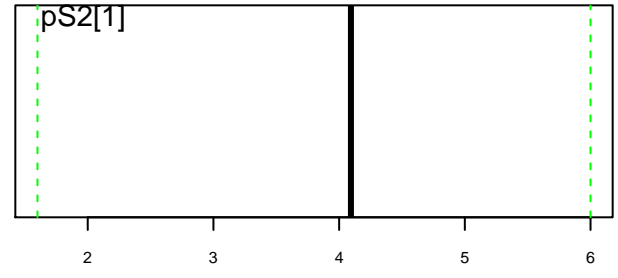
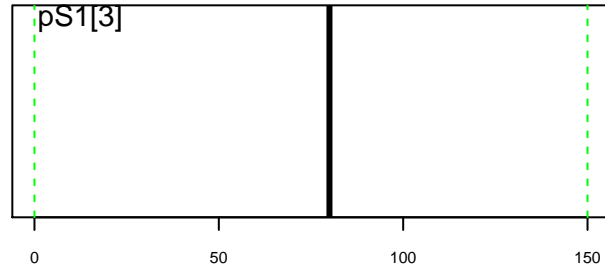
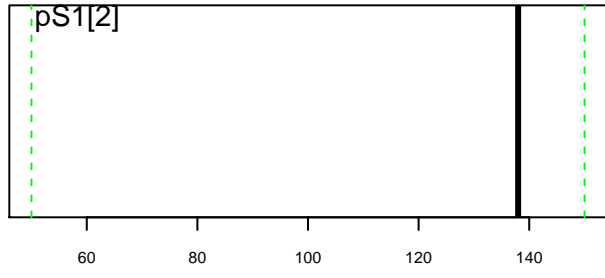
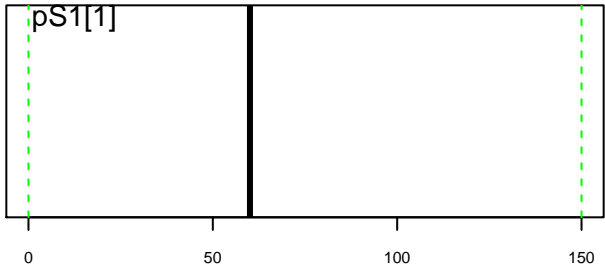
case
tcsam

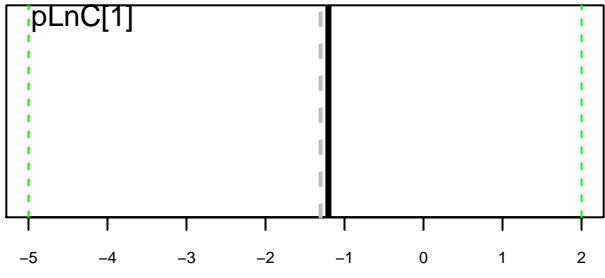


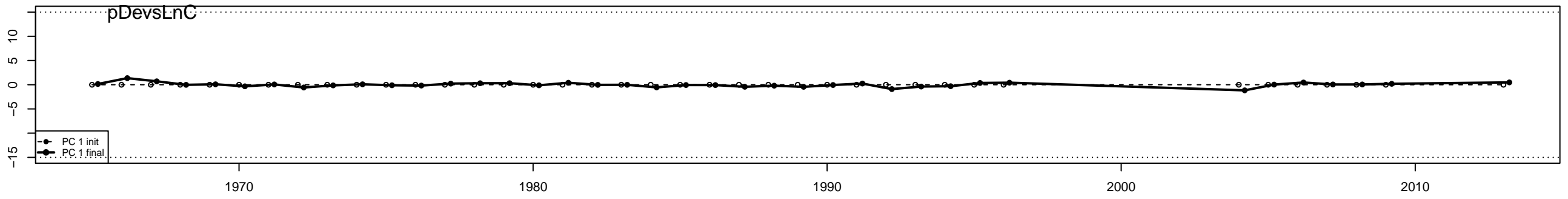












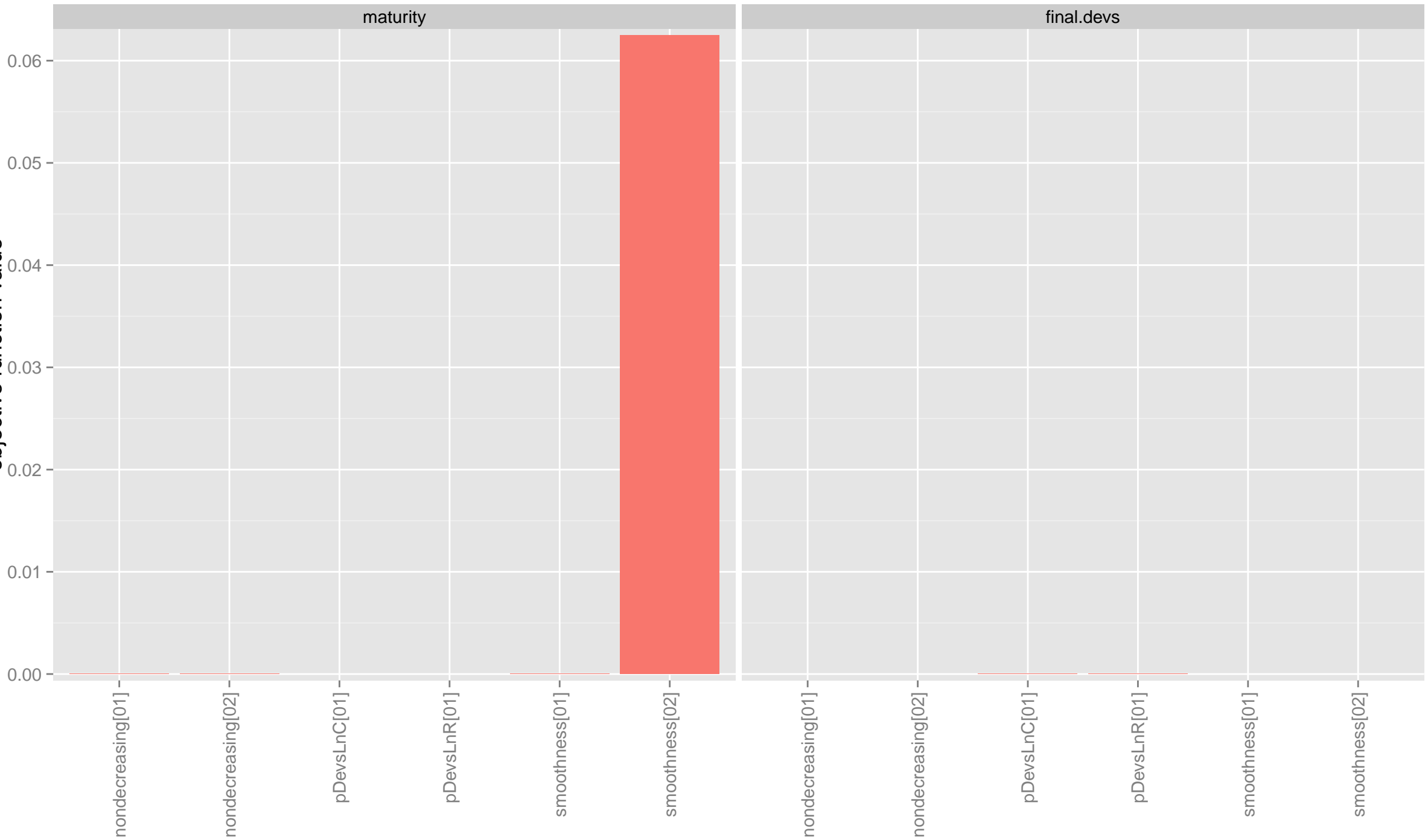
Penalties

maturity

final.devs

objective function value

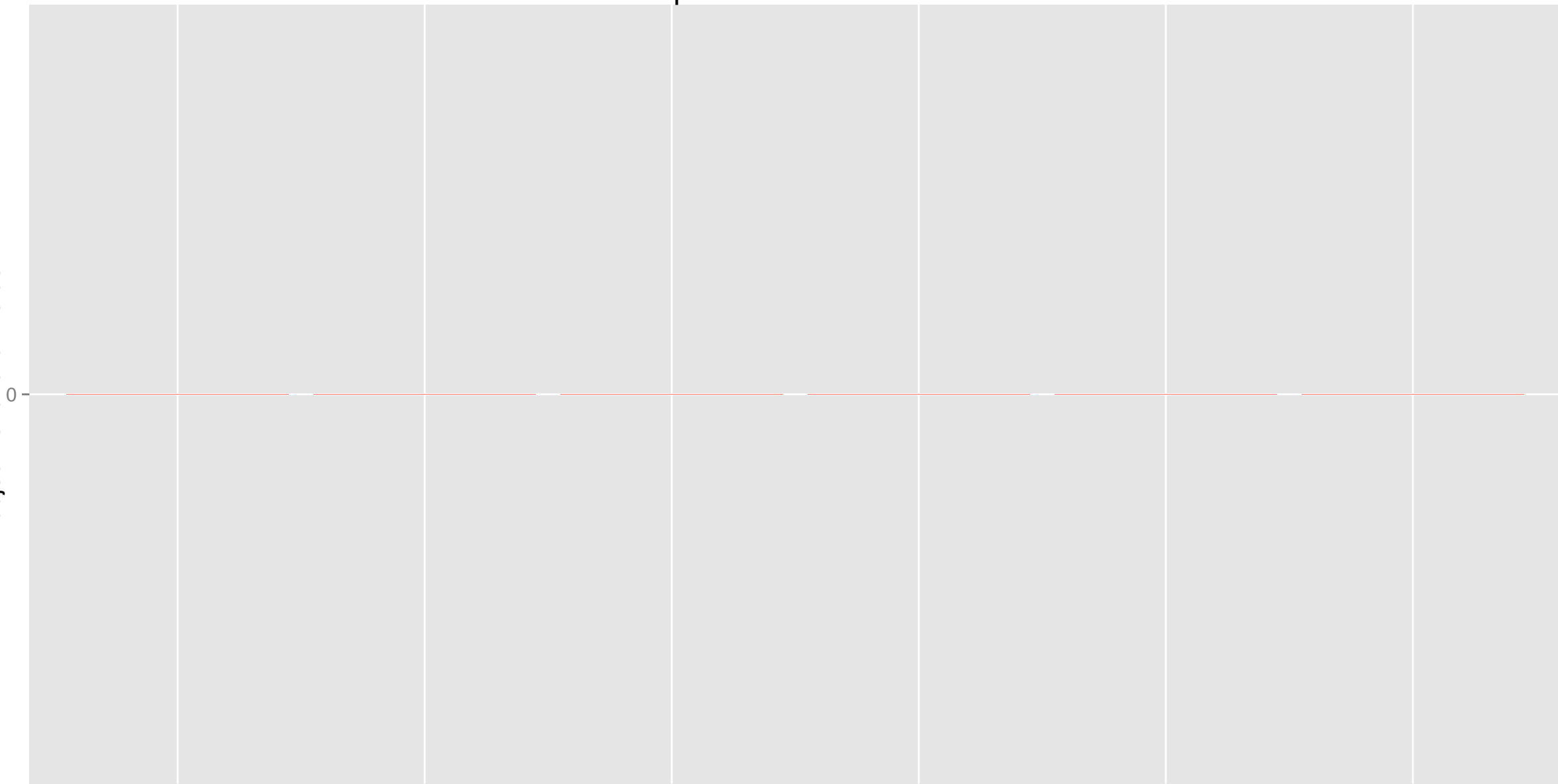
rsimTest



Penalty

priors: recruitment

objective function value



pDevsLnR[01]

pLgtRX[01]

pLnR[01]

pLnRa[01]

pLnRb[01]

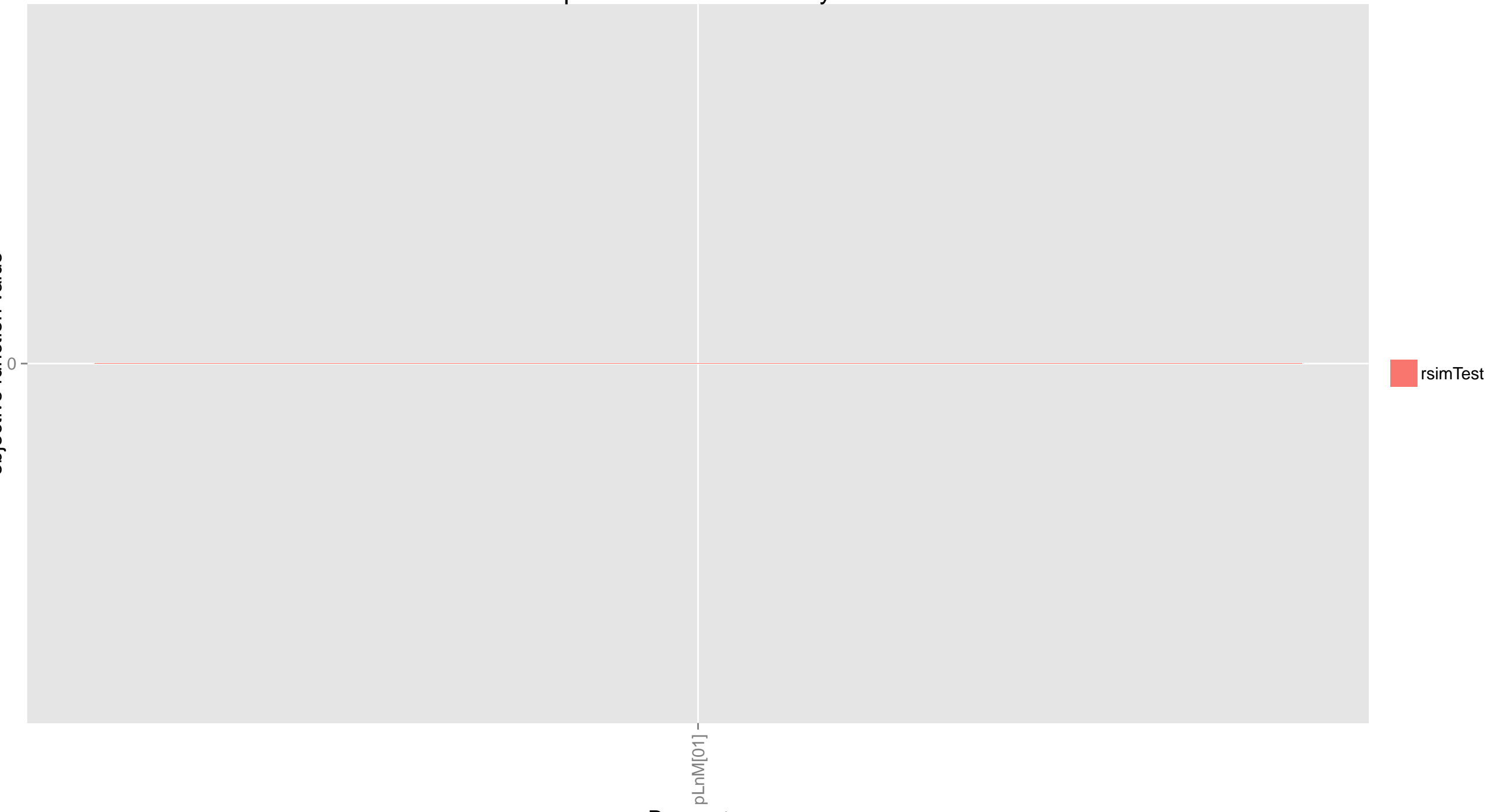
pLnRCV[01]

Parameter

rsimTest

priors: natural mortality

objective function value



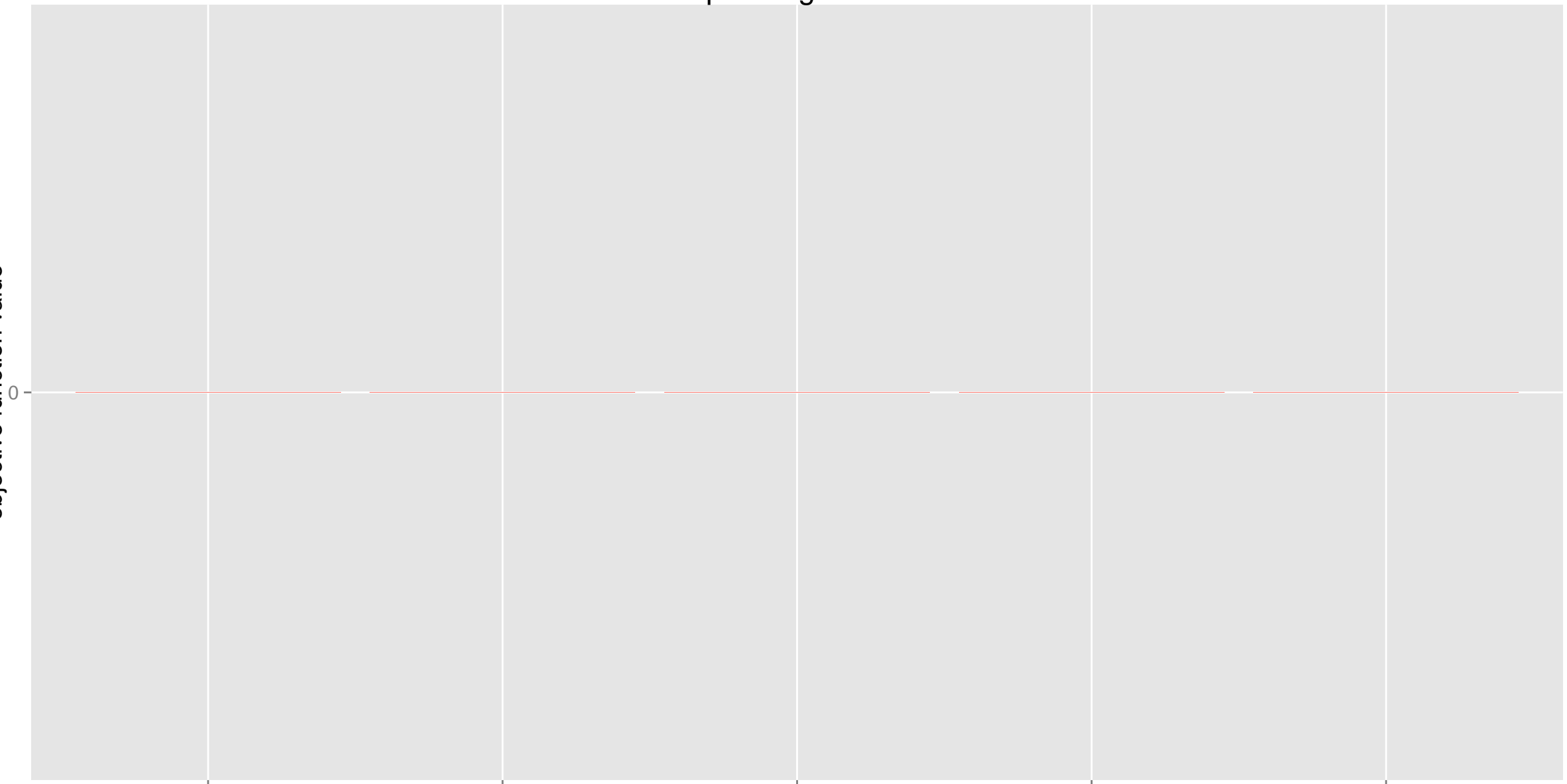
rsimTest

Parameter

$p_{LnM}[01]$

priors: growth

objective function value



rsimTest

pLnGrA[01]

pLnGrA[02]

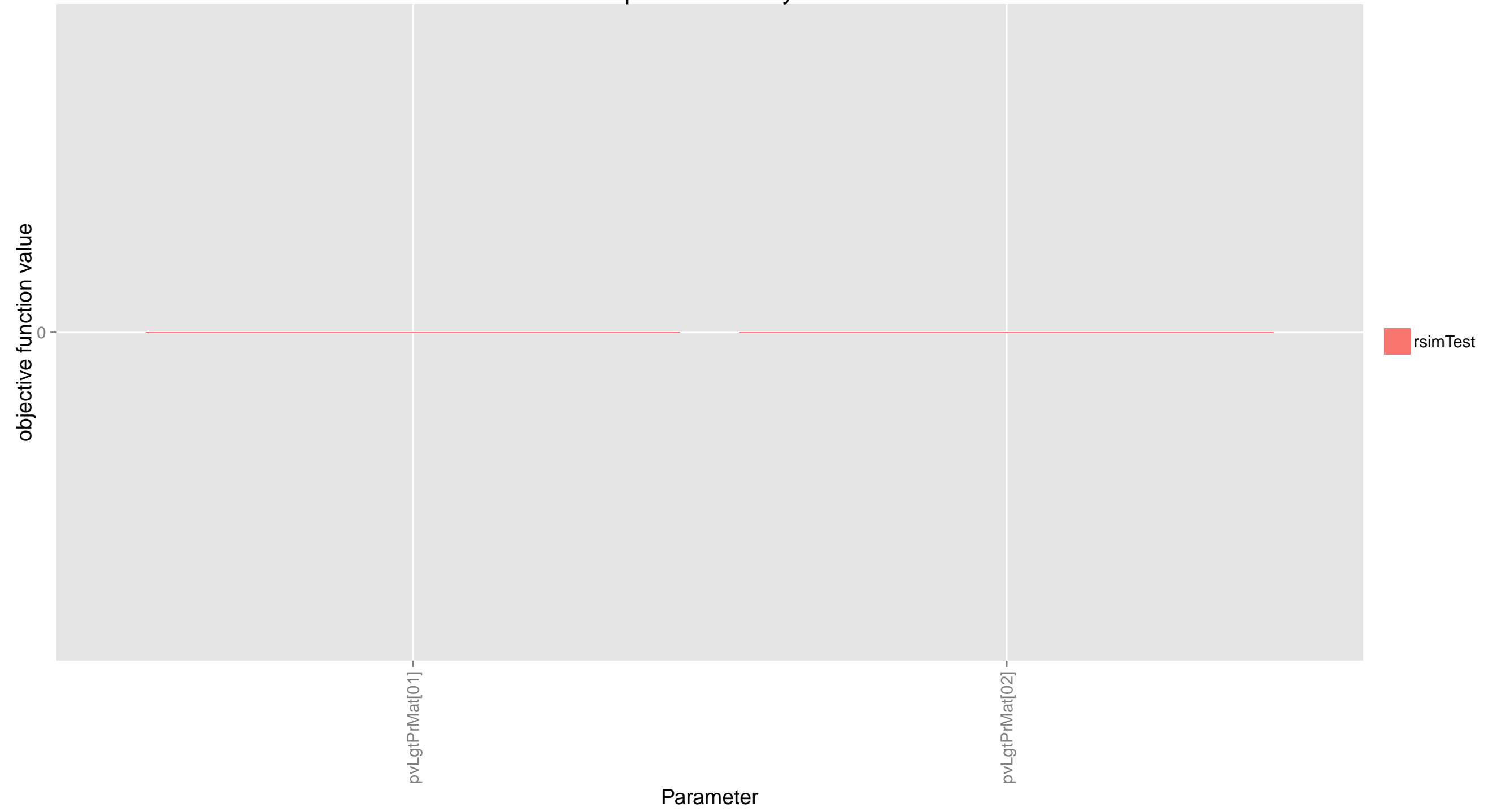
pLnGrB[01]

pLnGrB[02]

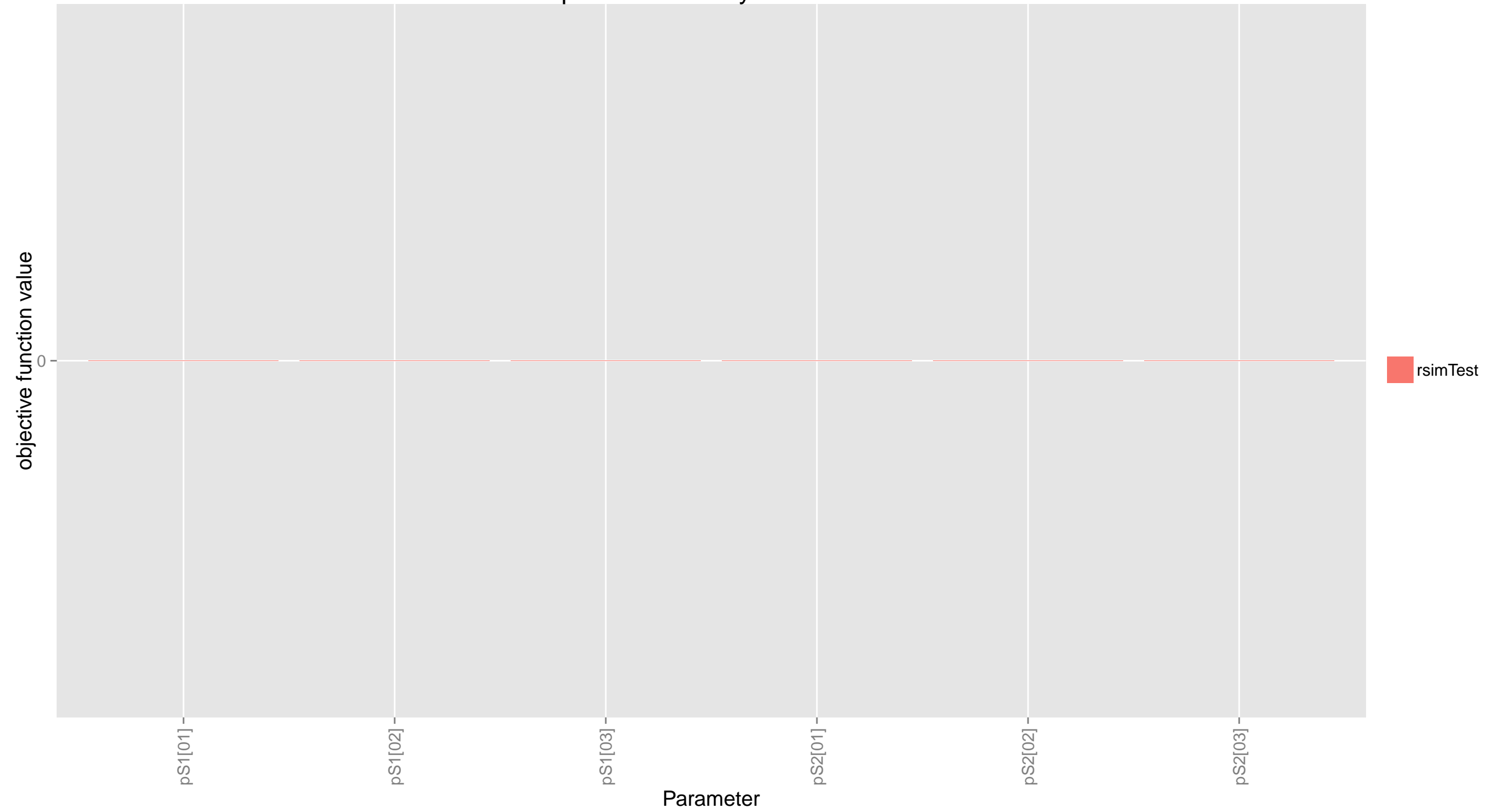
pLnGrBeta[01]

Parameter

priors: maturity

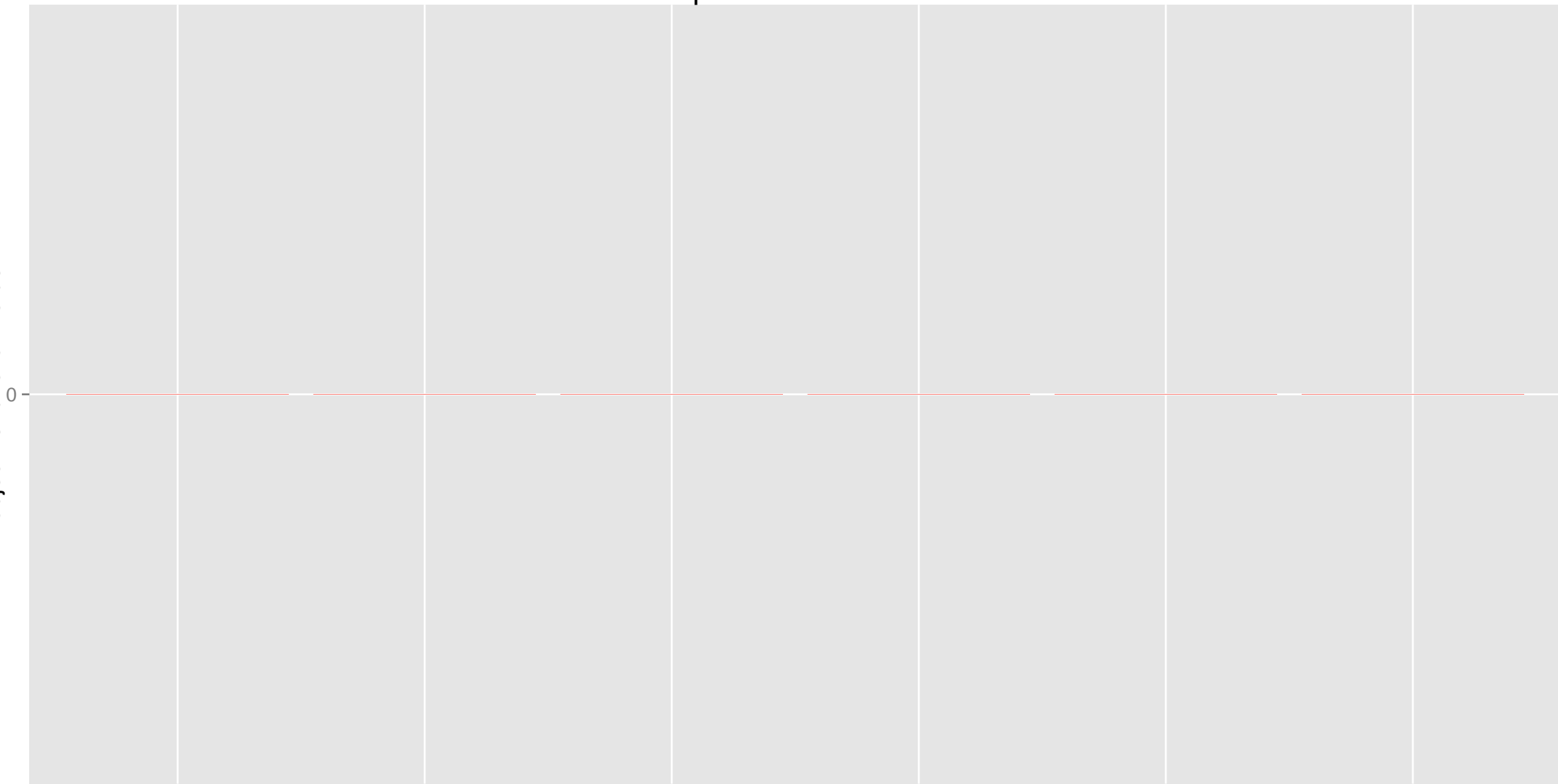


priors: selectivity functions



priors: fisheries

objective function value



pDevsLnC[01]

pLnC[01]

pLnDCM[01]

pLnDCT[01]

pLnDCX[01]

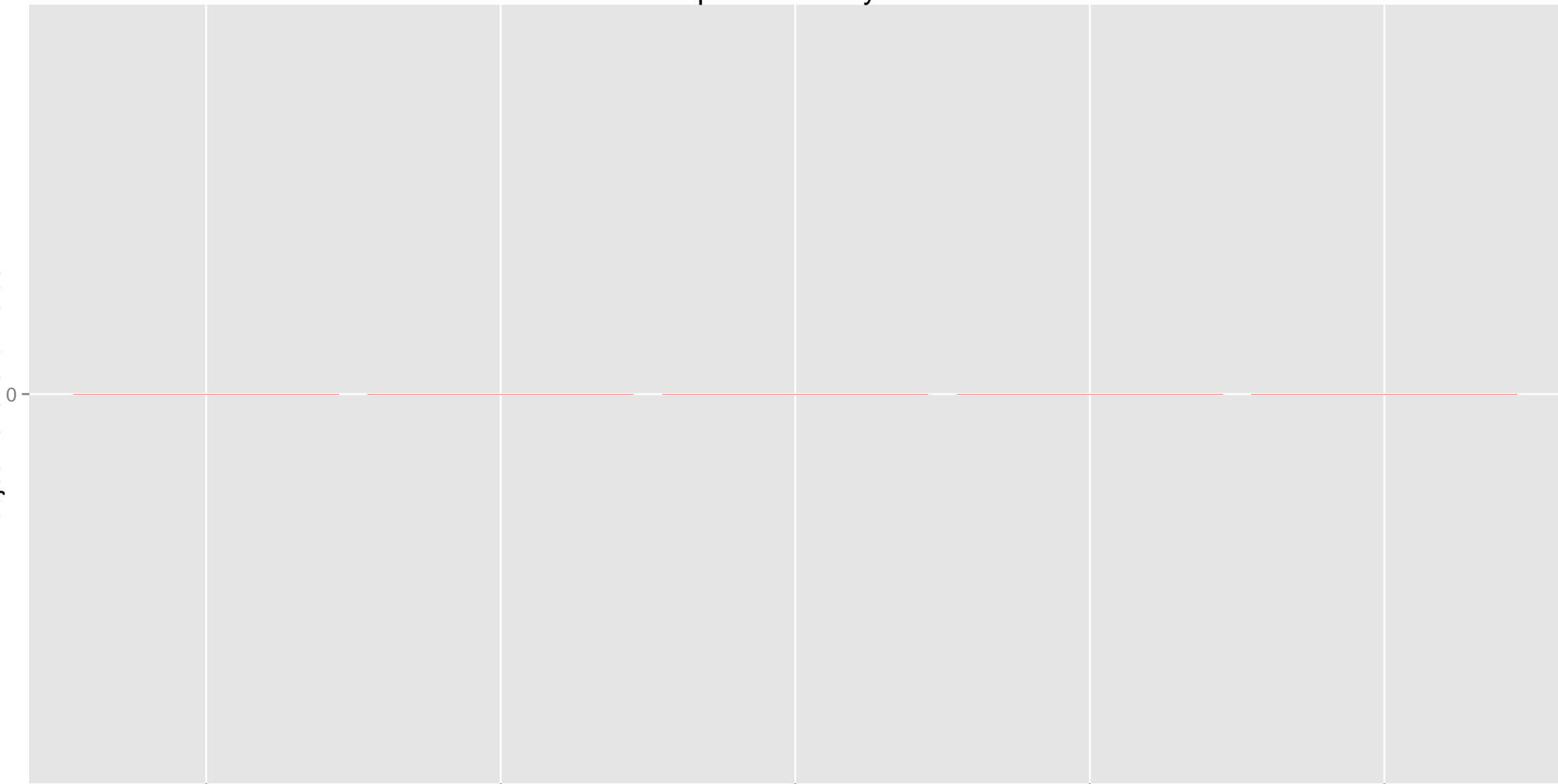
pLnDCXM[01]

Parameter

rsimTest

priors: surveys

objective function value



0

pLnDQM[01]

pLnDQT[01]

pLnDQX[01]

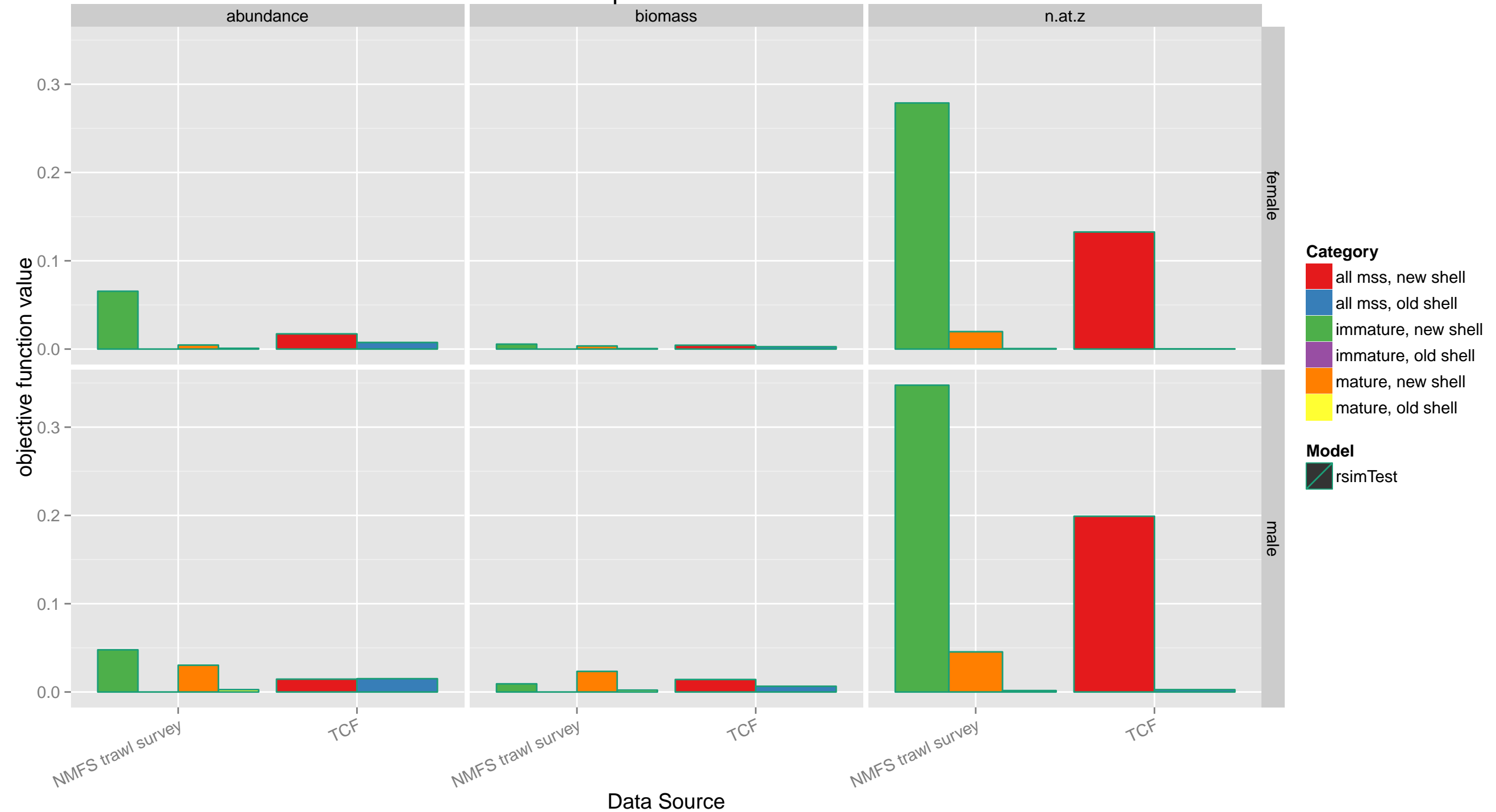
pLnDQXM[01]

pLnQ[01]

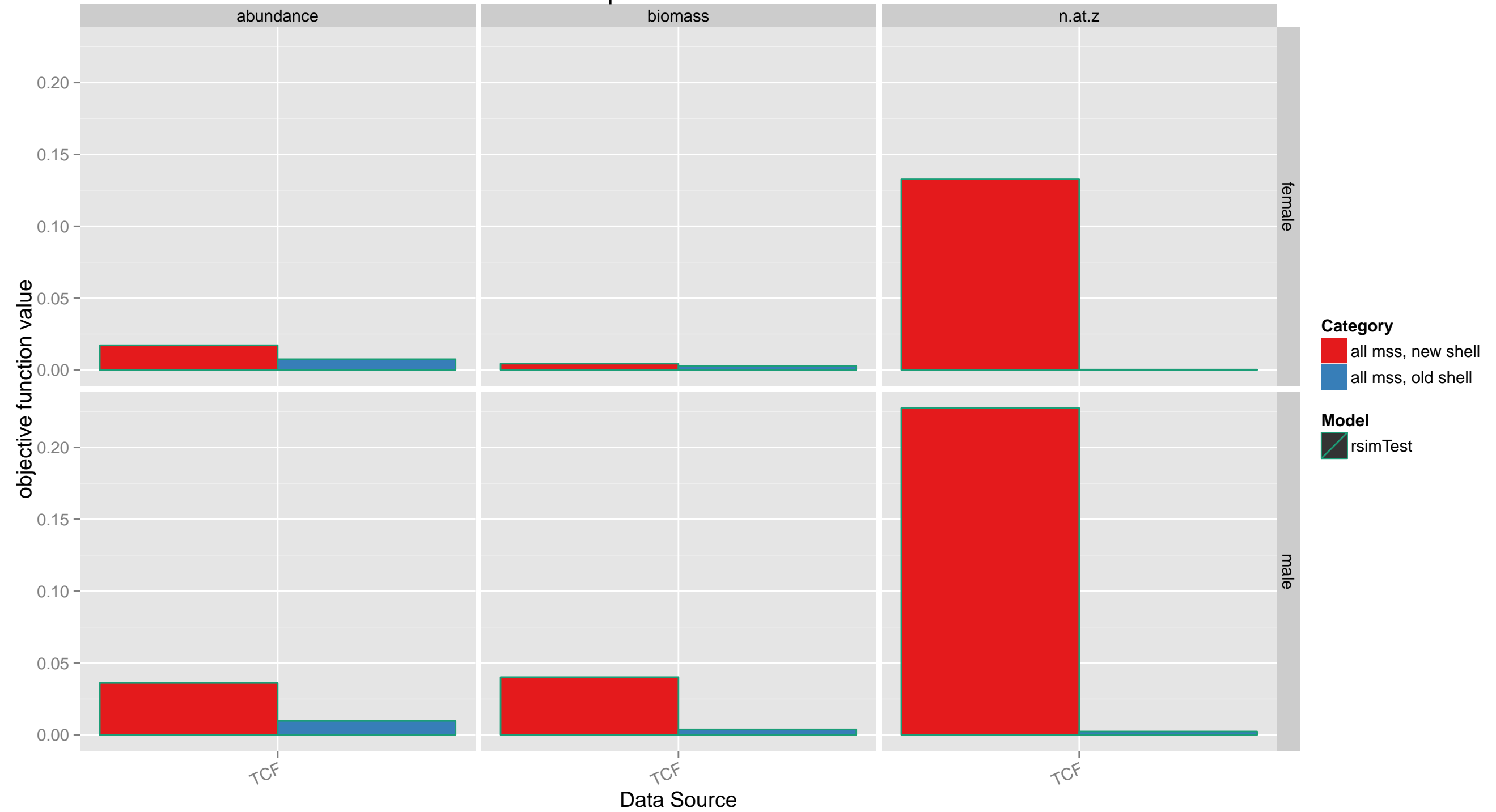
Parameter

rsimTest

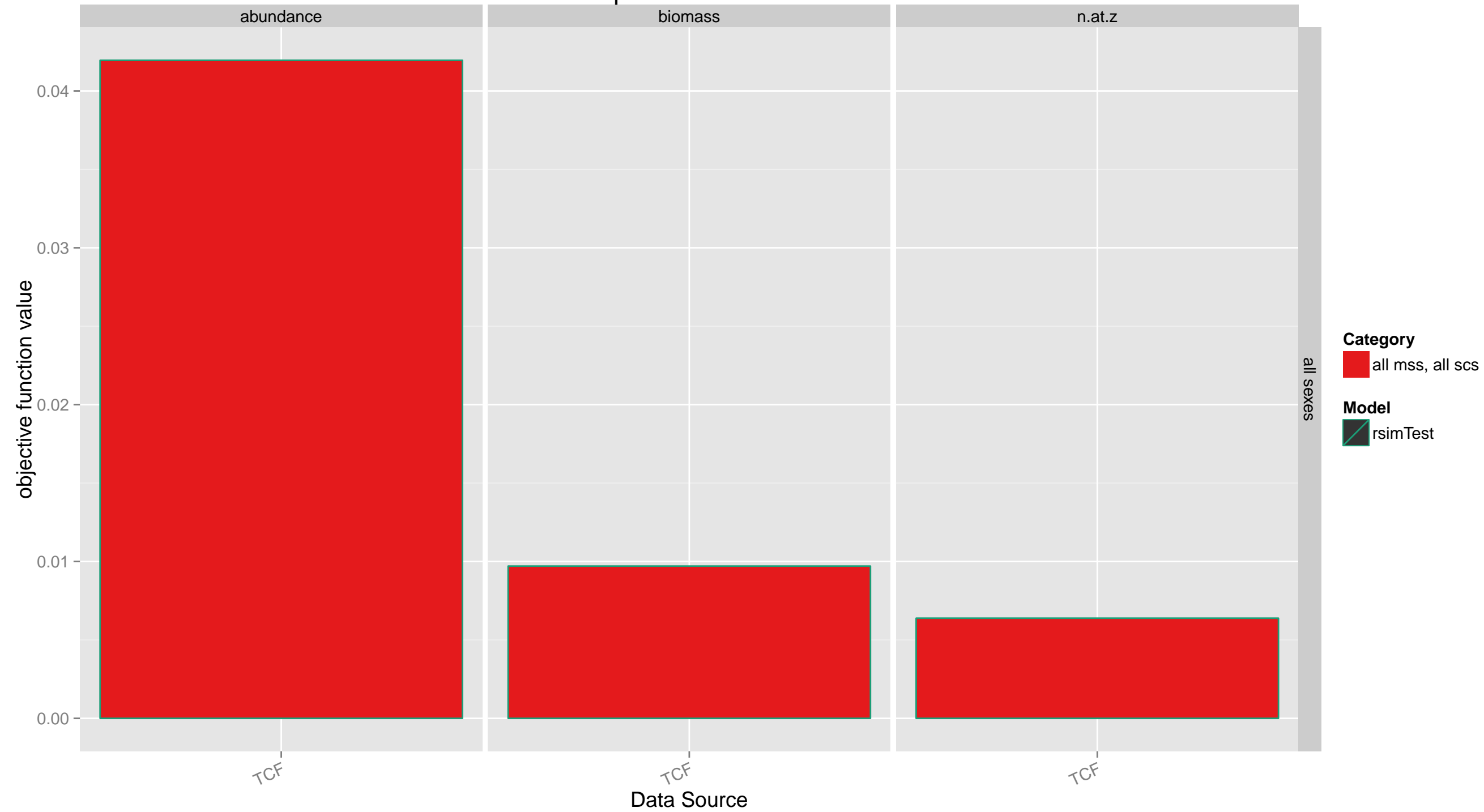
Data Components: total catch



Data Components: discard catch

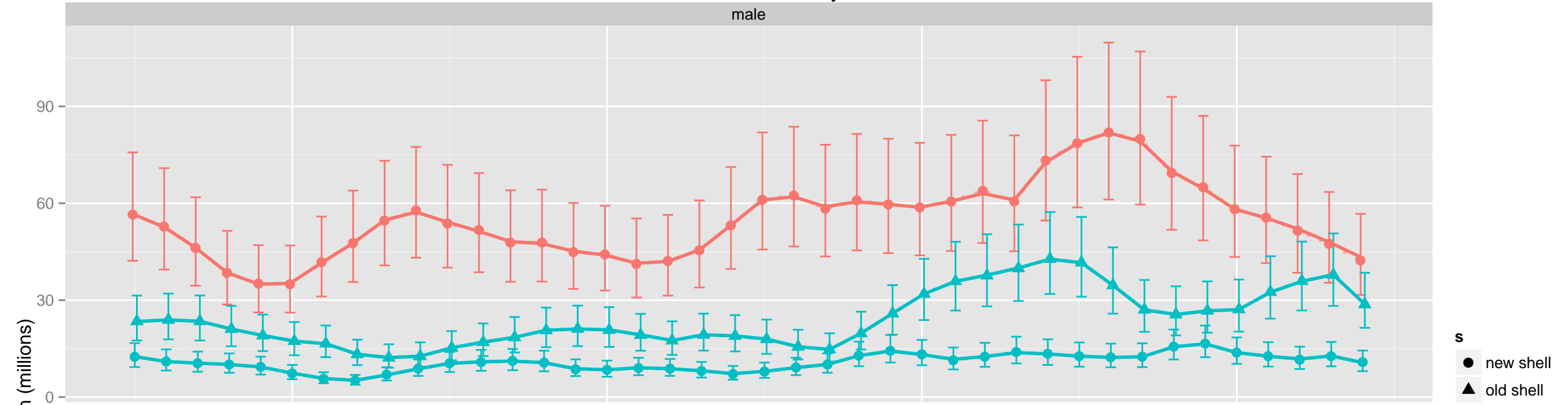


Data Components: retained catch

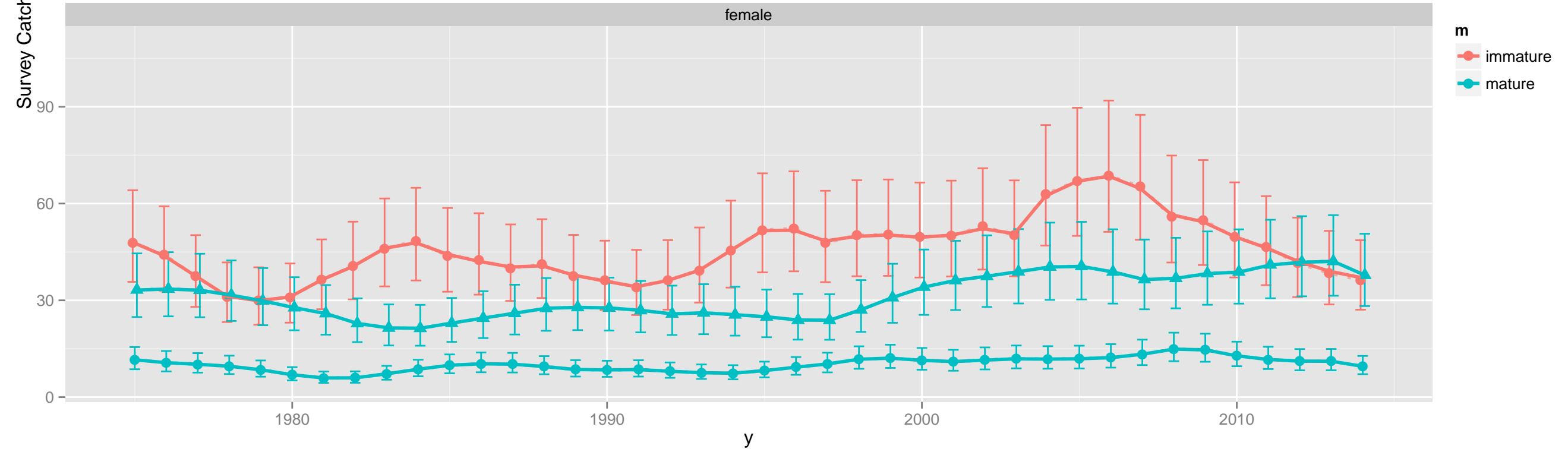


NMFS trawl survey

male

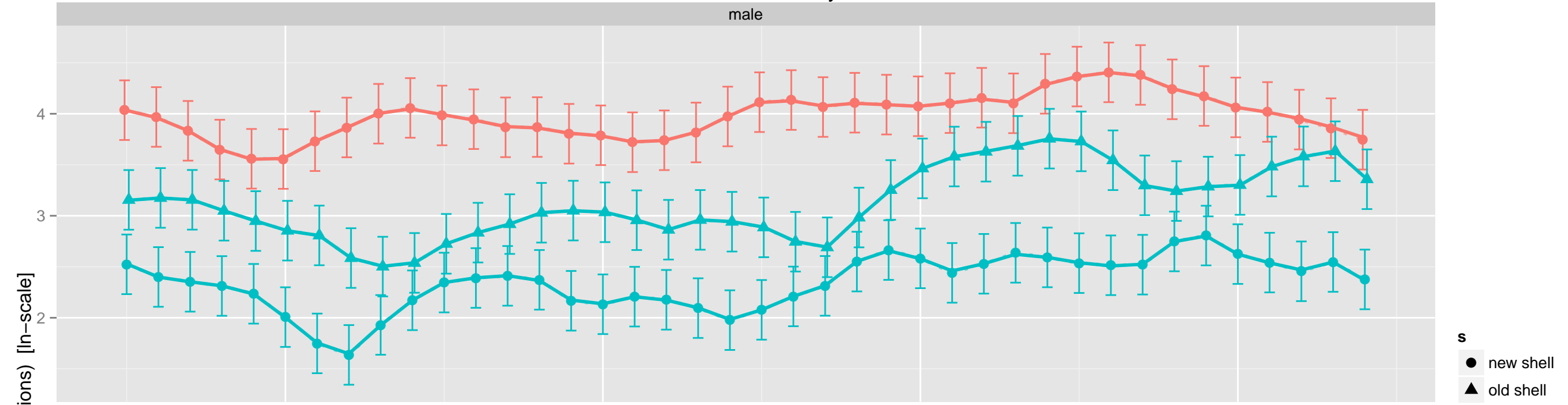


female

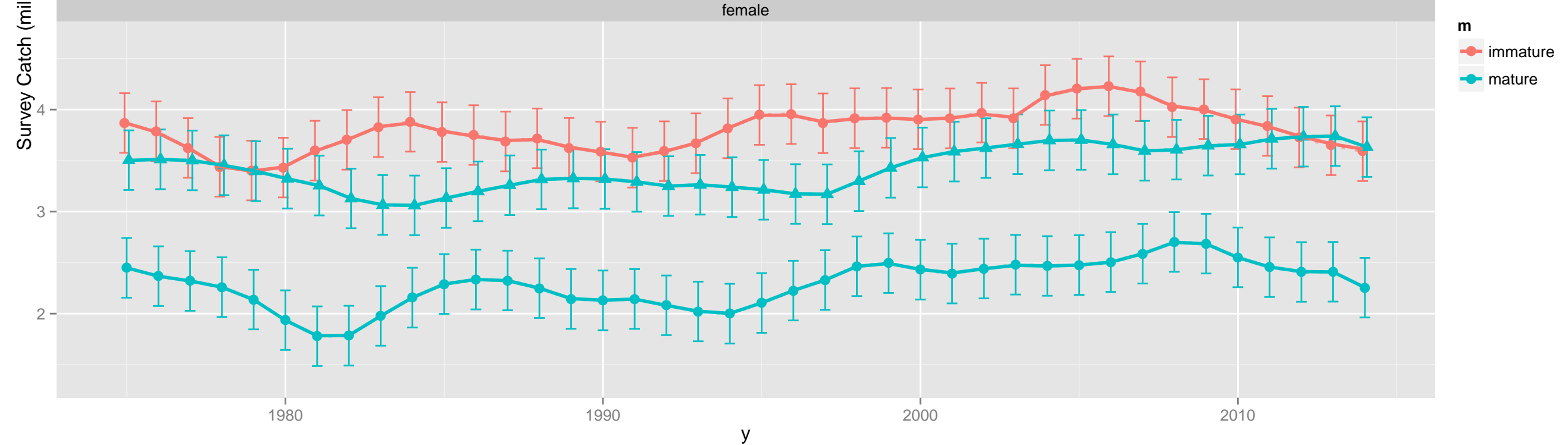


NMFS trawl survey

male

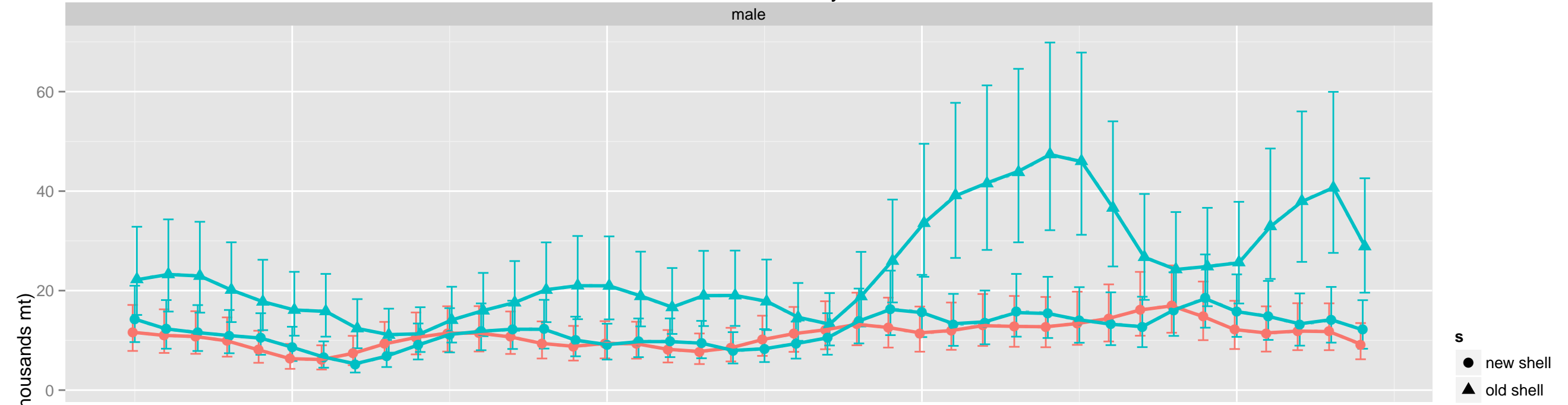


female

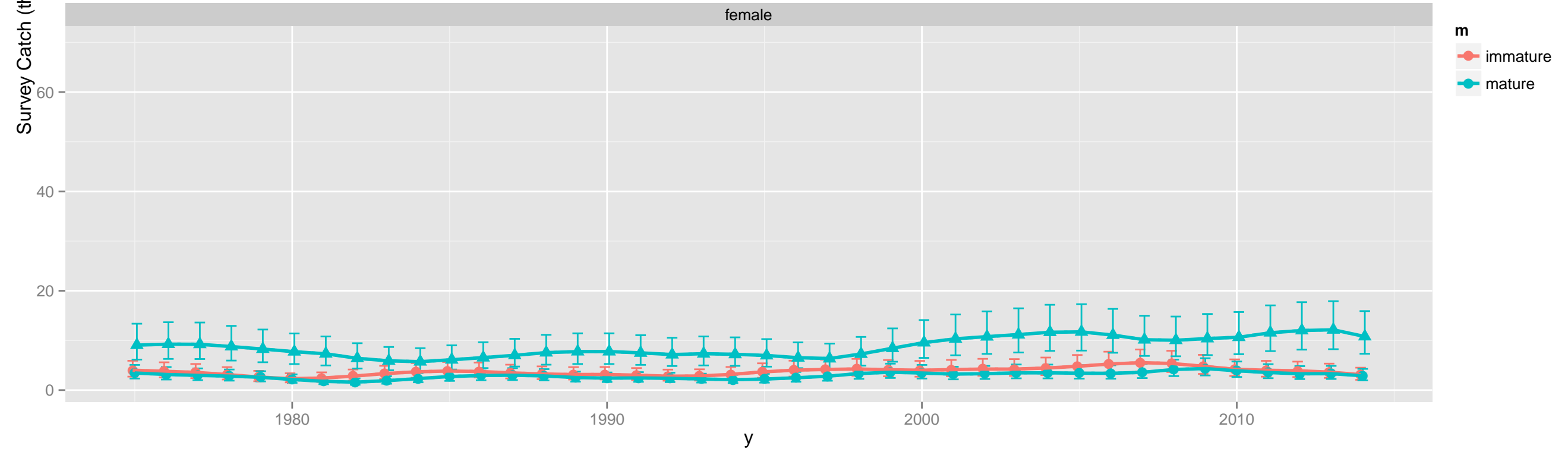


NMFS trawl survey

male

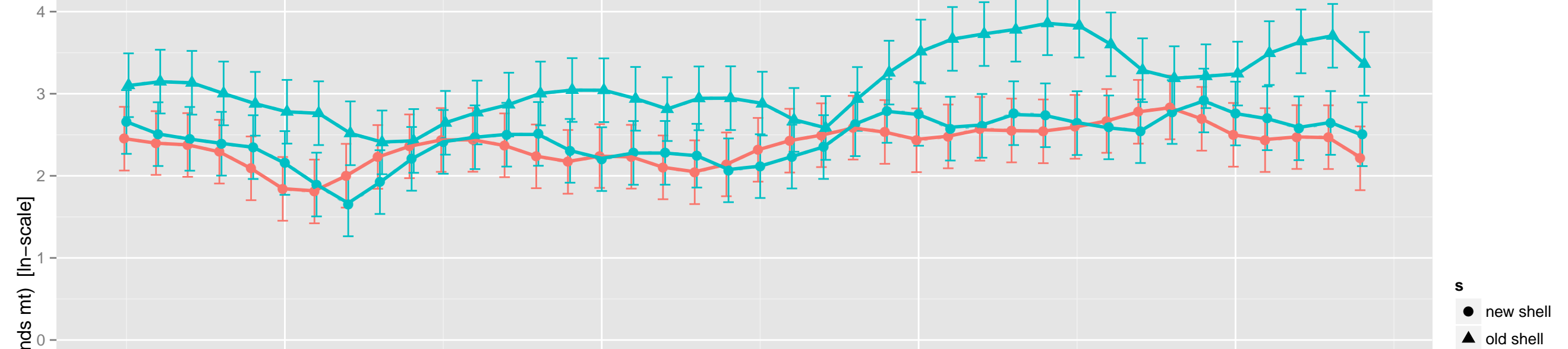


female

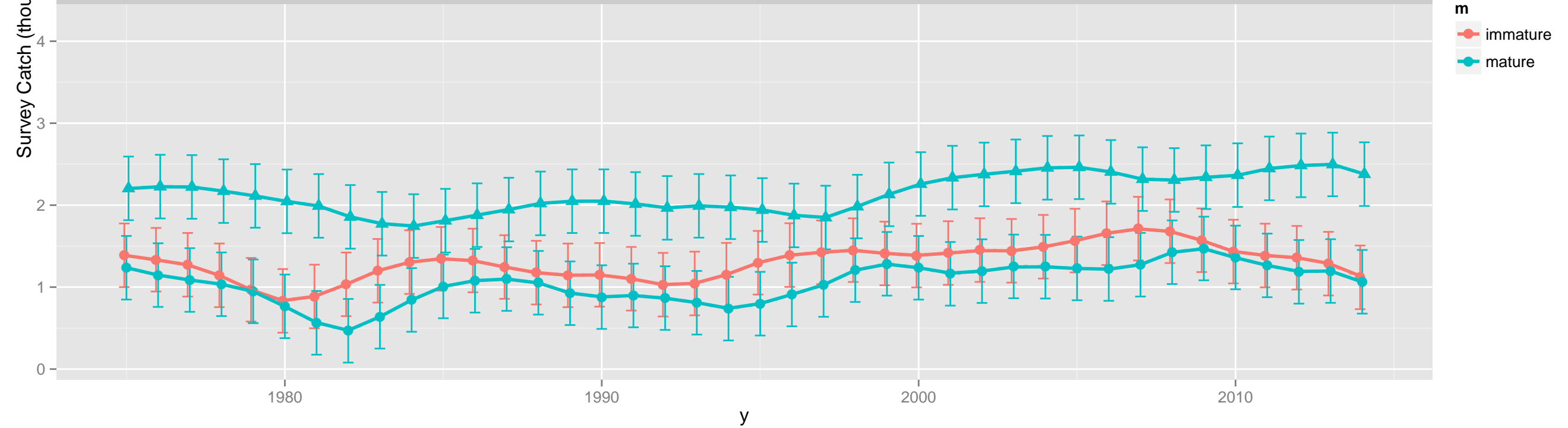


NMFS trawl survey

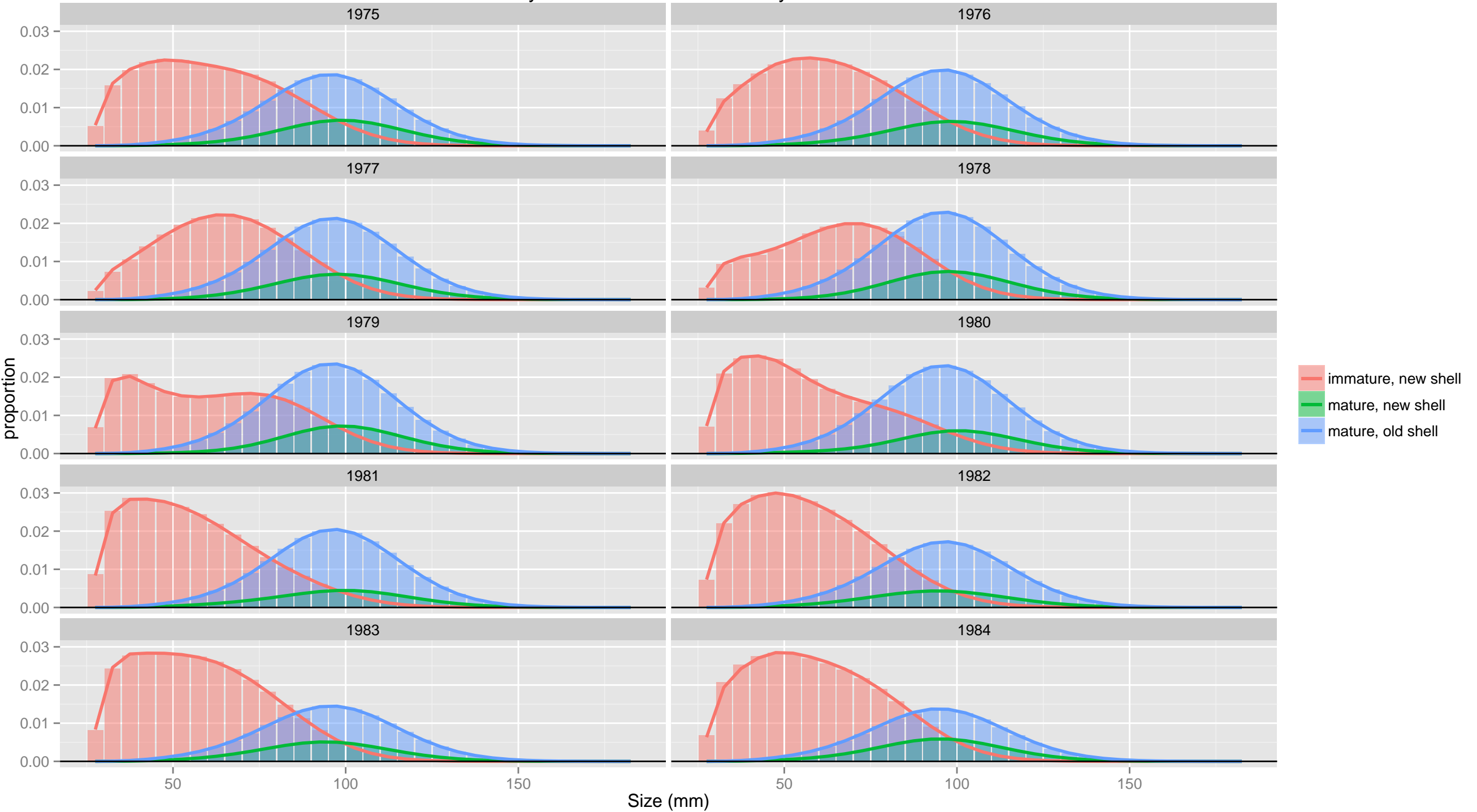
male



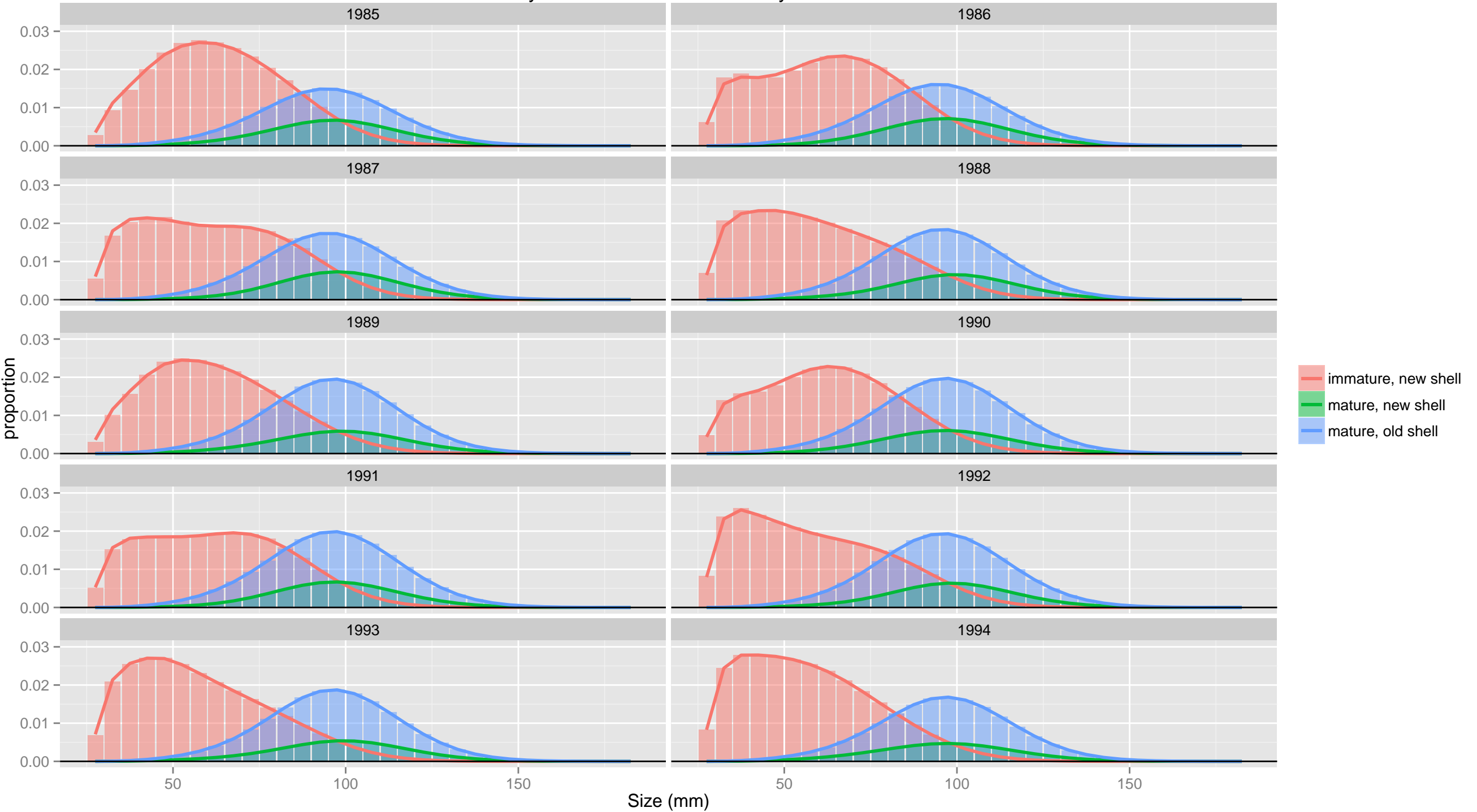
female



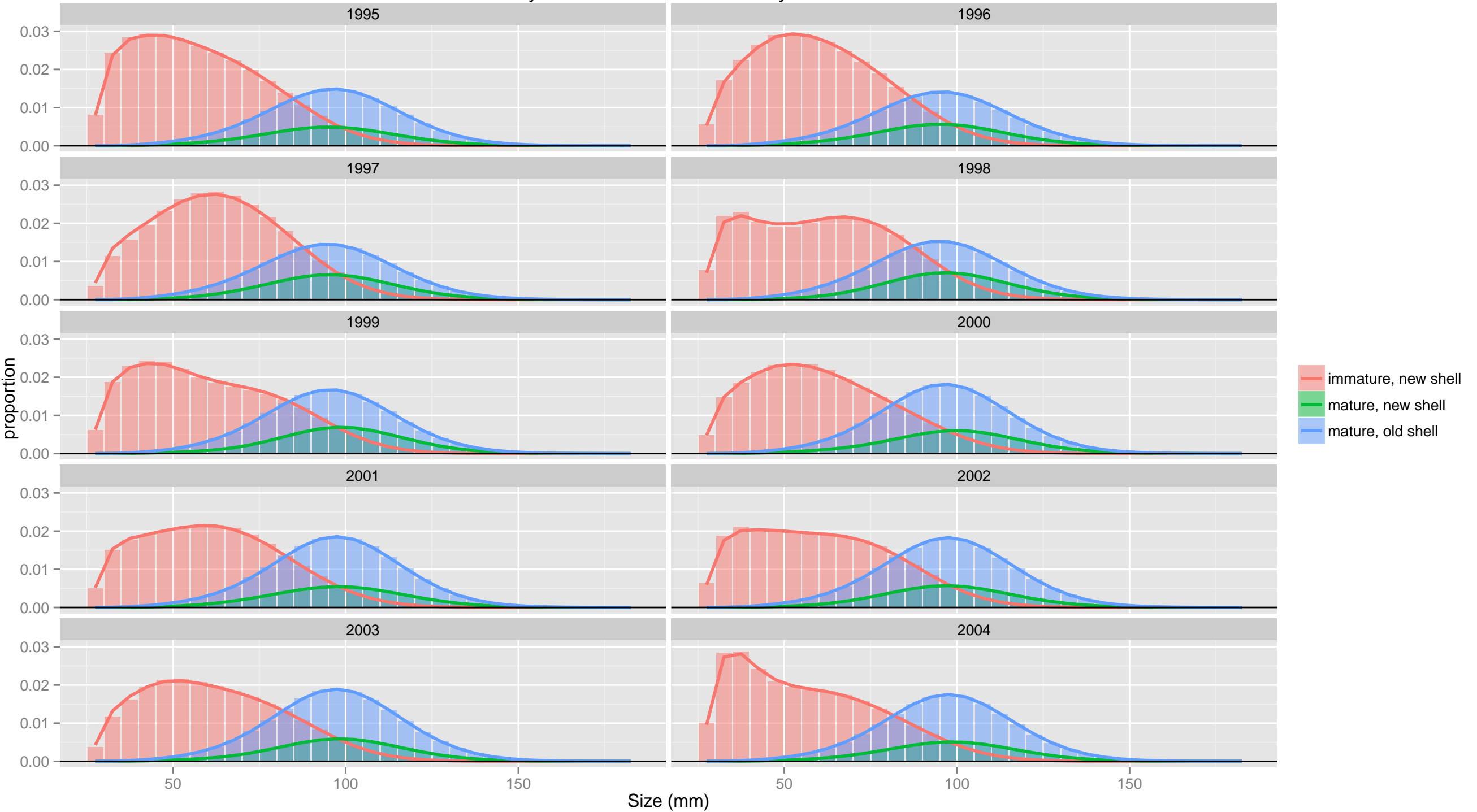
Survey Catch: NMFS trawl survey: female



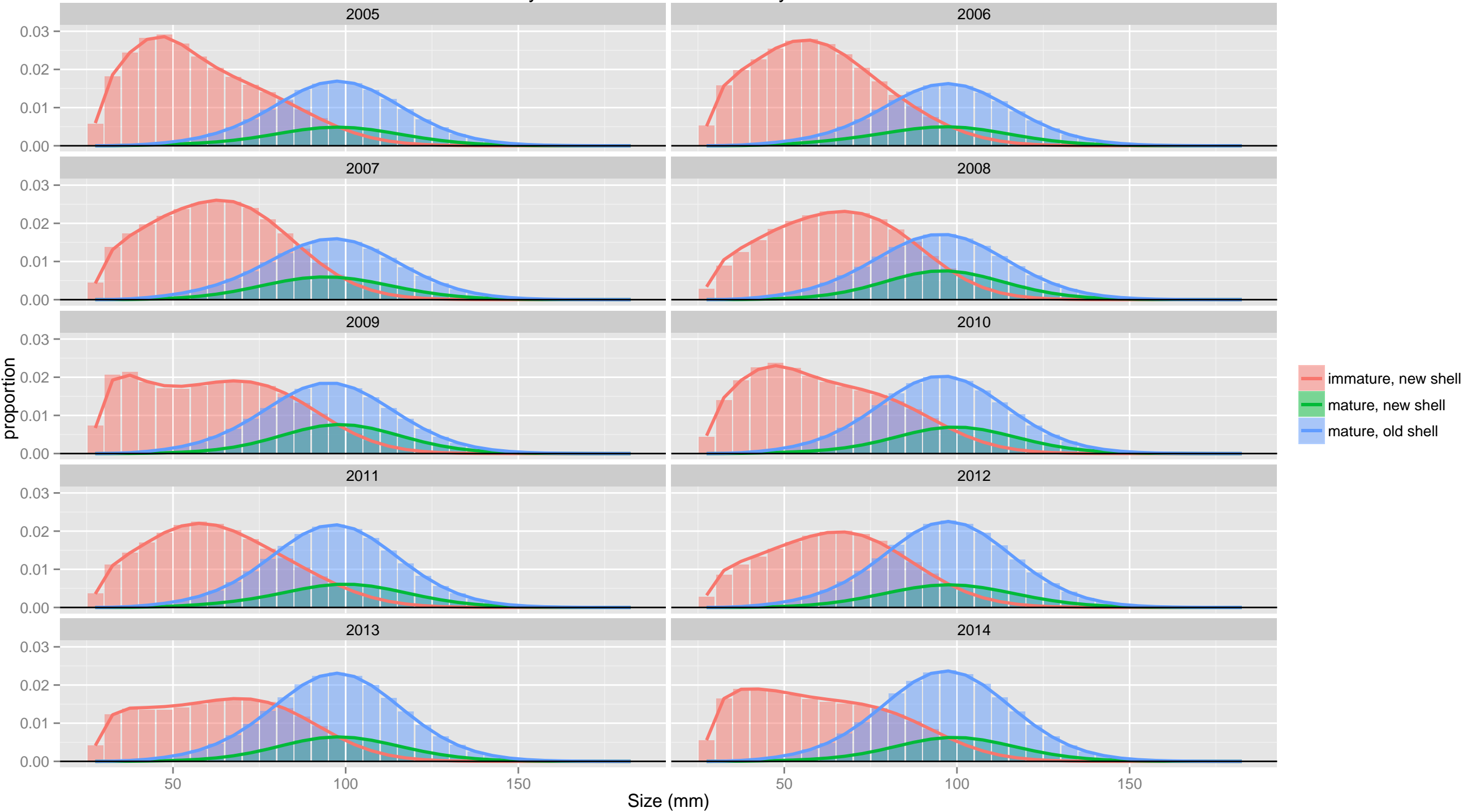
Survey Catch: NMFS trawl survey: female



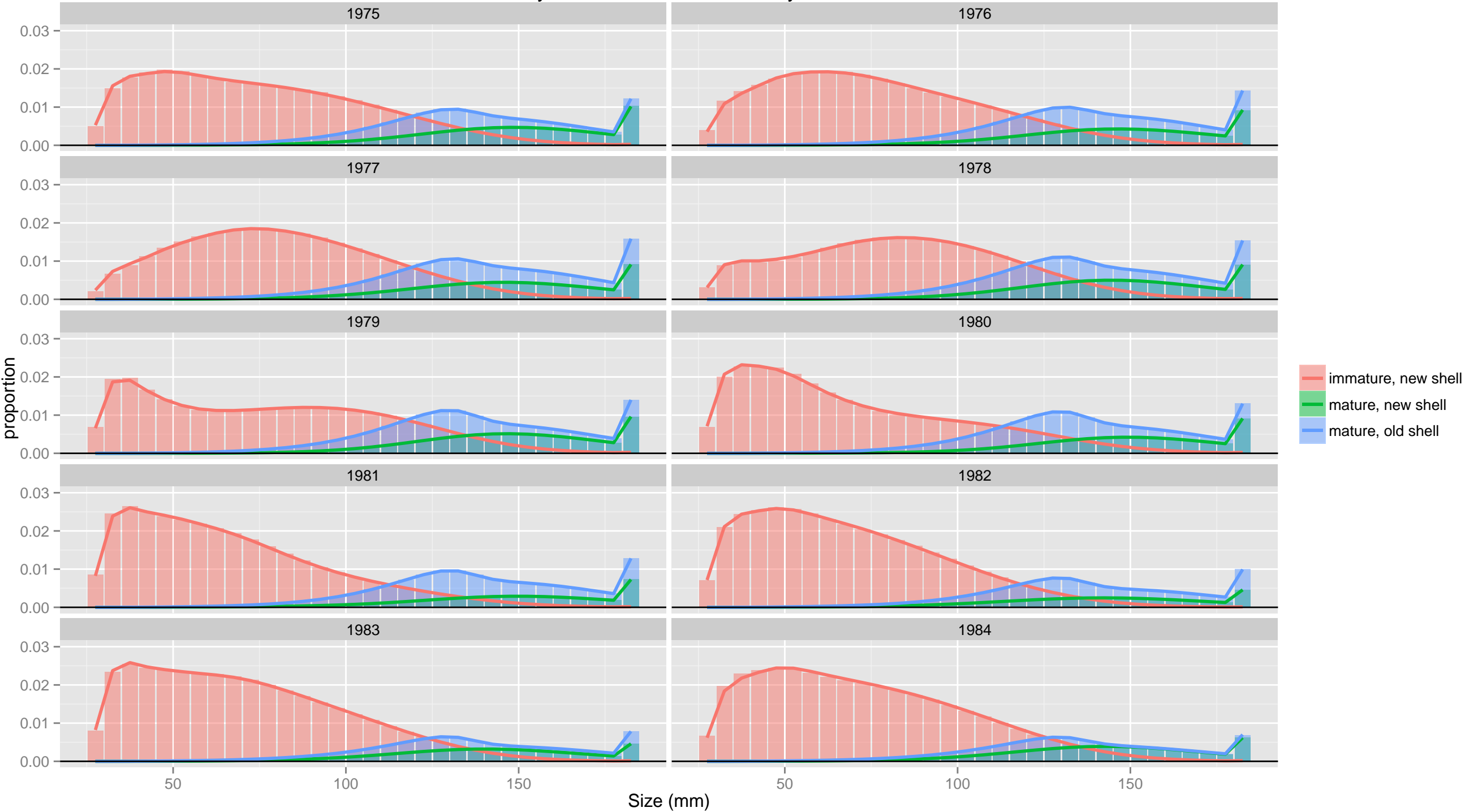
Survey Catch: NMFS trawl survey: female



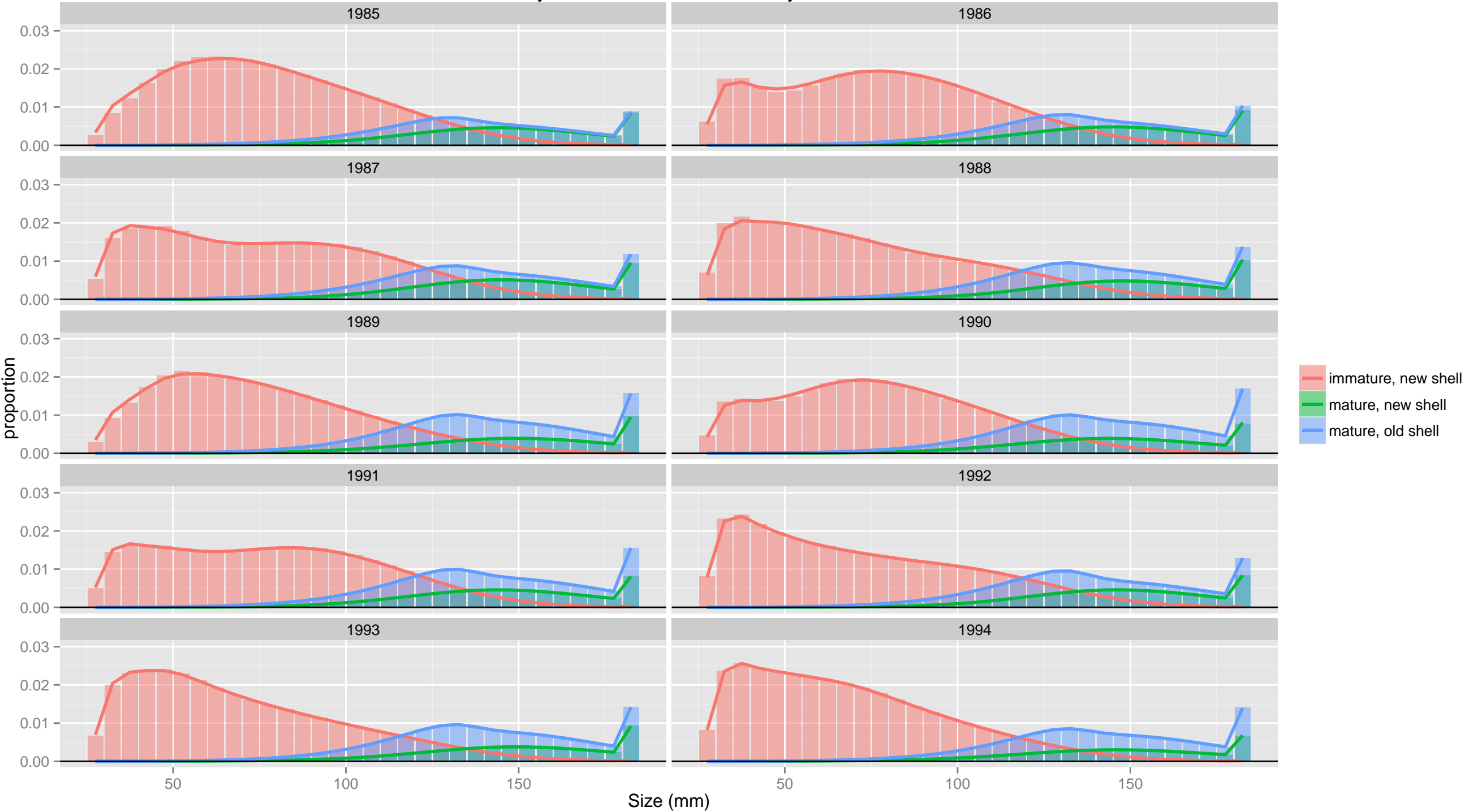
Survey Catch: NMFS trawl survey: female



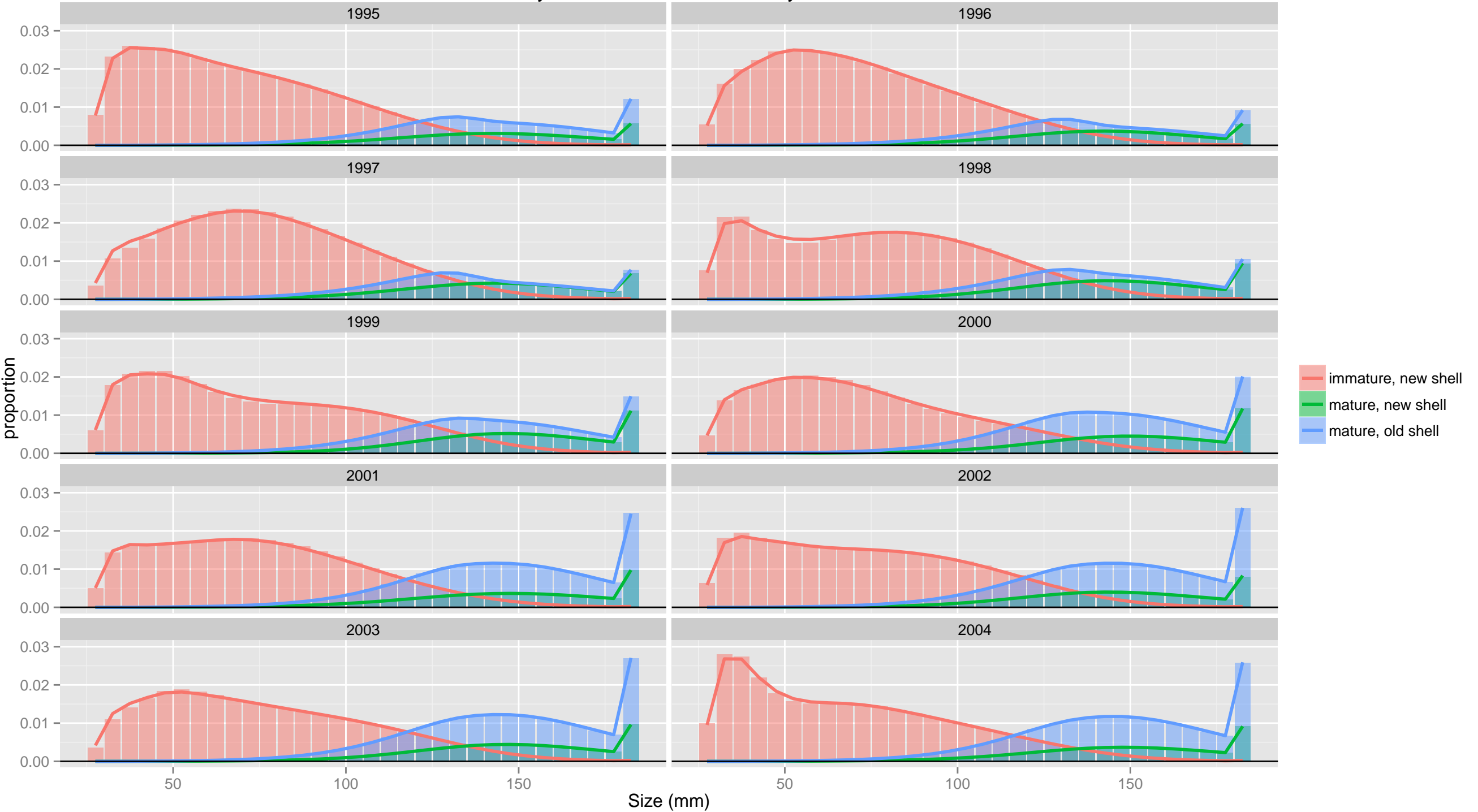
Survey Catch: NMFS trawl survey: male



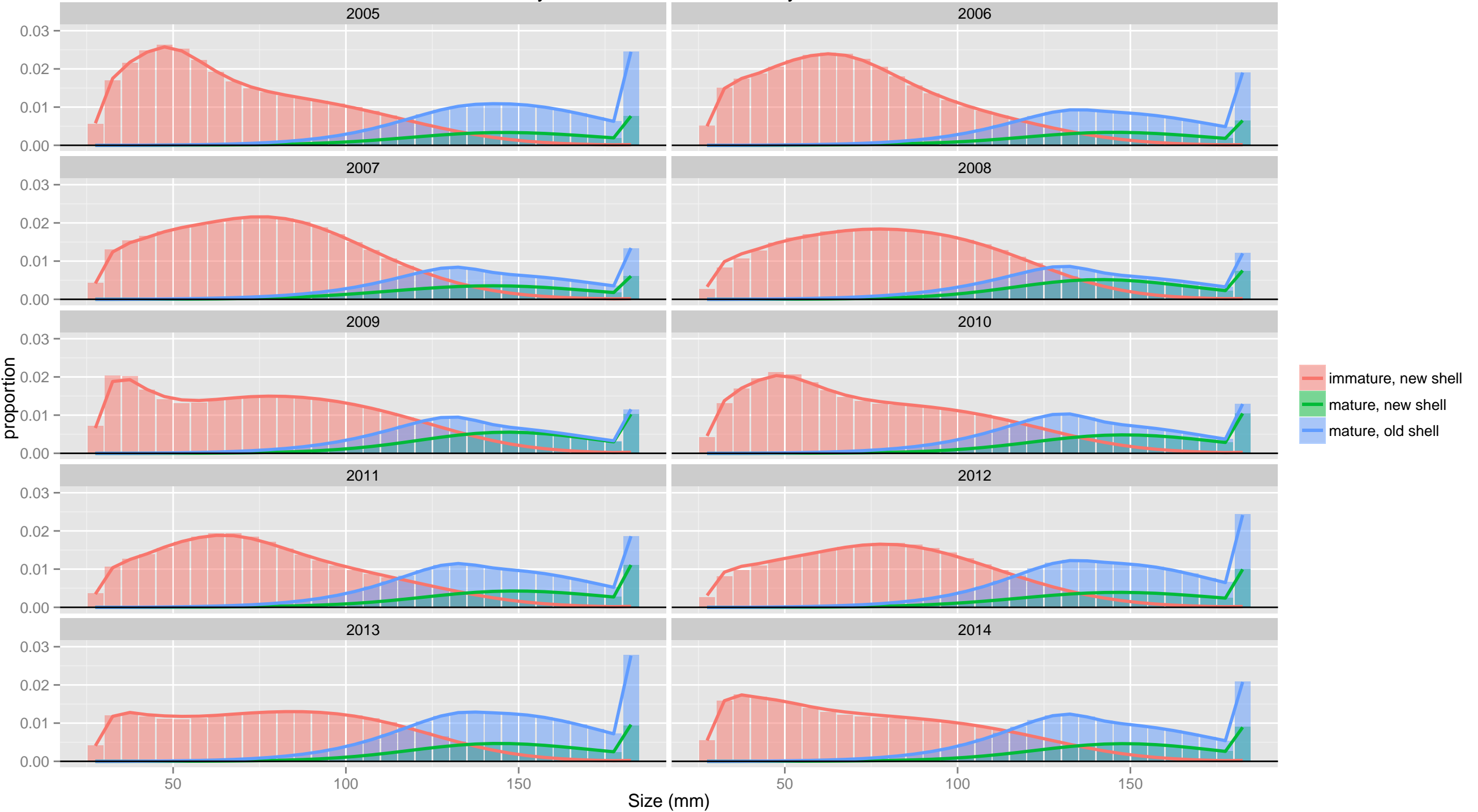
Survey Catch: NMFS trawl survey: male



Survey Catch: NMFS trawl survey: male



Survey Catch: NMFS trawl survey: male



Survey Catch: NMFS trawl survey

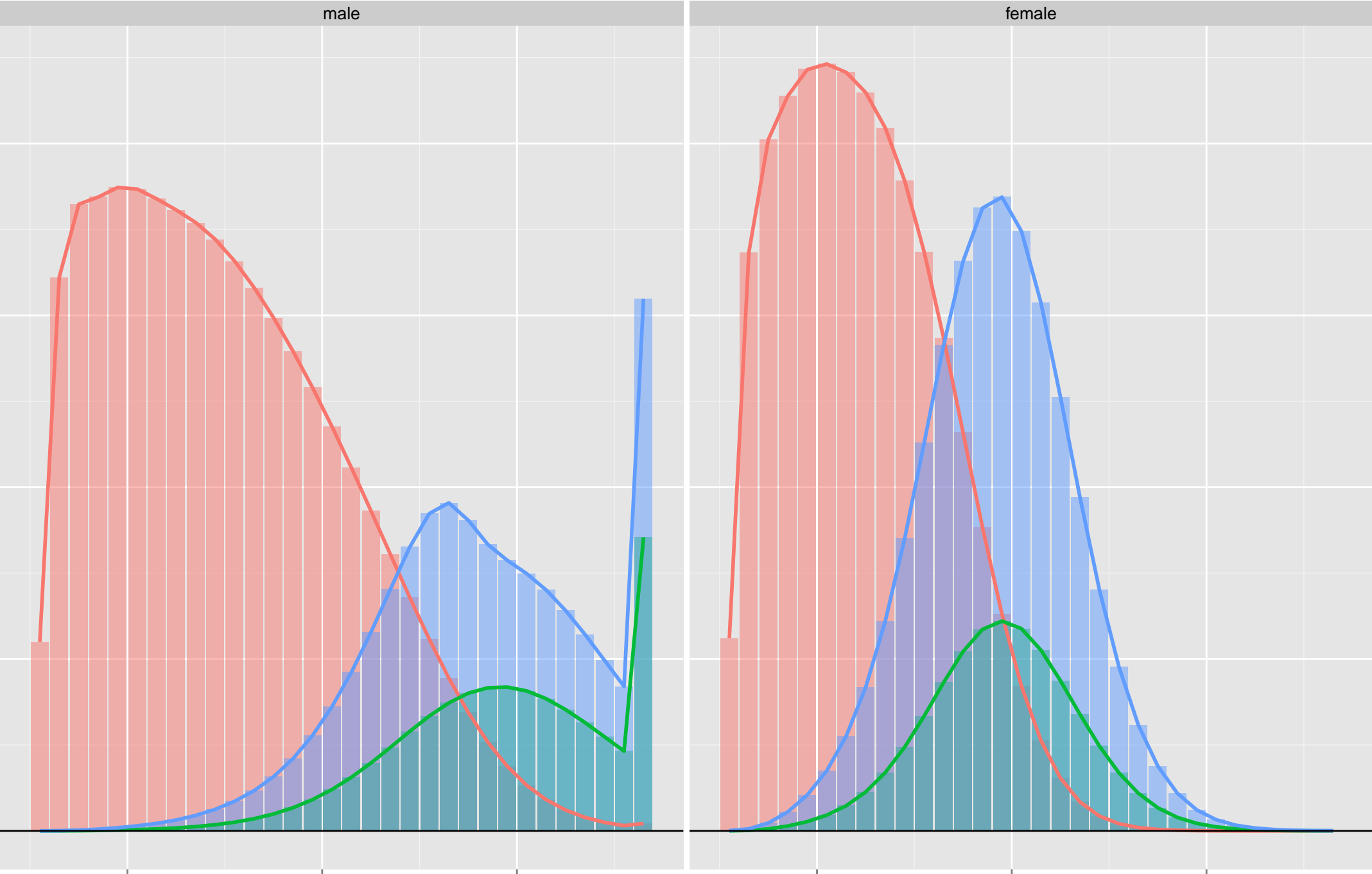
male

female

proportion

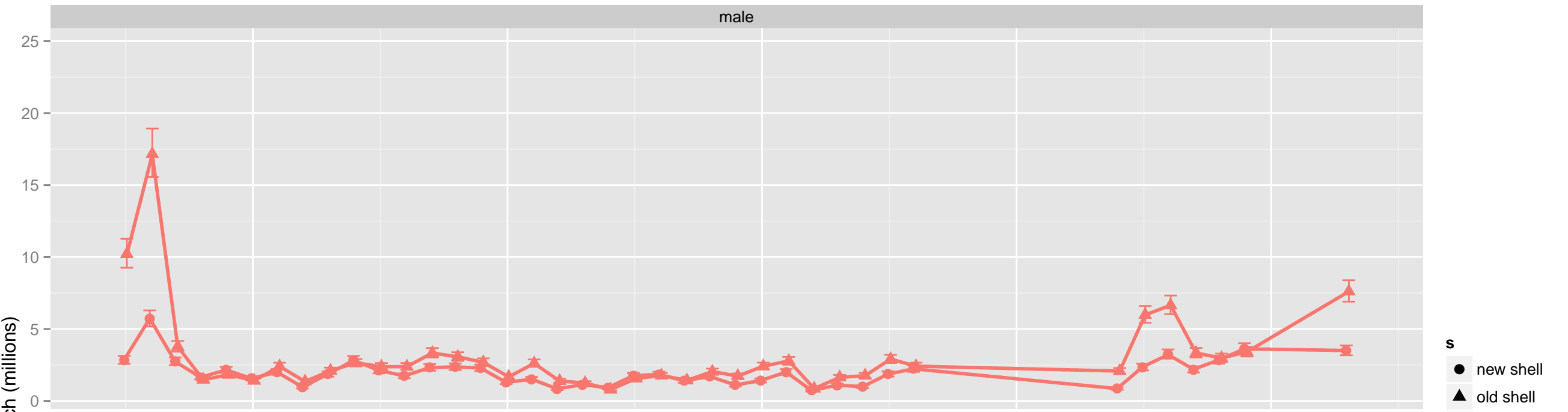
- immature, new shell
- mature, new shell
- mature, old shell

Size (mm)

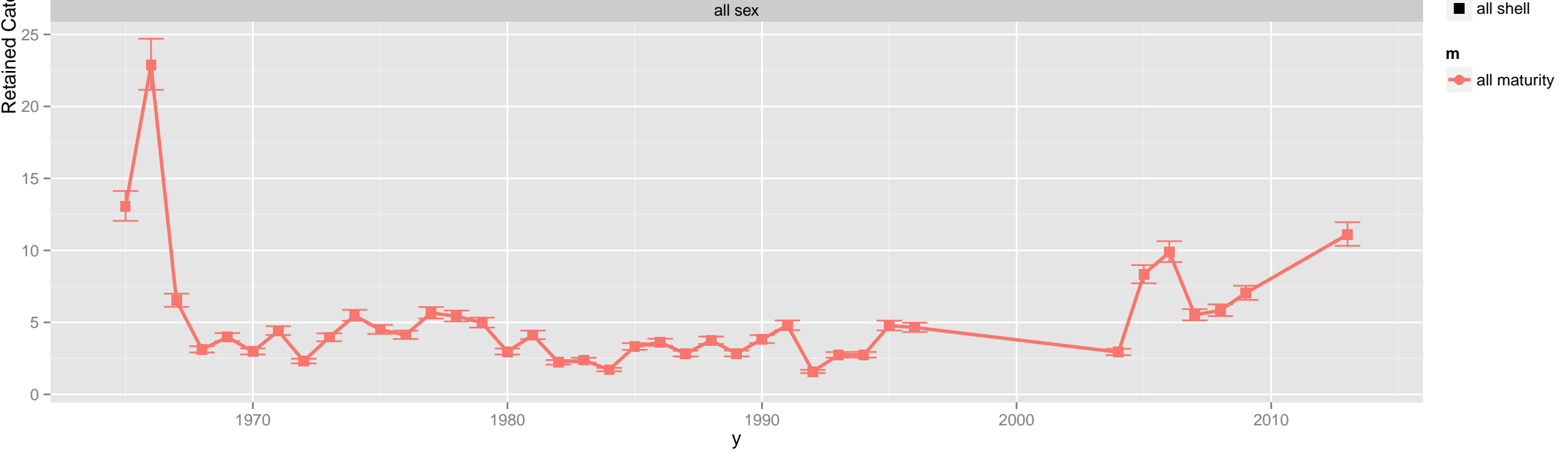


TCF

male

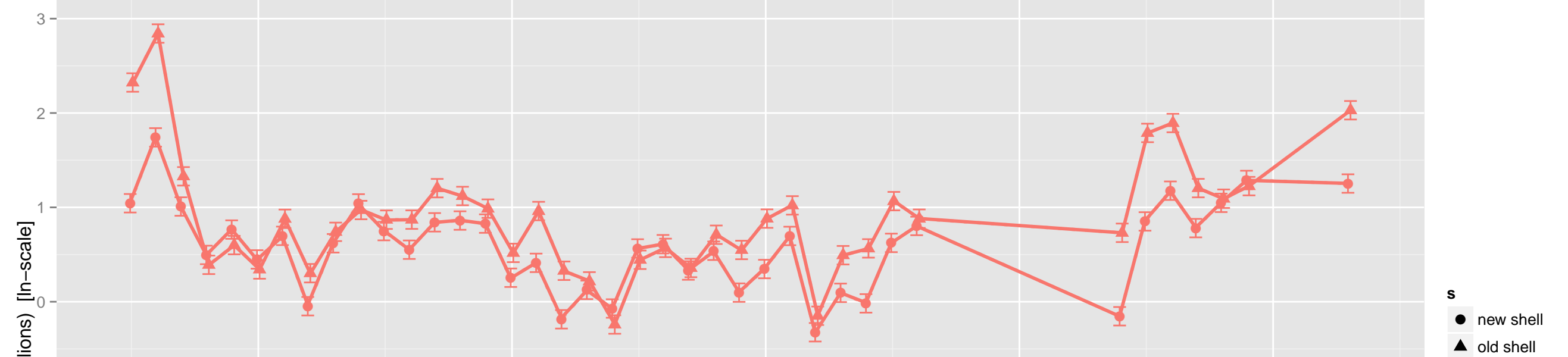


all sex

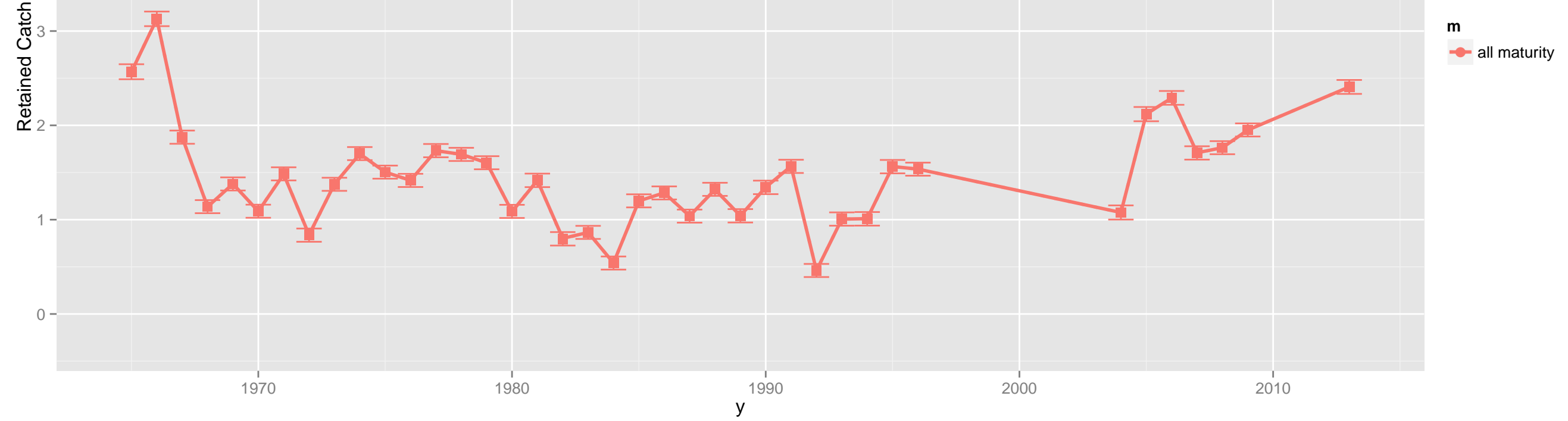


TCF

male

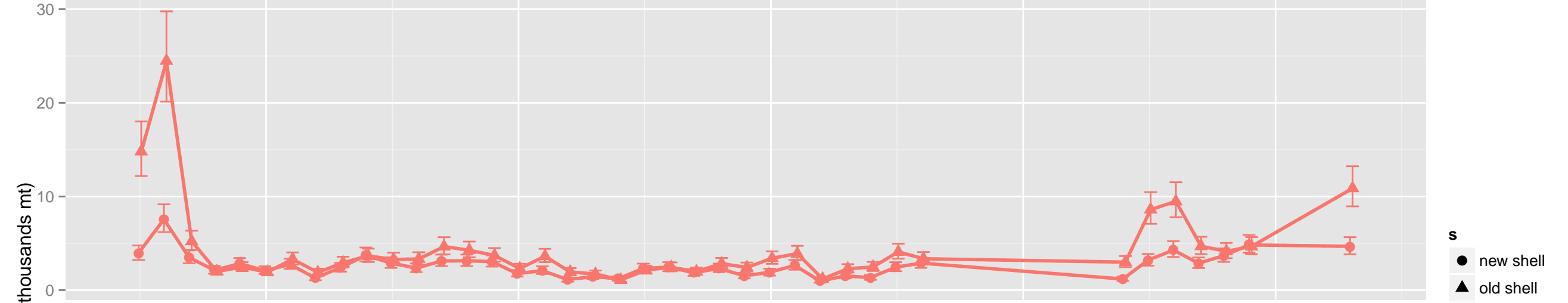


all sex

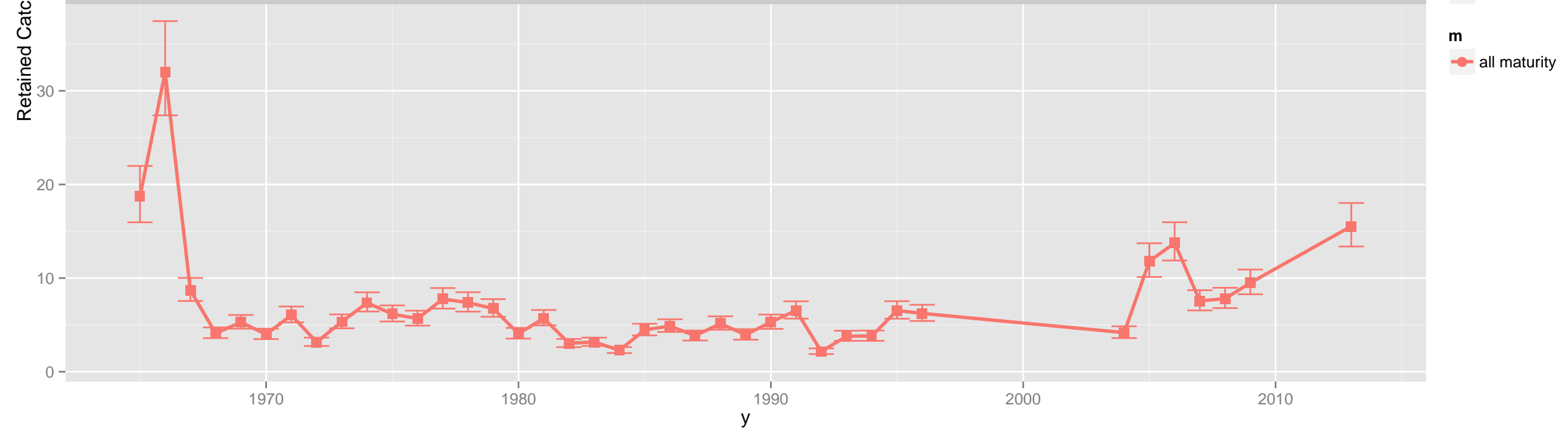


TCF

male

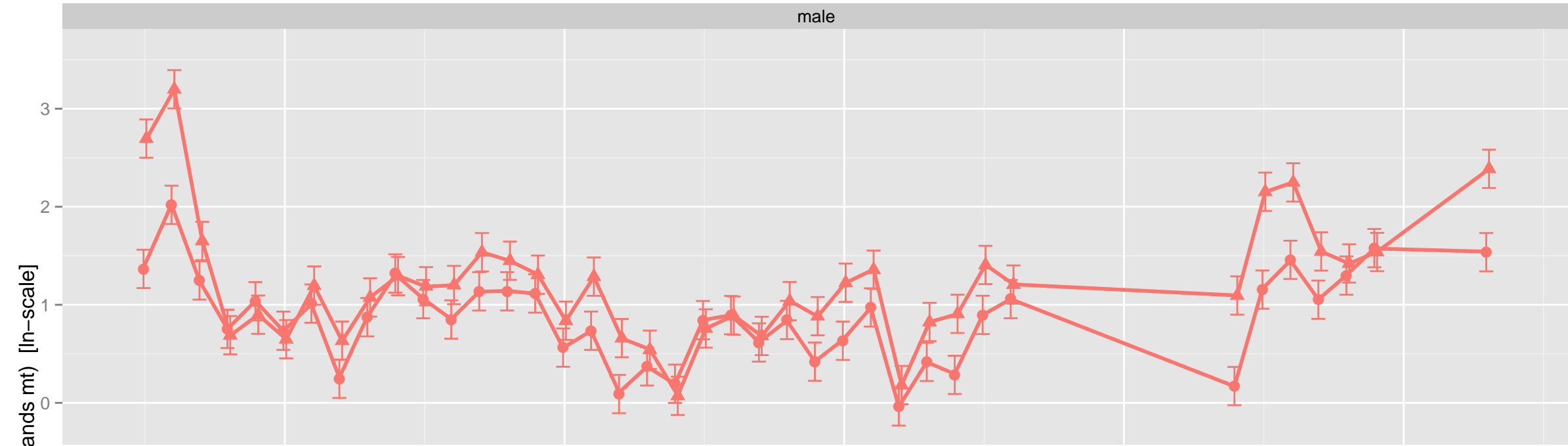


all sex

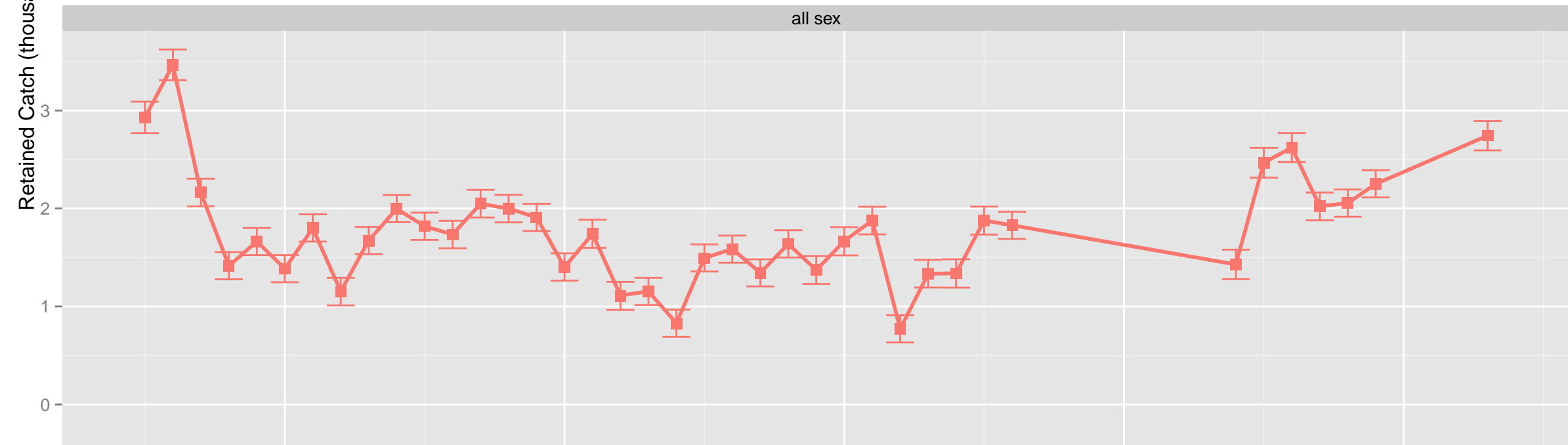


TCF

male

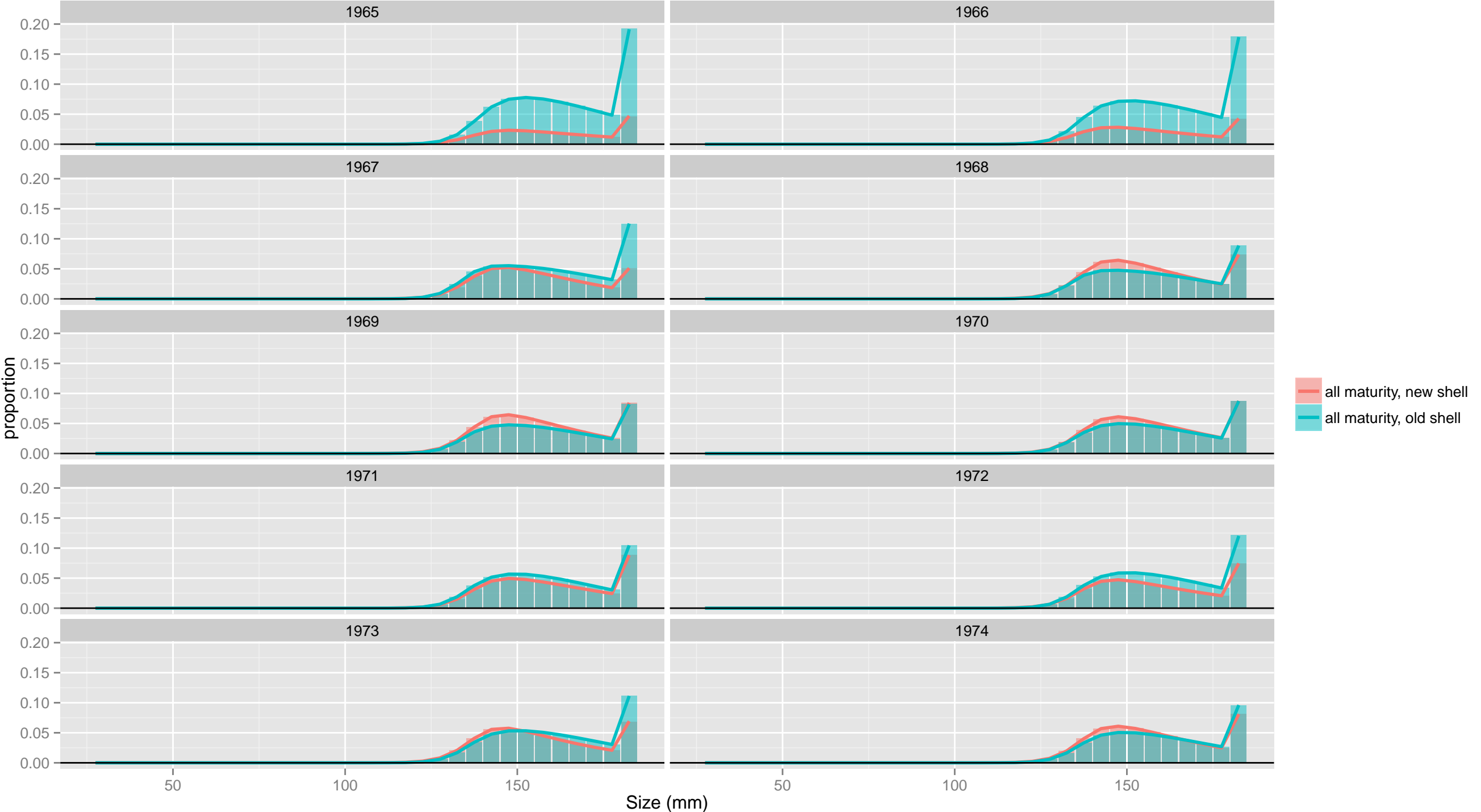


all sex

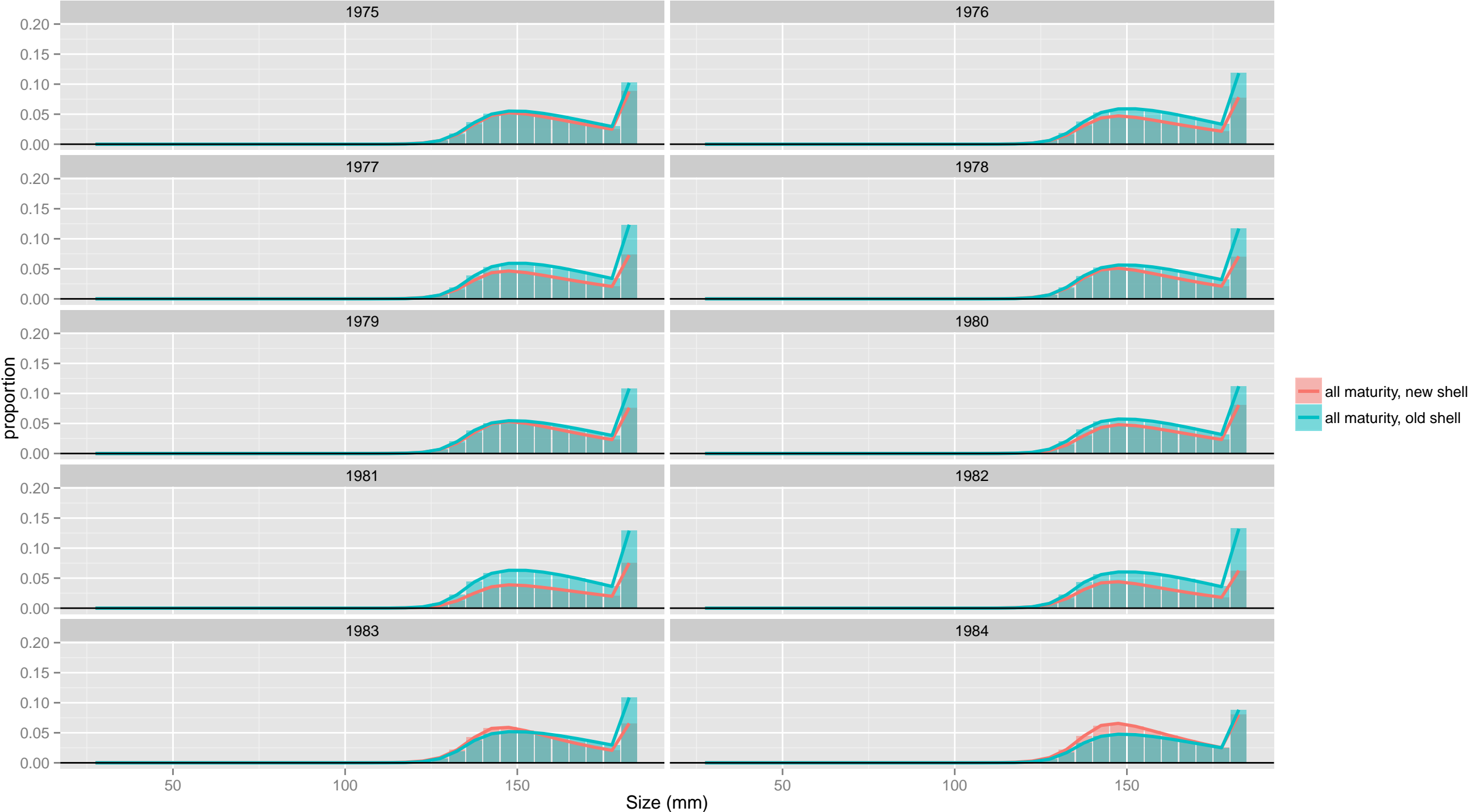


y

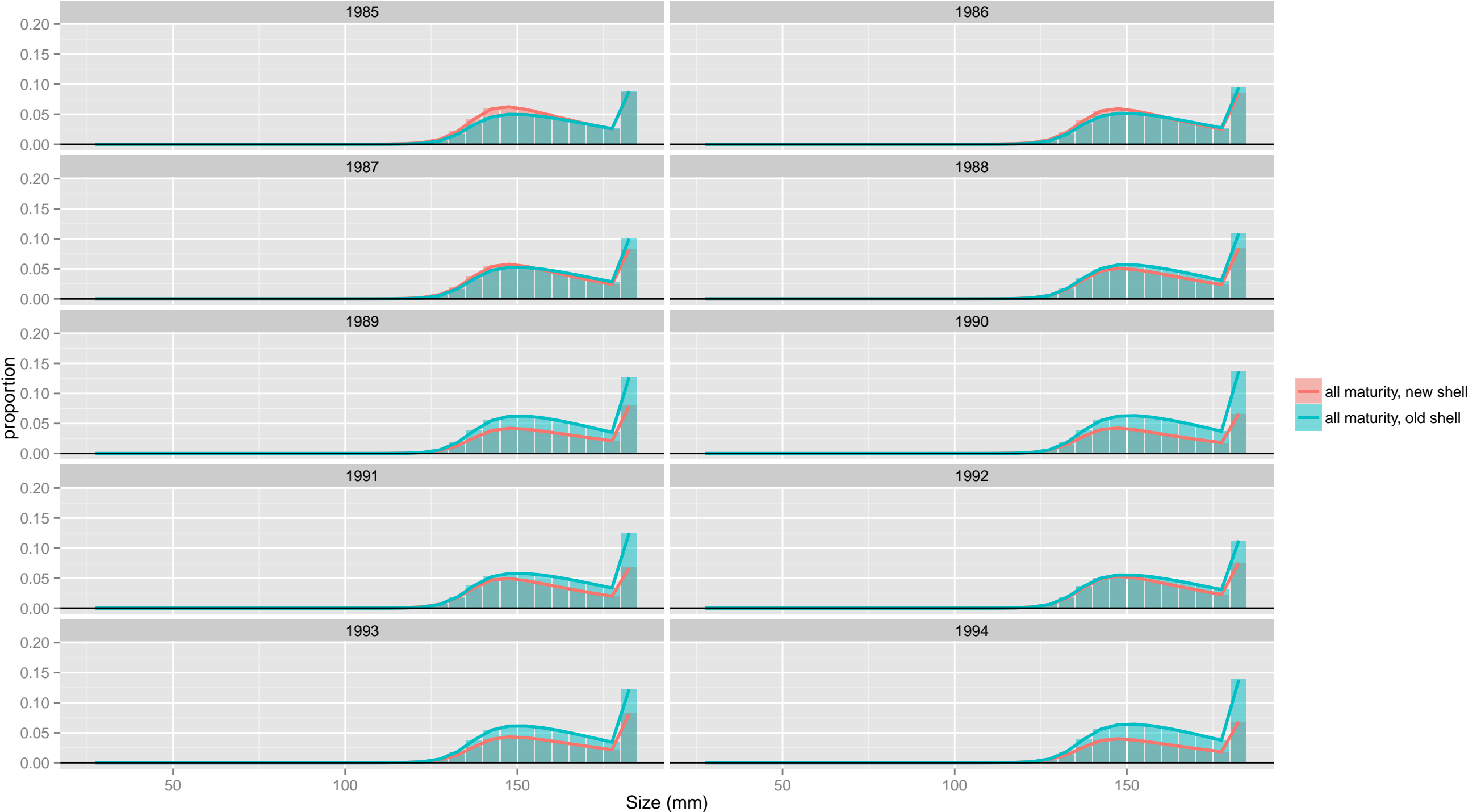
Retained Catch: TCF: male



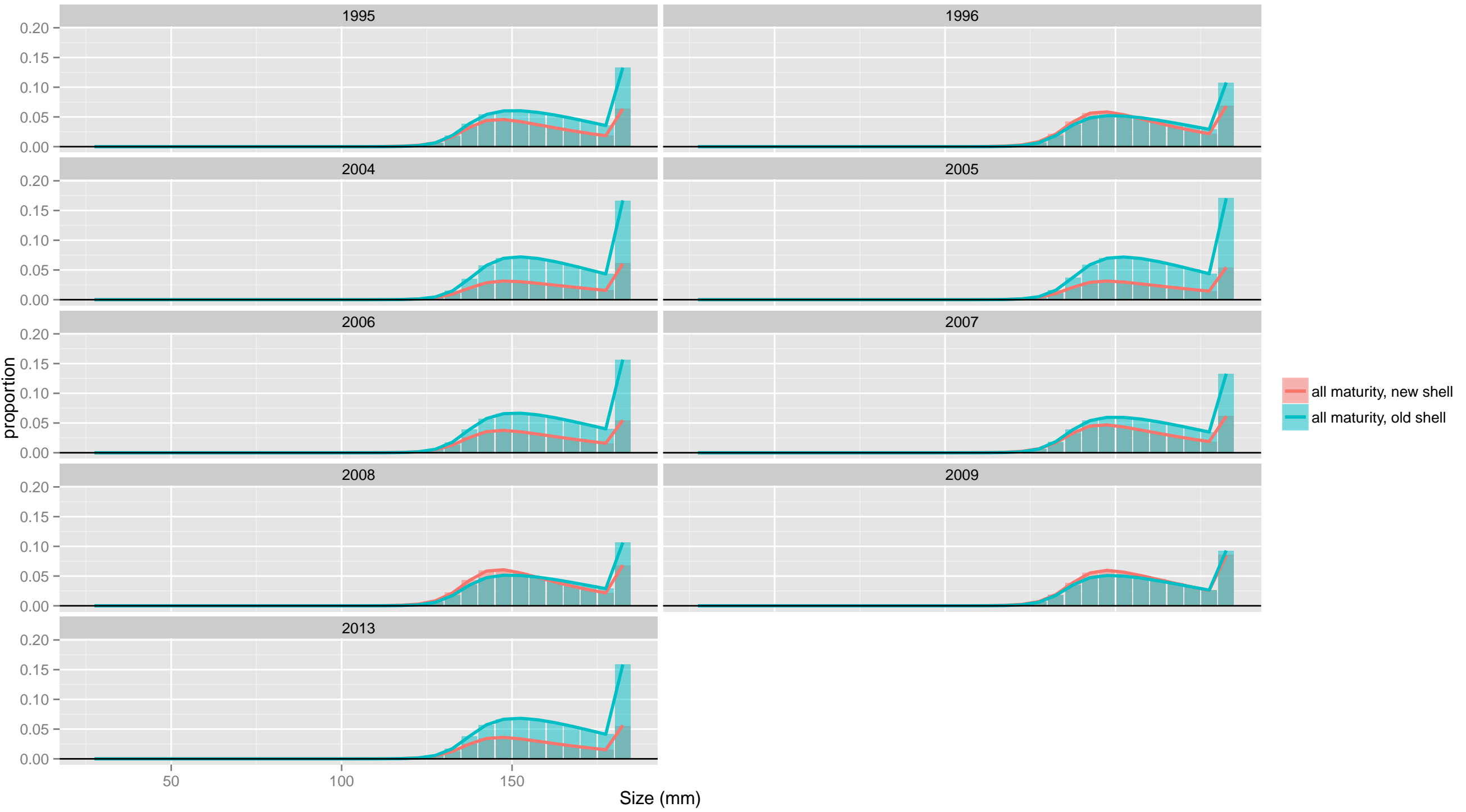
Retained Catch: TCF: male



Retained Catch: TCF: male

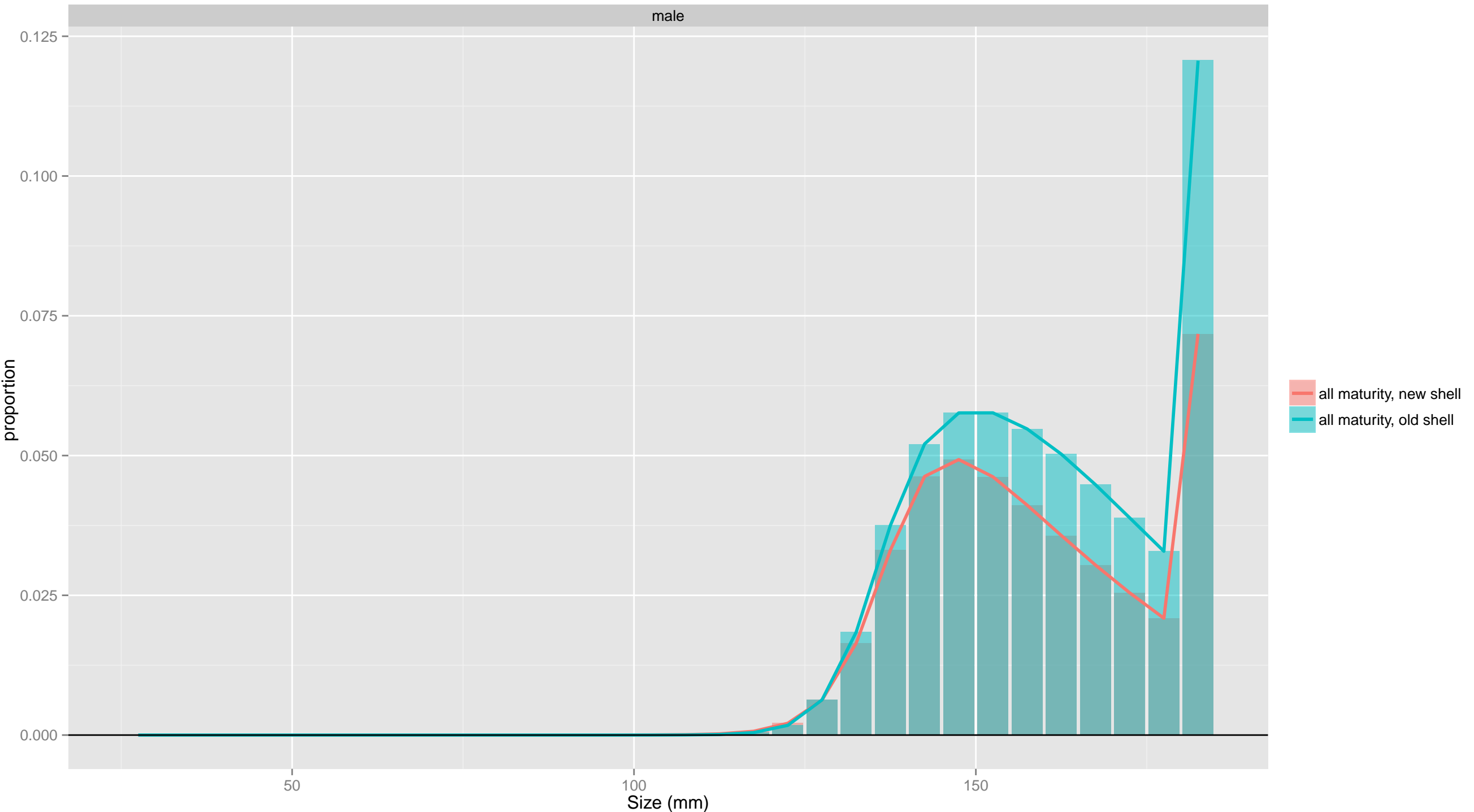


Retained Catch: TCF: male



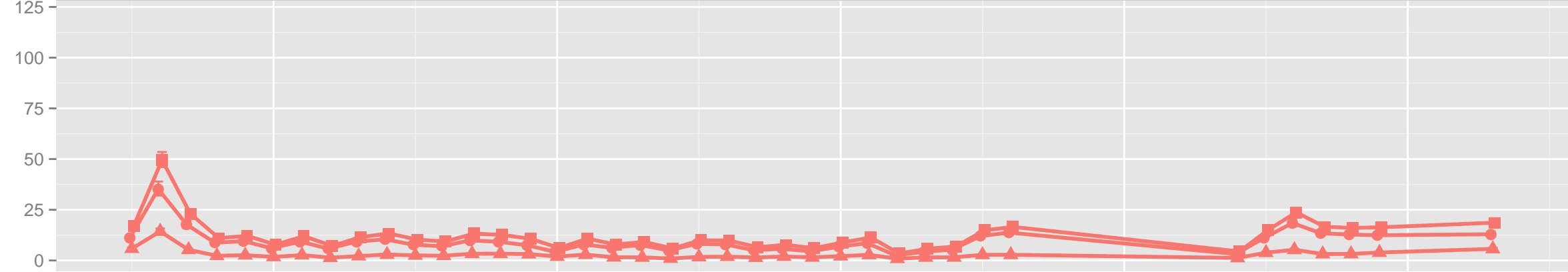
Retained Catch: TCF

male

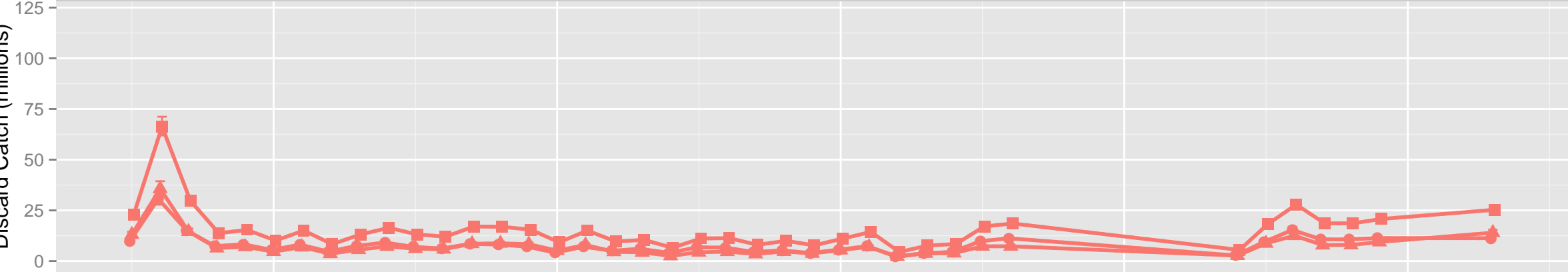


TCF

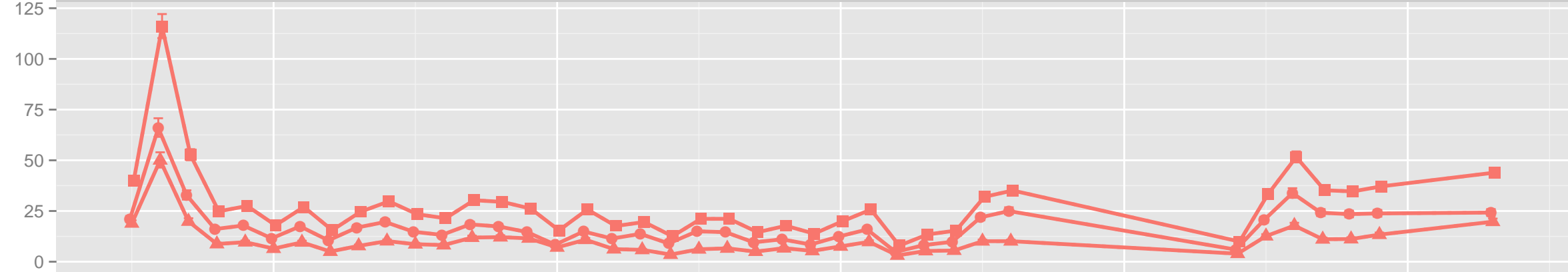
male



female



all sex



s

- new shell
- ▲ old shell
- all shell

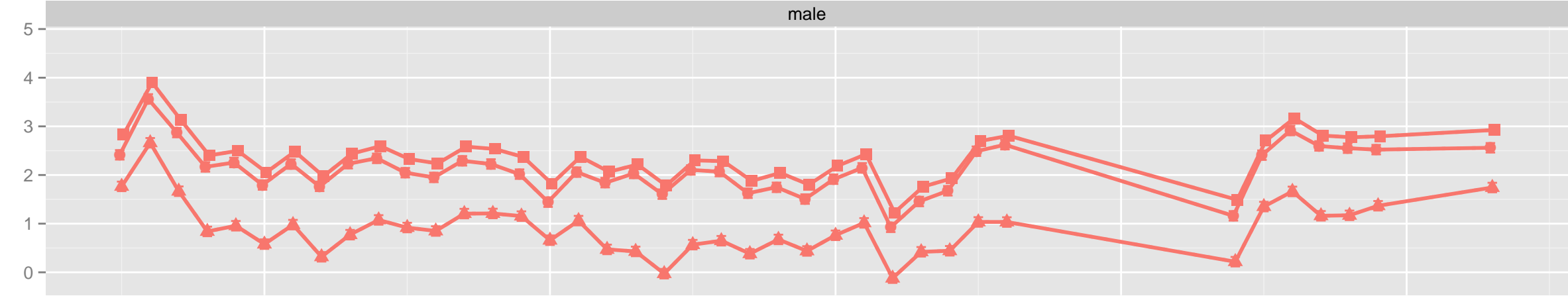
m

- all maturity

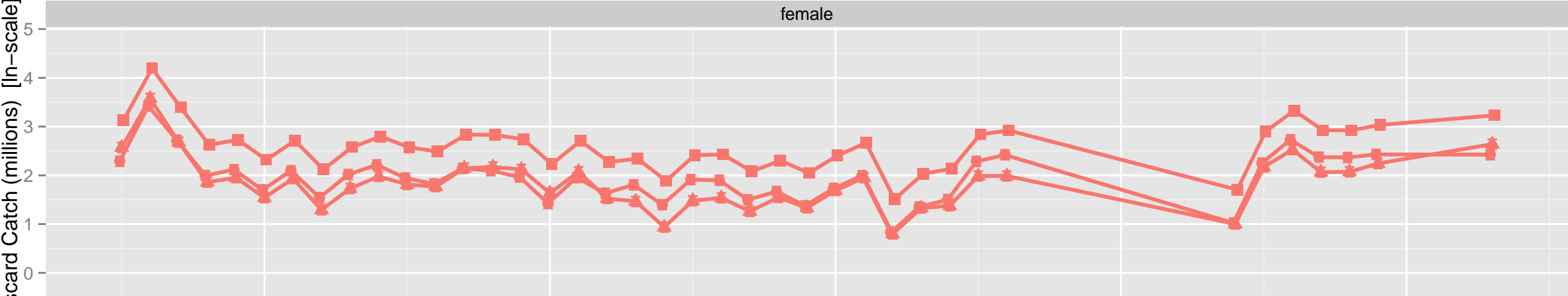
y

TCF

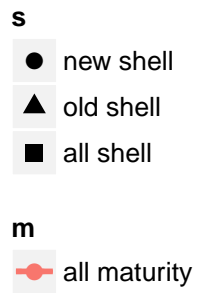
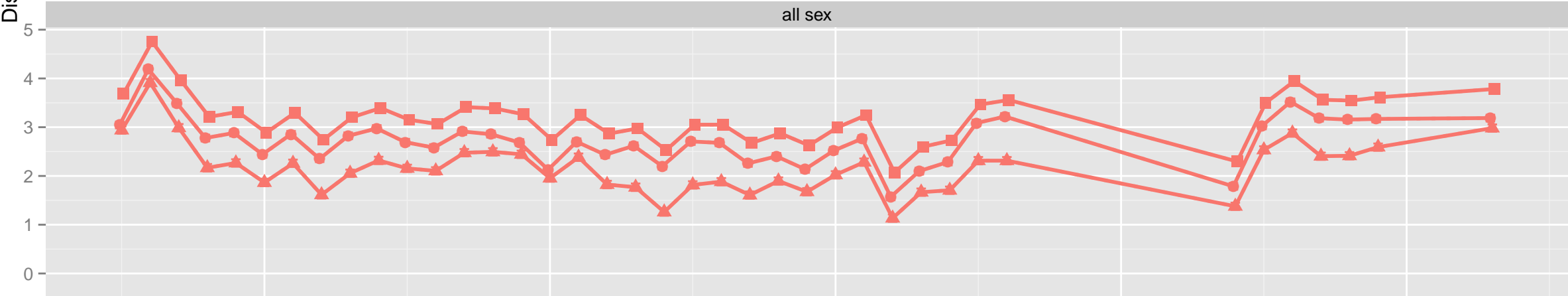
male



female



all sex



y

TCF

male

30

20

10

0

female

30

20

10

0

all sex

30

20

10

0

1970

1980

1990

2000

2010

y

s

● new shell

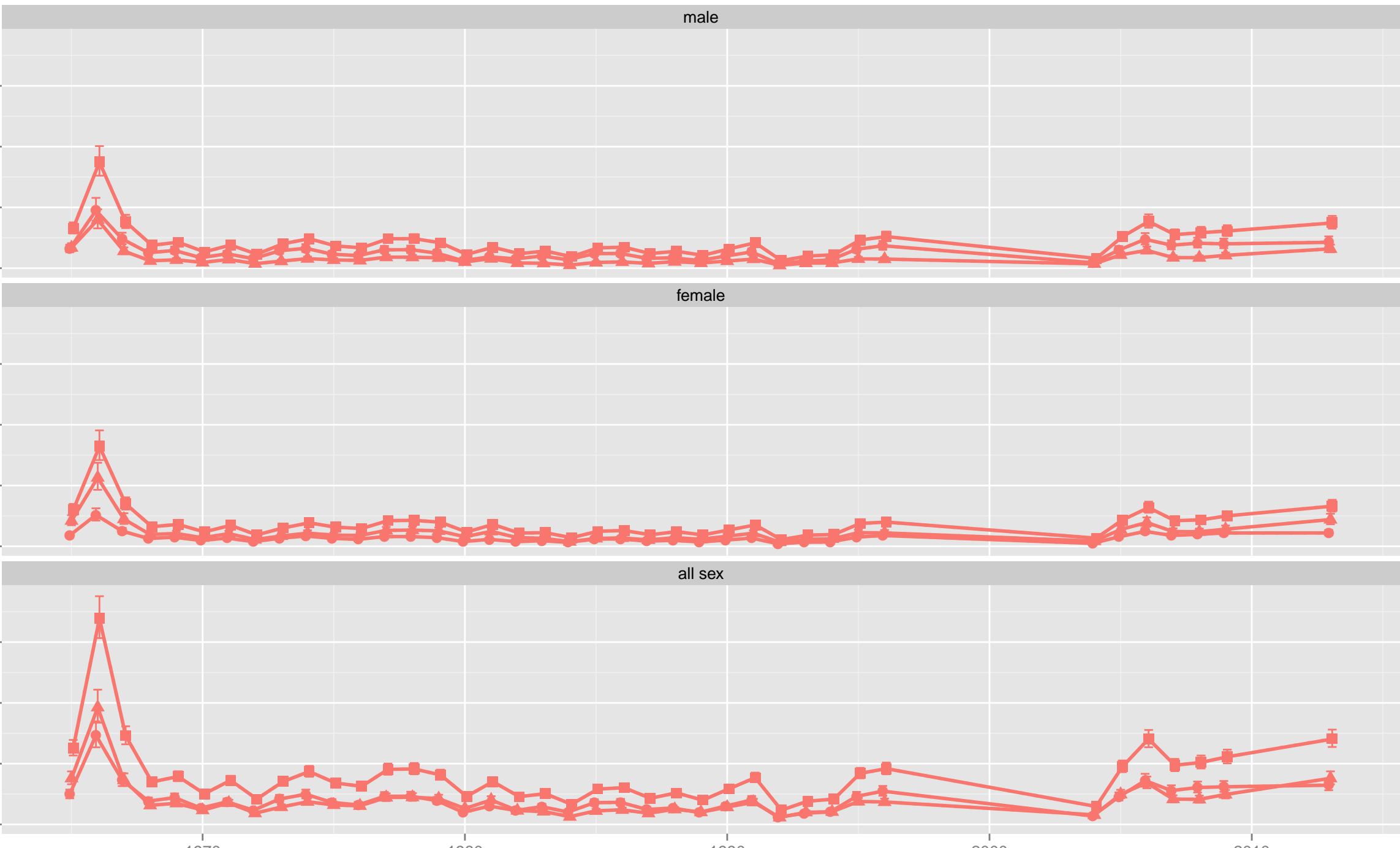
▲ old shell

■ all shell

m

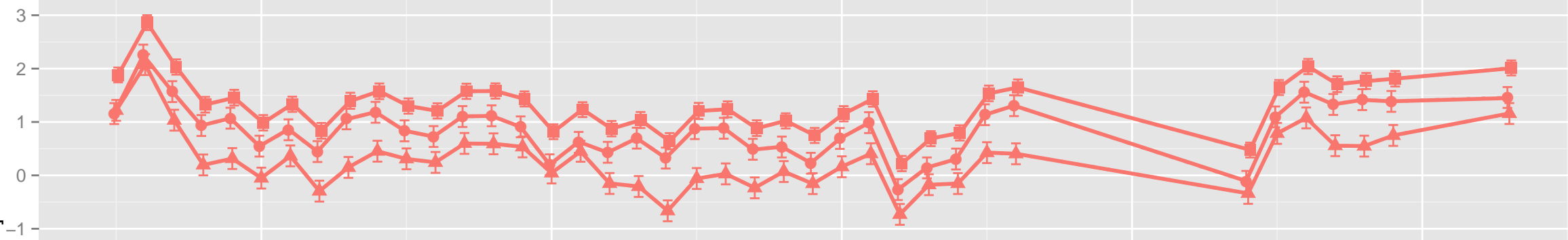
—●— all maturity

Discard Catch (thousands mt)

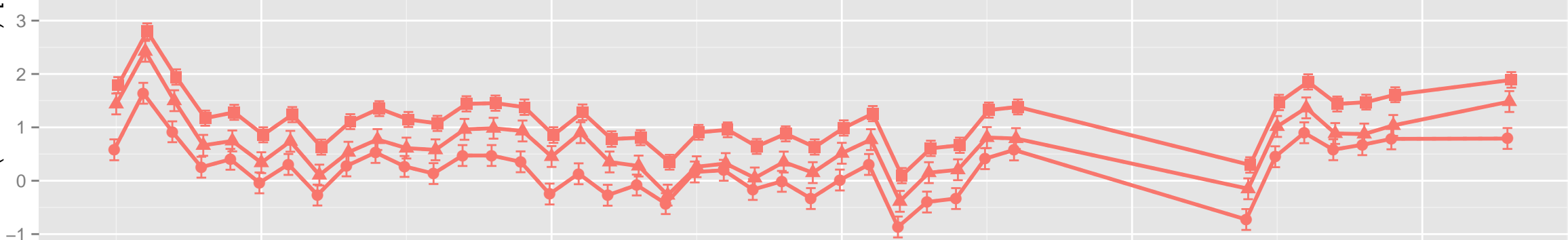


TCF

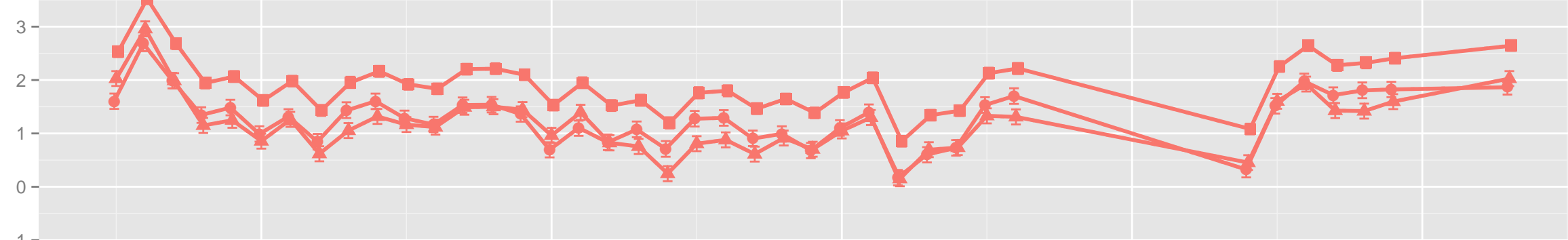
male



female



all sex



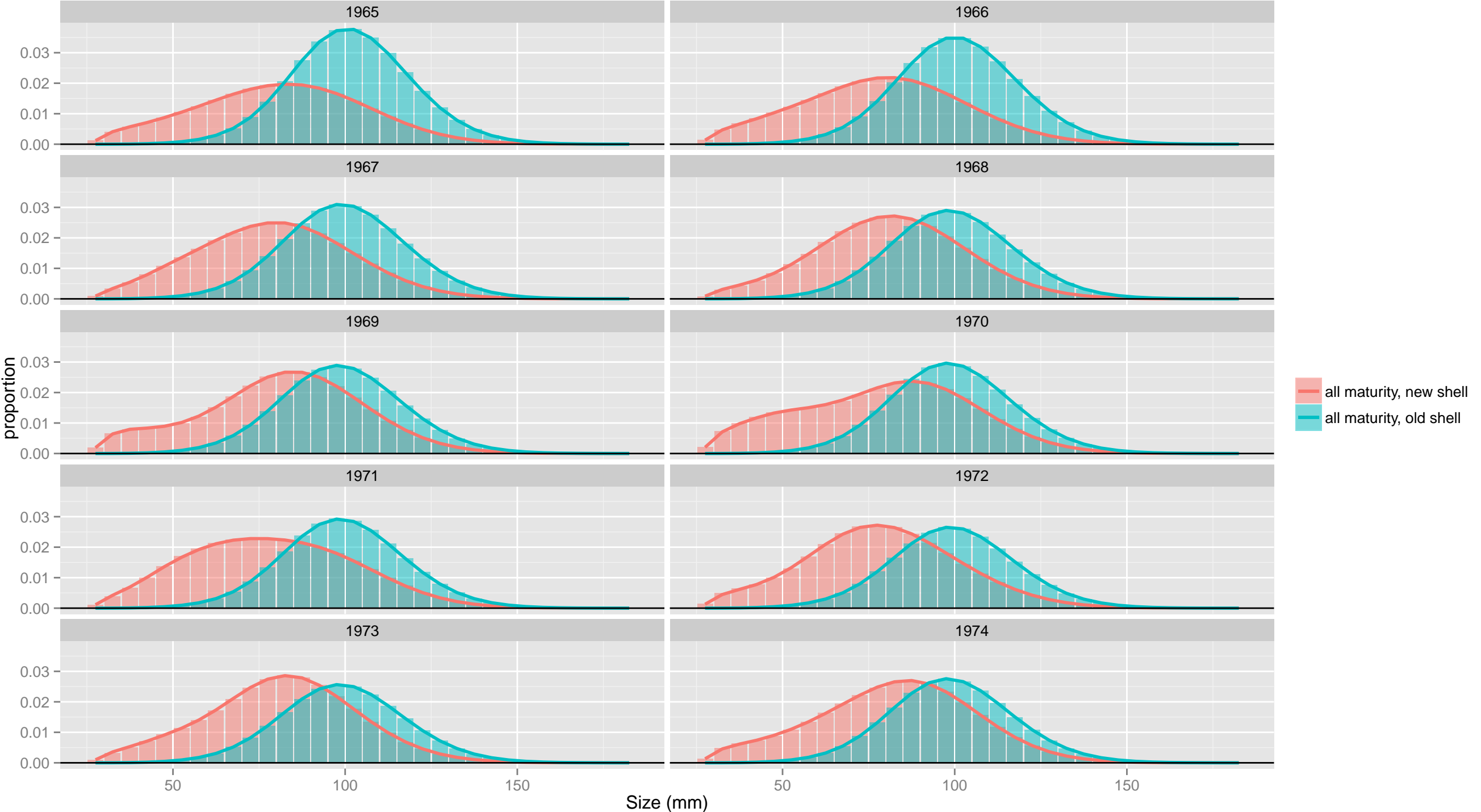
s

- new shell
- ▲ old shell
- all shell

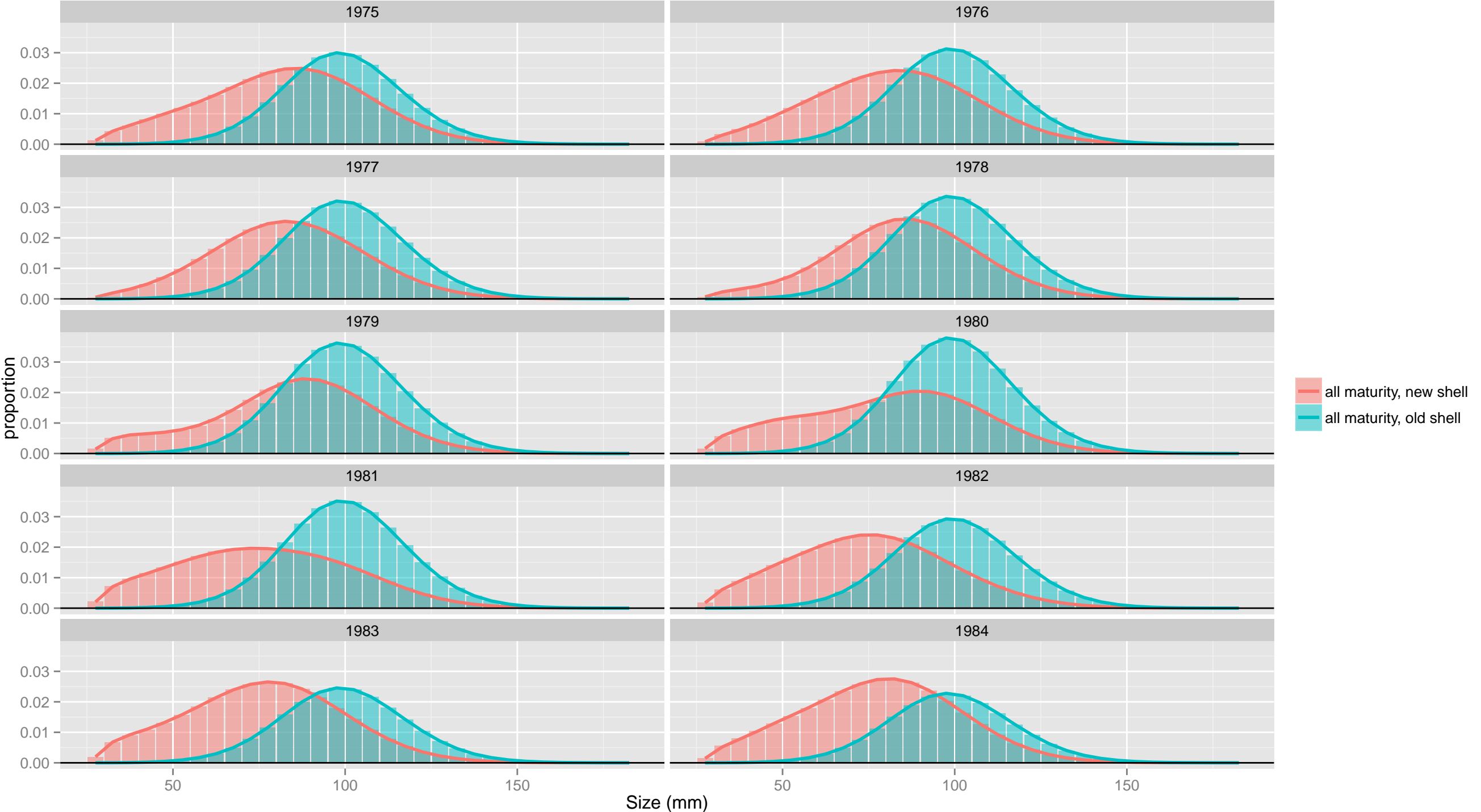
m

- all maturity

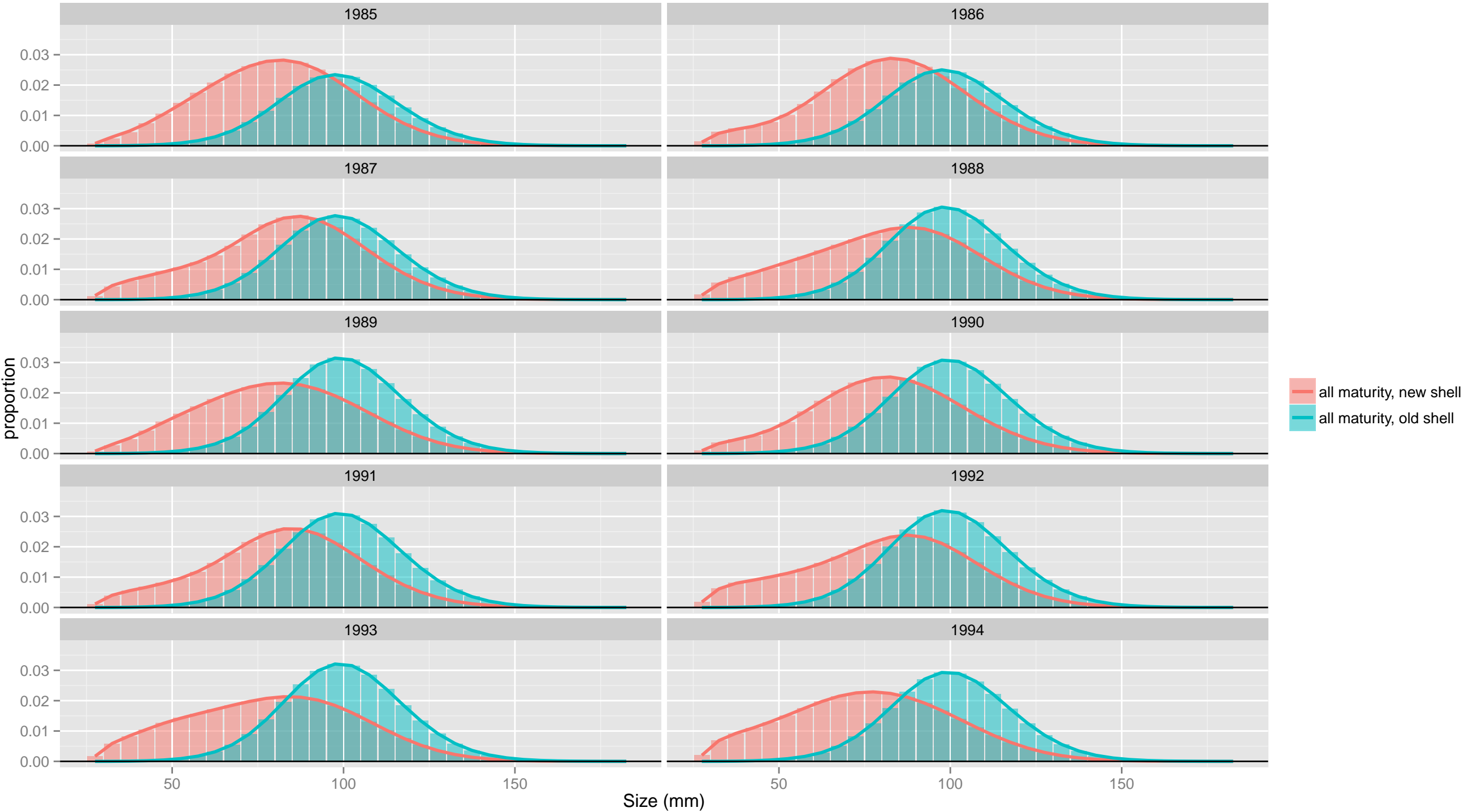
Discard Catch: TCF: female



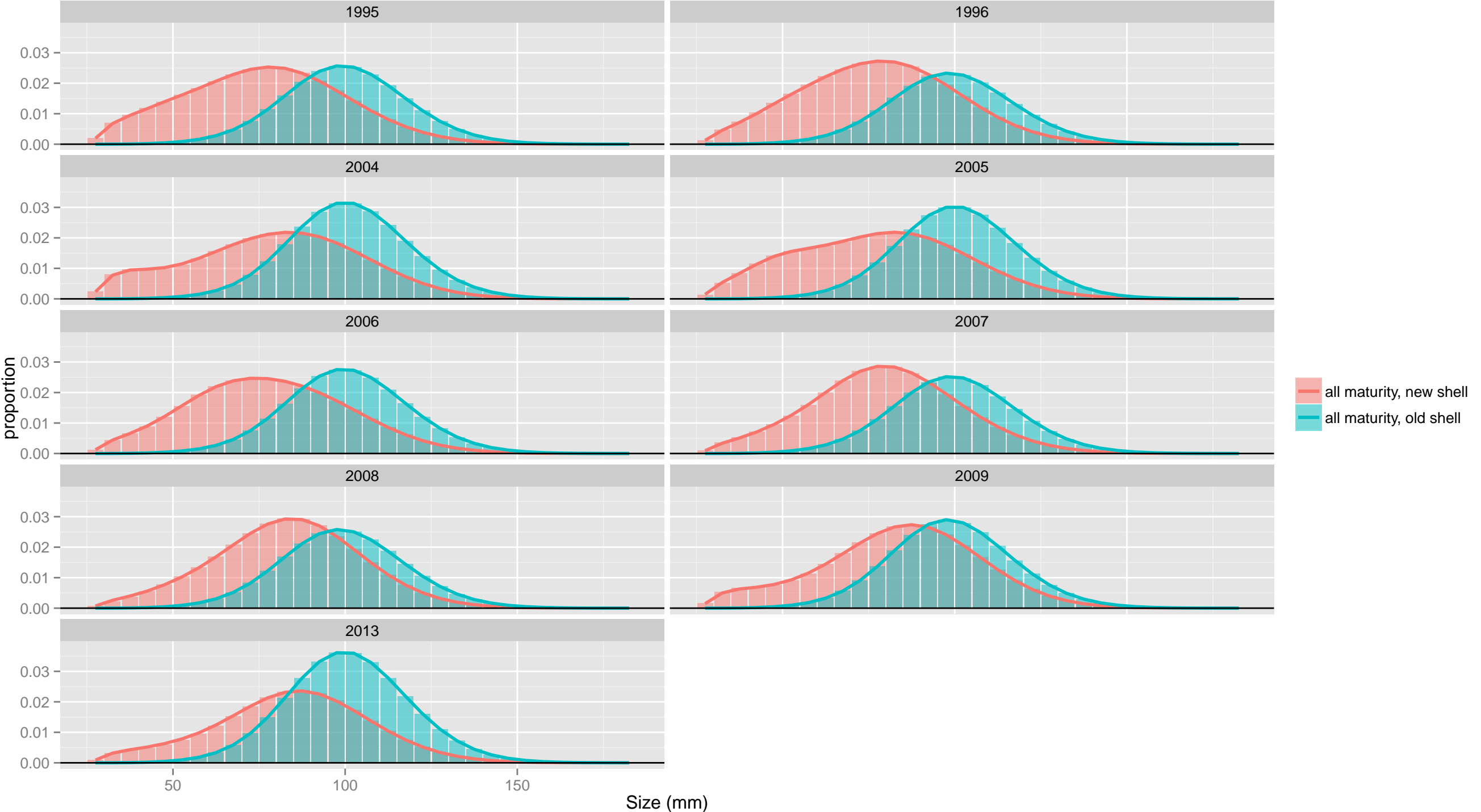
Discard Catch: TCF: female



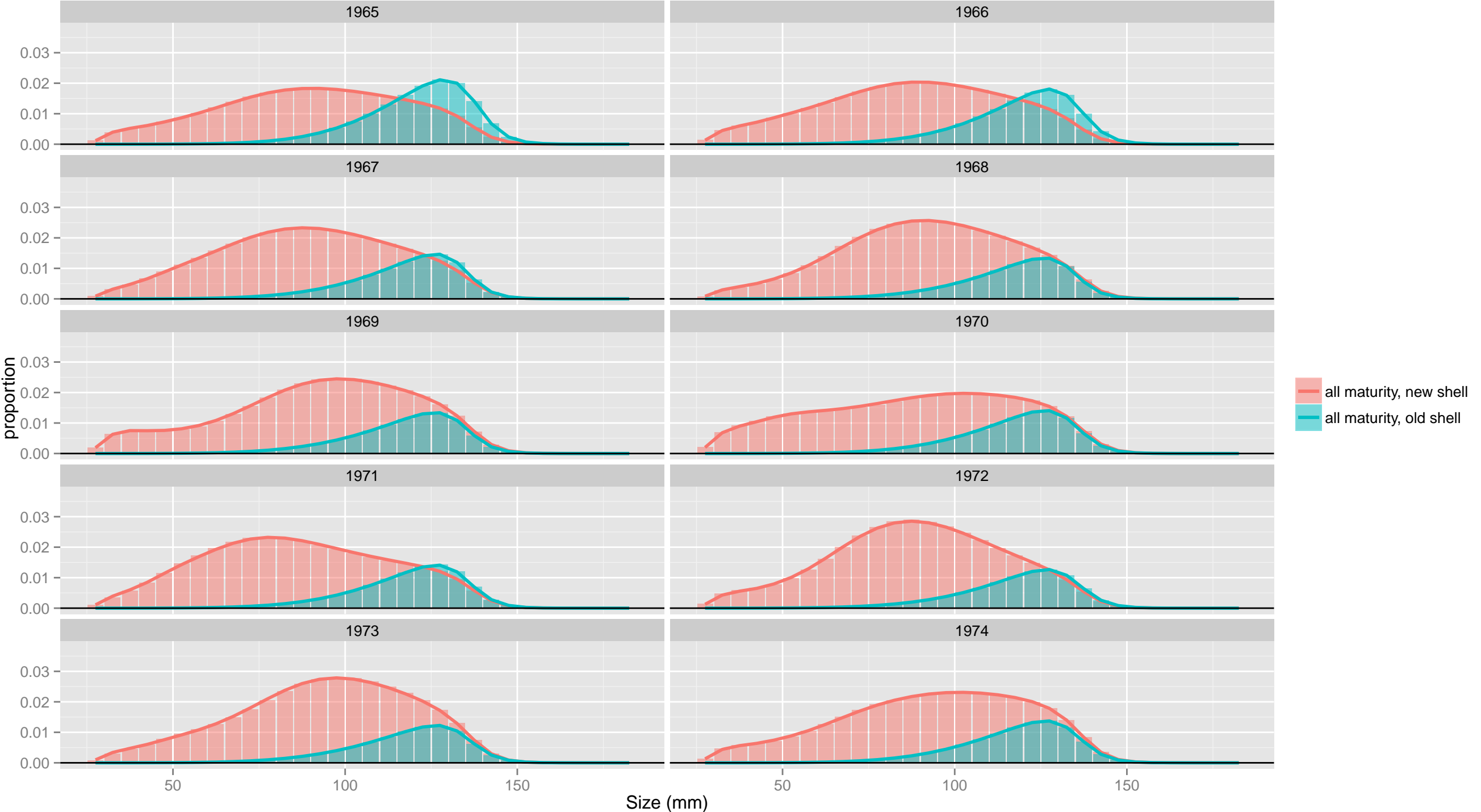
Discard Catch: TCF: female



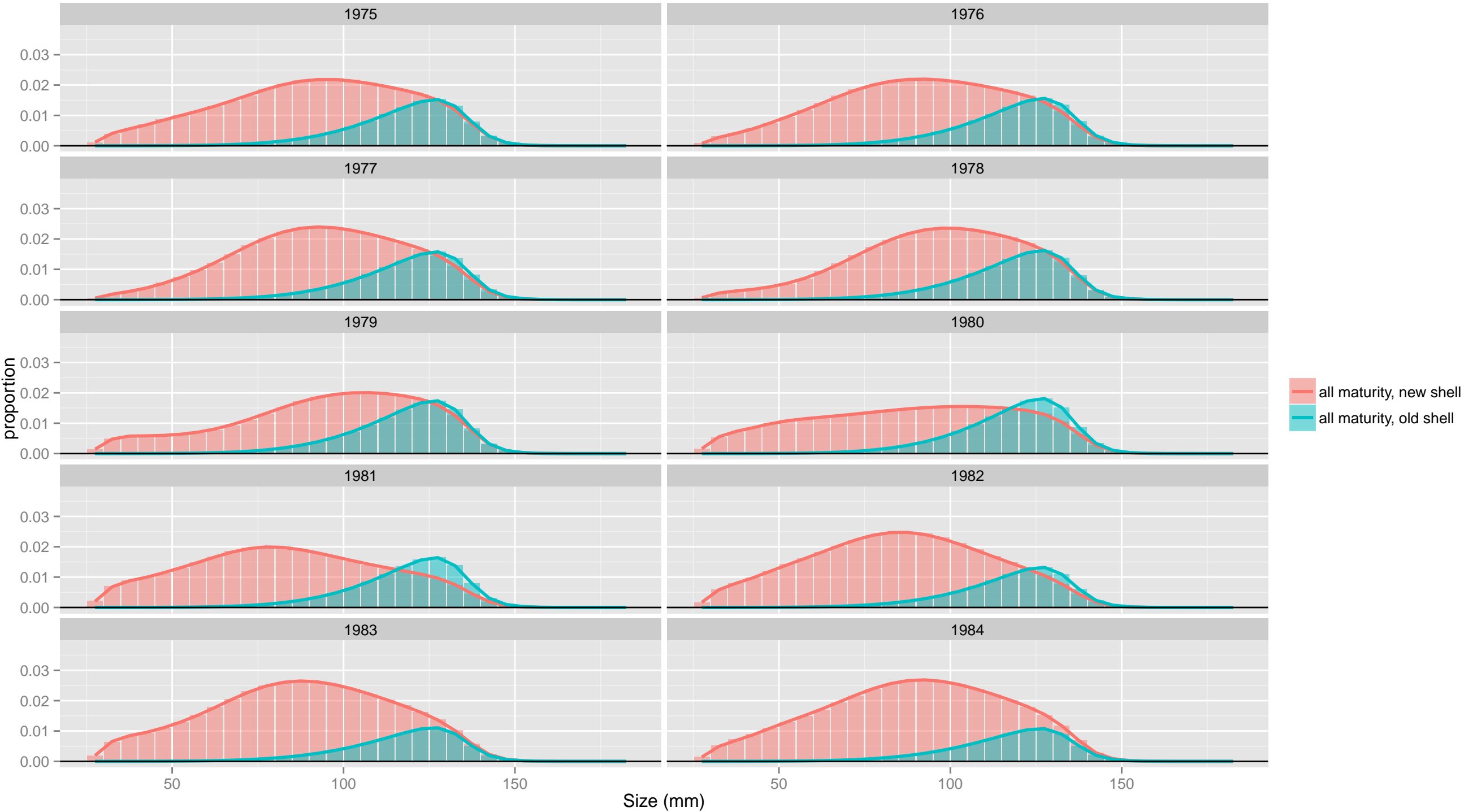
Discard Catch: TCF: female



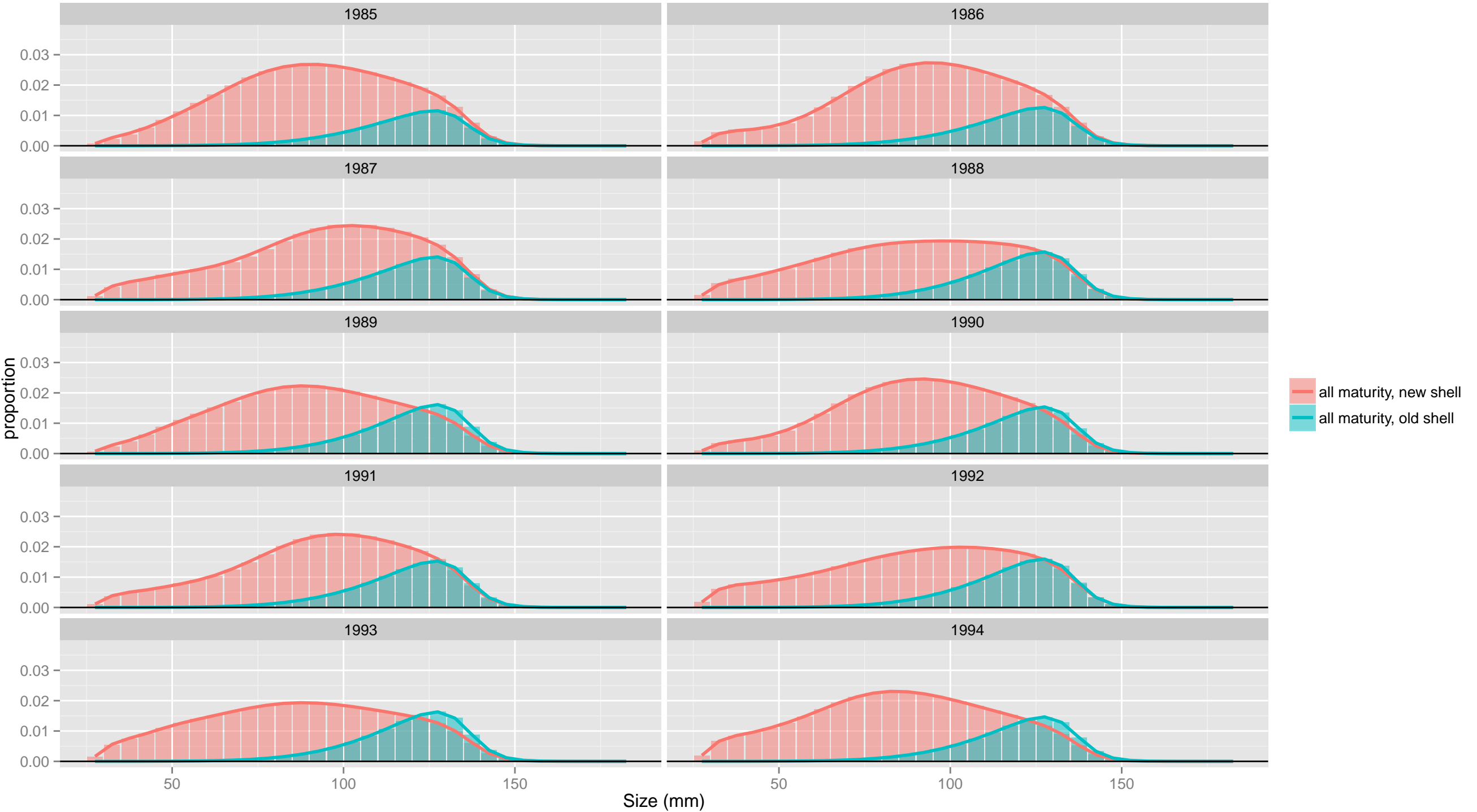
Discard Catch: TCF: male



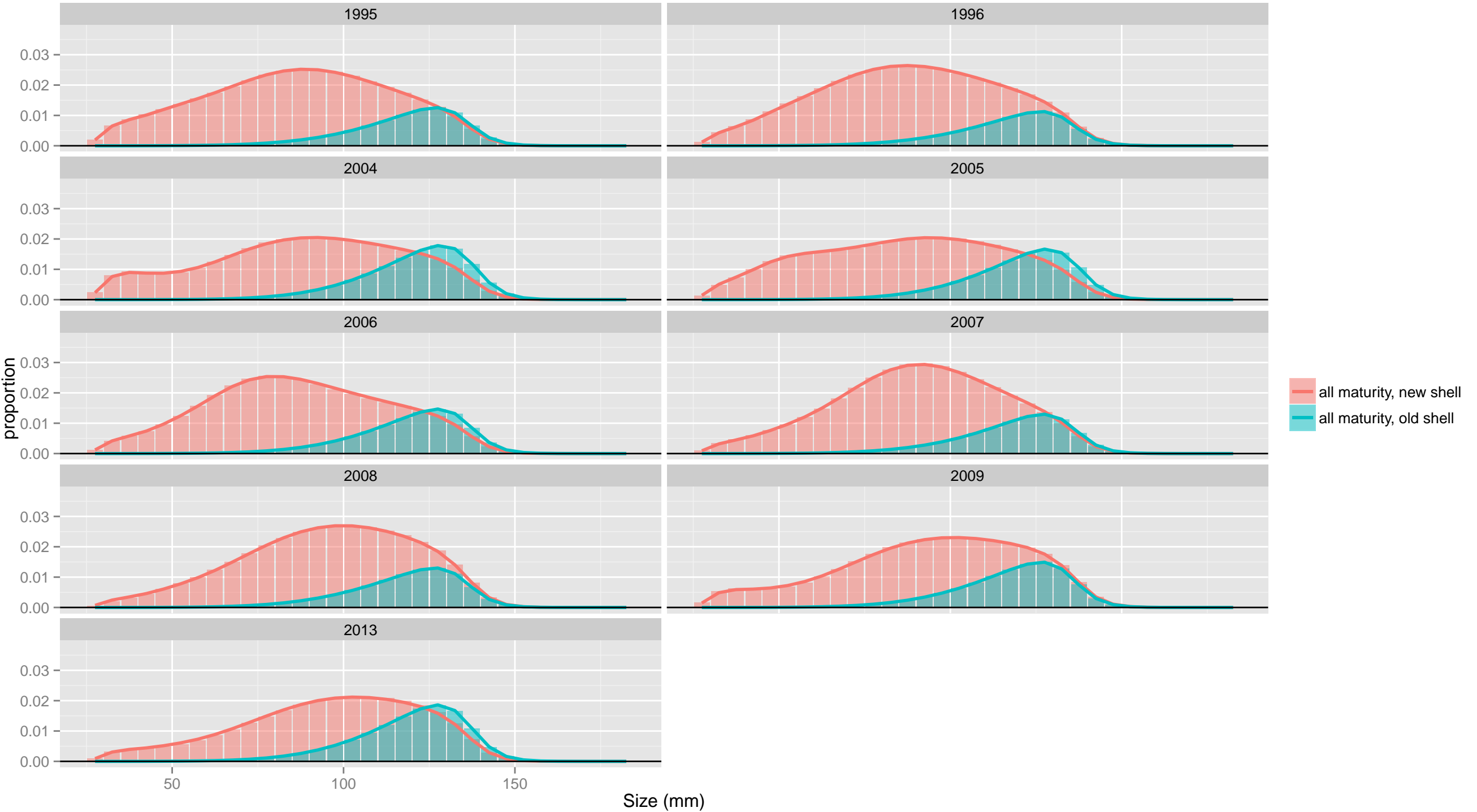
Discard Catch: TCF: male



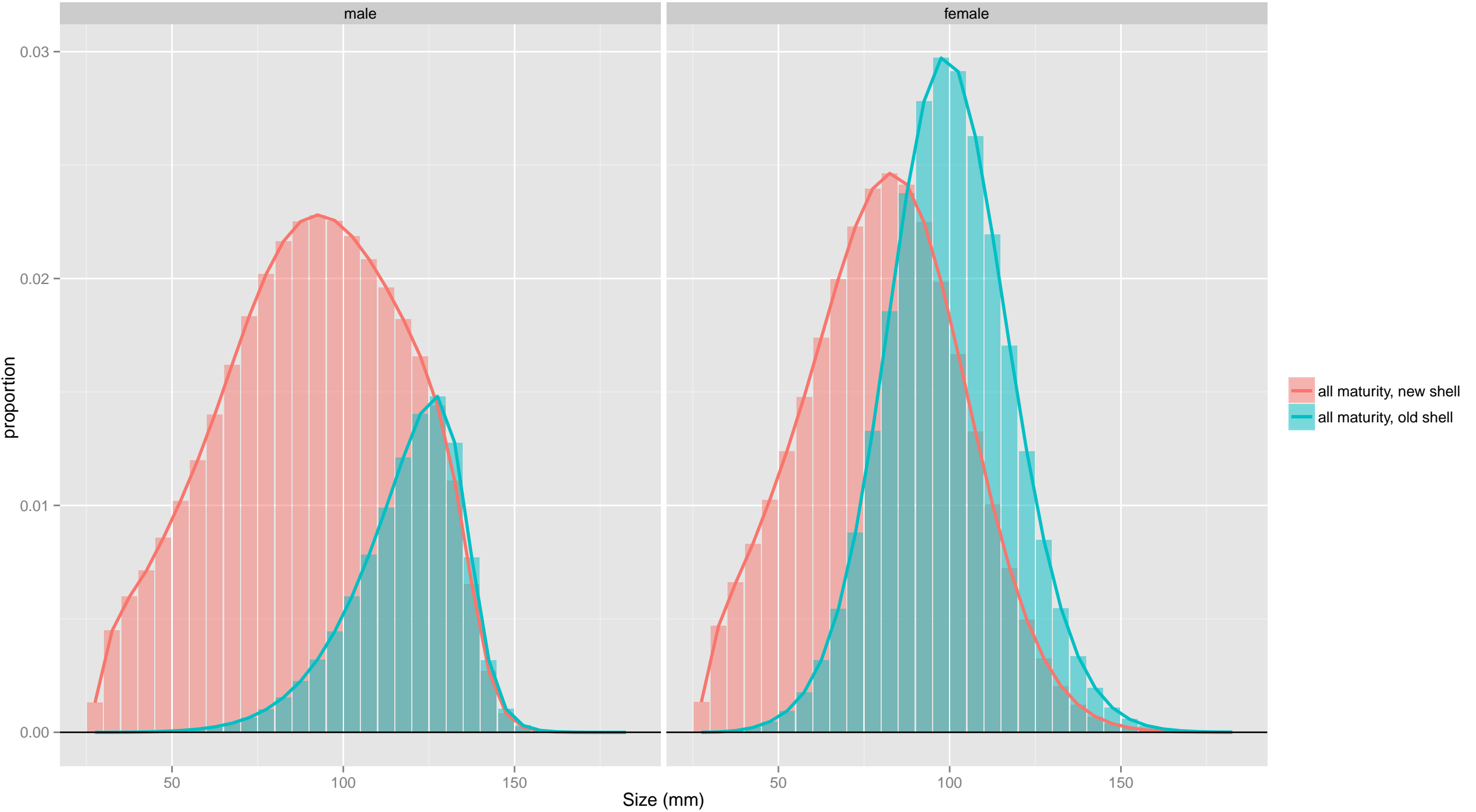
Discard Catch: TCF: male



Discard Catch: TCF: male

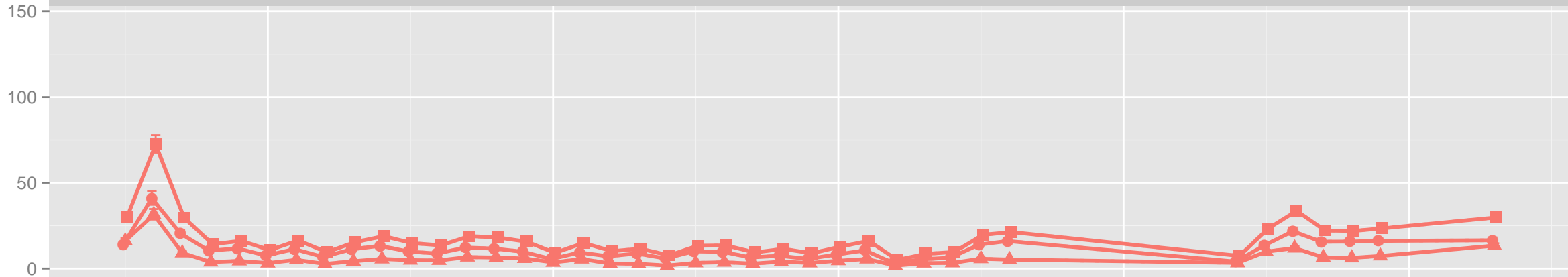


Discard Catch: TCF

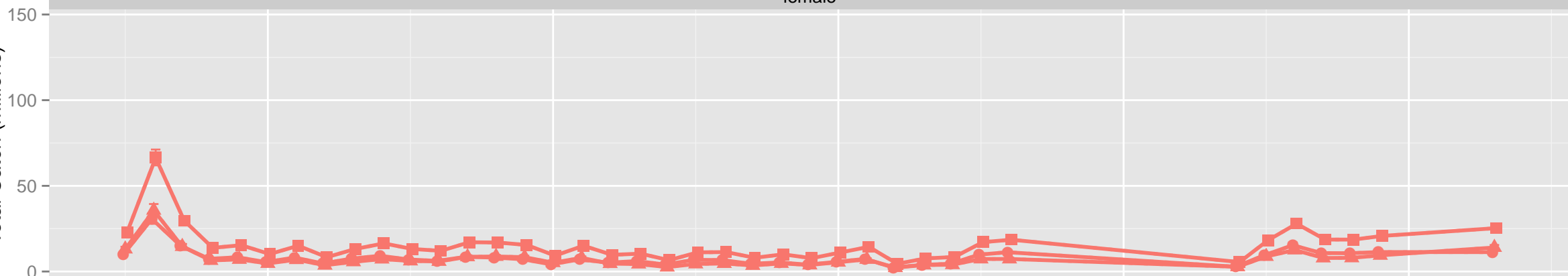


TCF

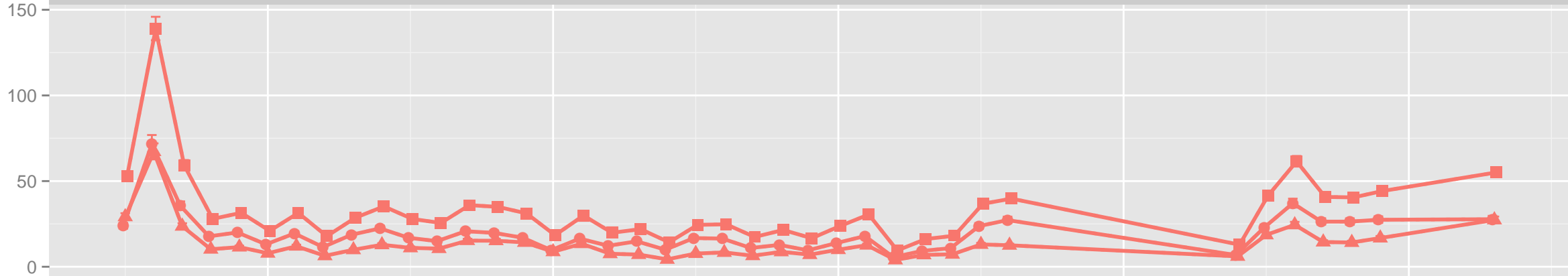
male



female



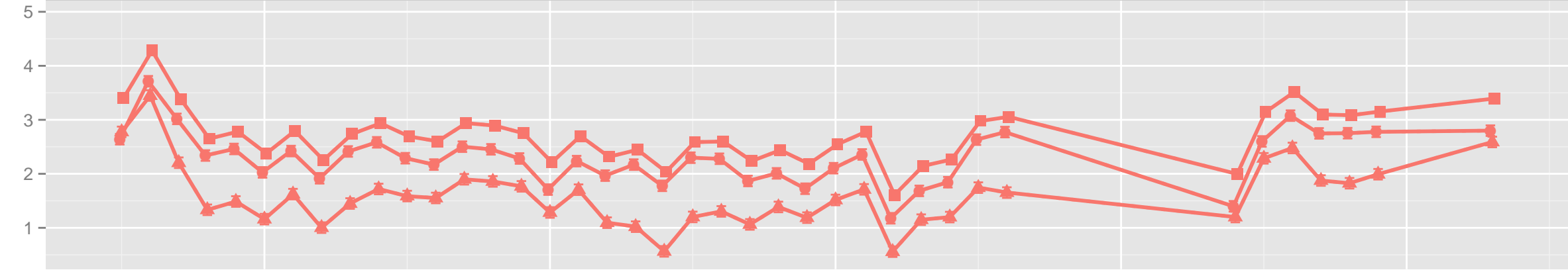
all sex



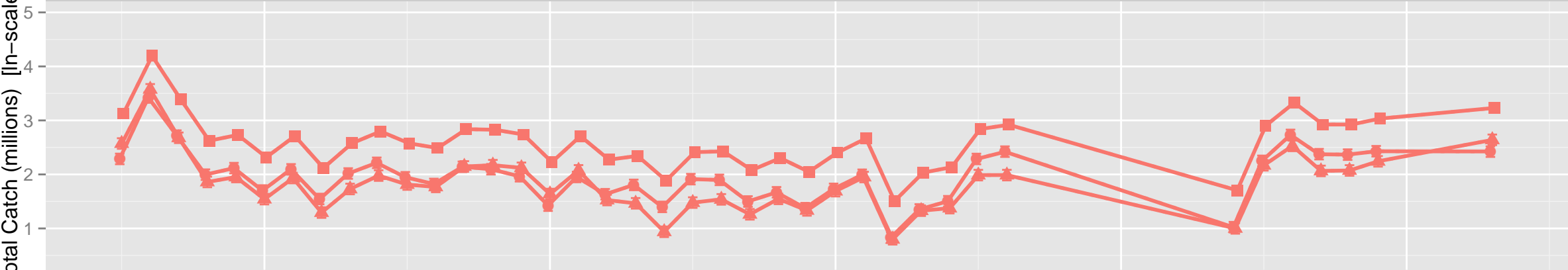
y

TCF

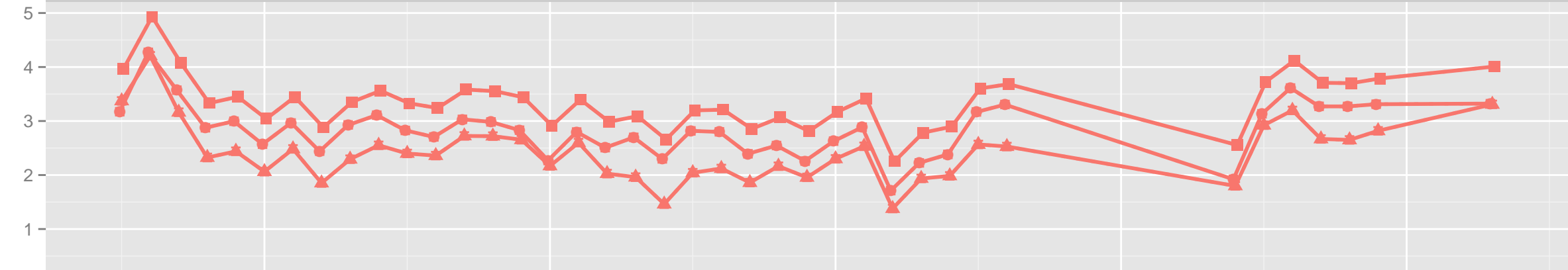
male



female



all sex



- s**
- new shell
 - ▲ old shell
 - all shell
- m**
- all maturity

TCF

male

60
40
20
0

female

Total Catch (thousands mt)

60
40
20
0

all sex

60
40
20
0

1970 1980 1990 2000 2010

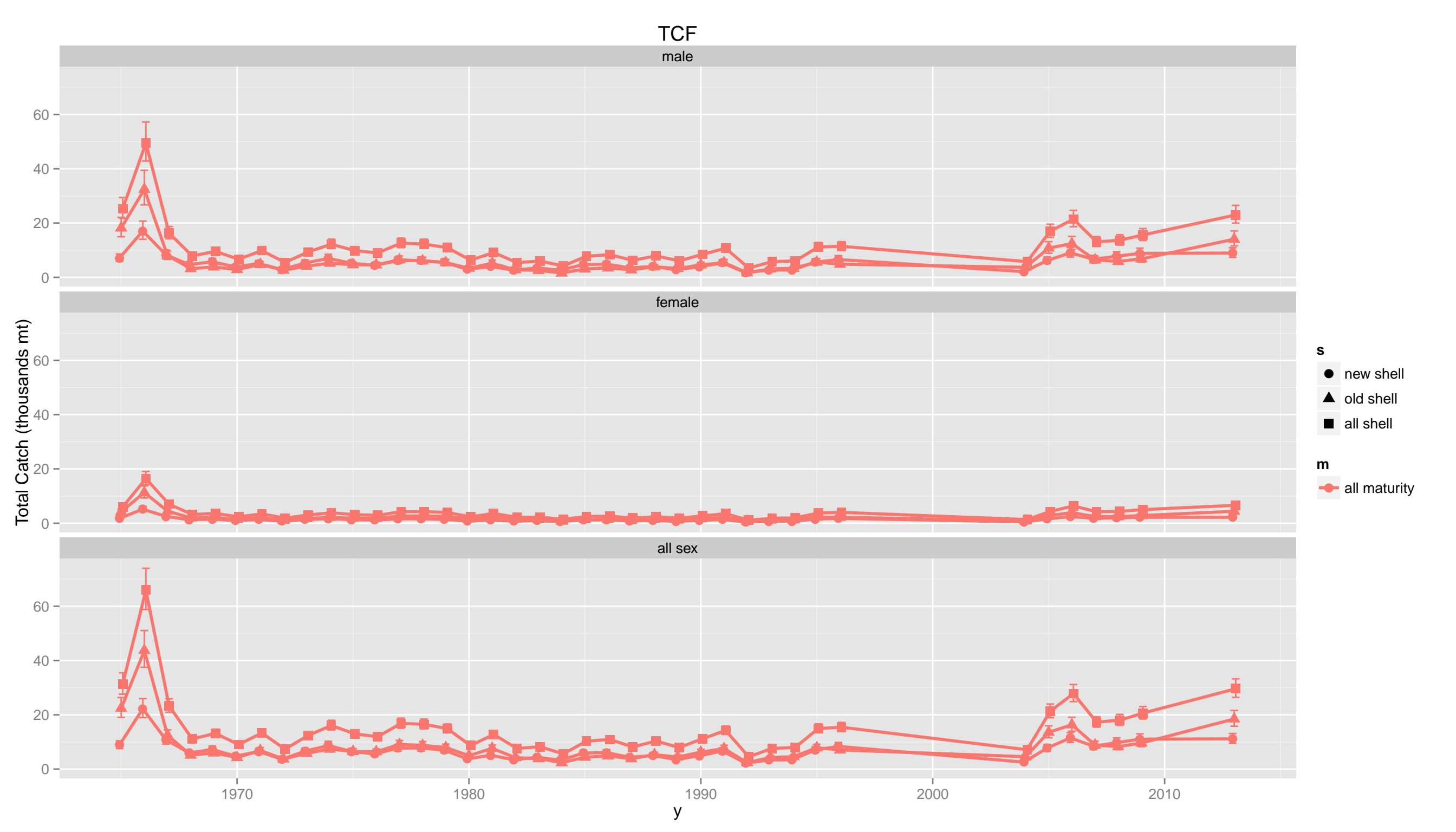
y

s

- new shell
- ▲ old shell
- all shell

m

- all maturity



TCF

male

4

3

2

1

0

-1

female

4

3

2

1

0

-1

all sex

4

3

2

1

0

-1

1970

1980

1990

2000

2010

y

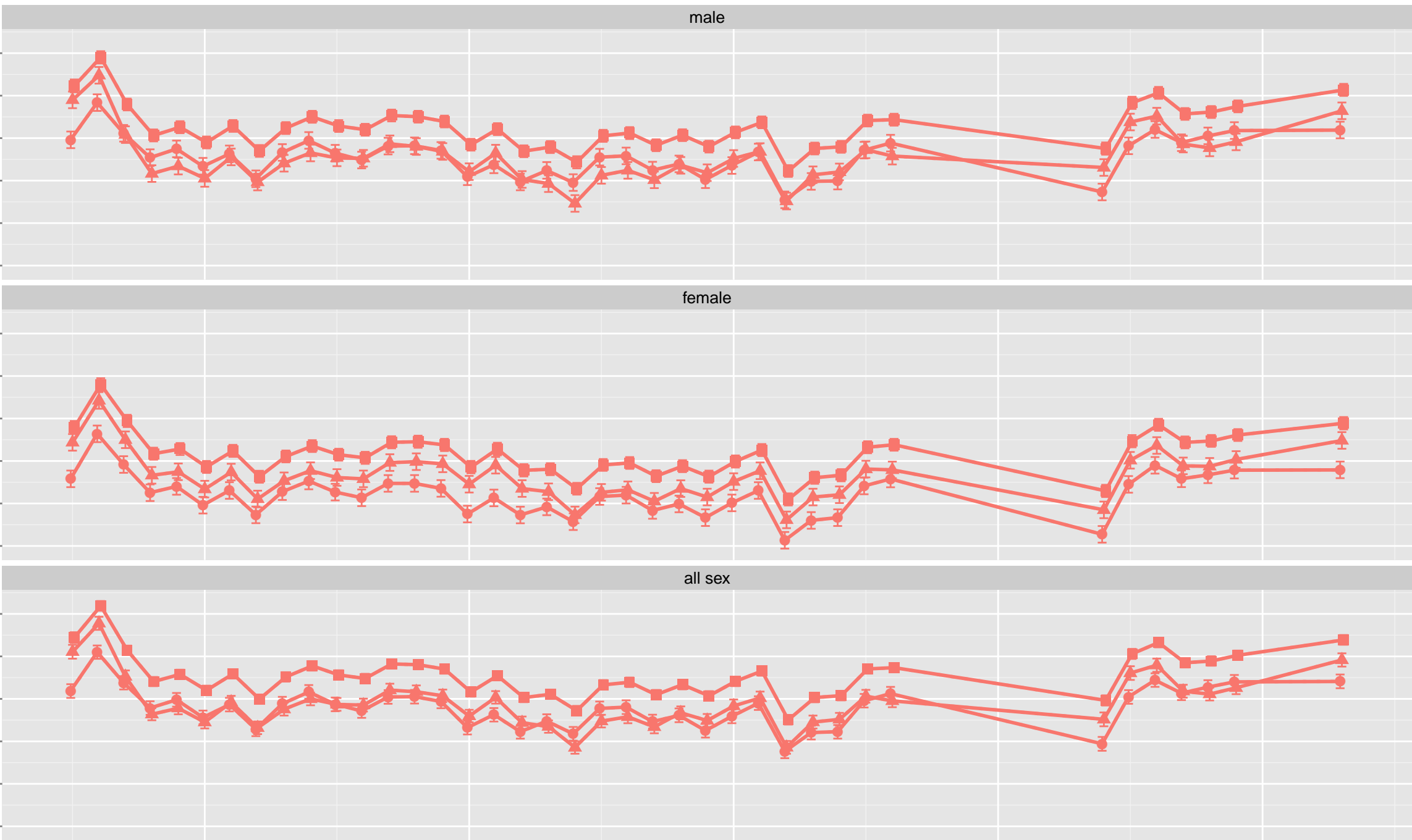
s

- new shell
- ▲ old shell
- all shell

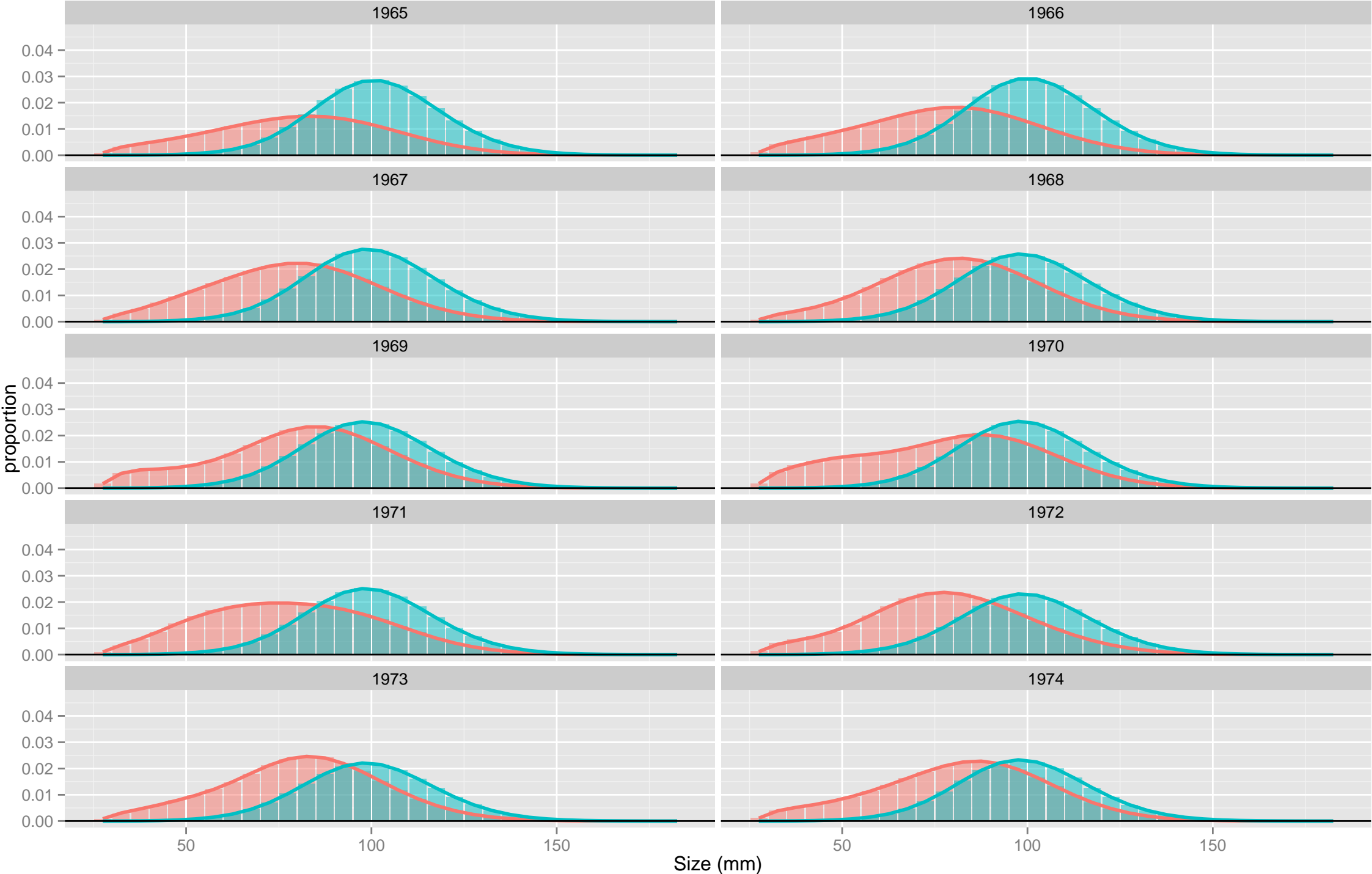
m

- all maturity

Total Catch (thousands mt) [ln-scale]

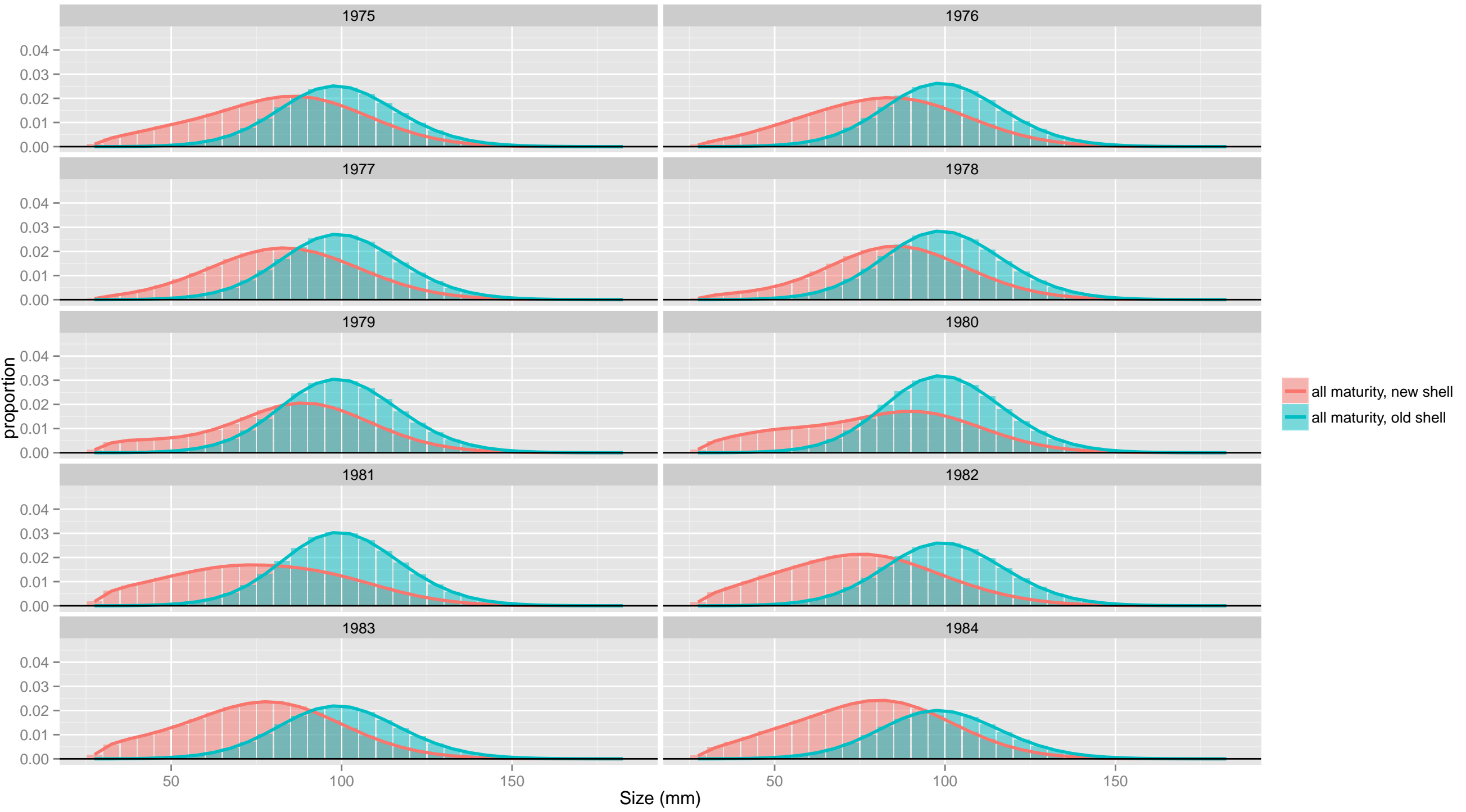


Total Catch: TCF: female

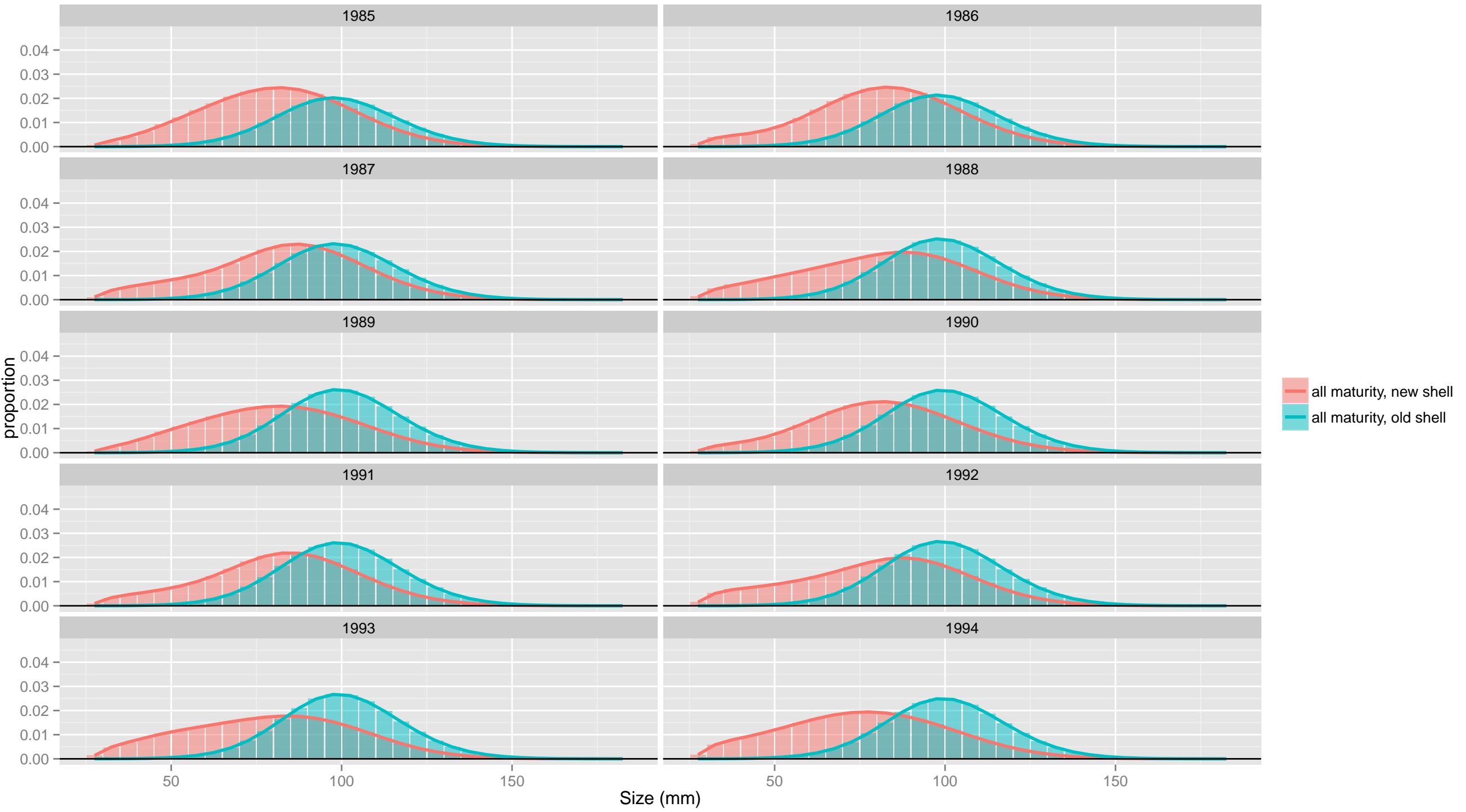


all maturity, new shell
all maturity, old shell

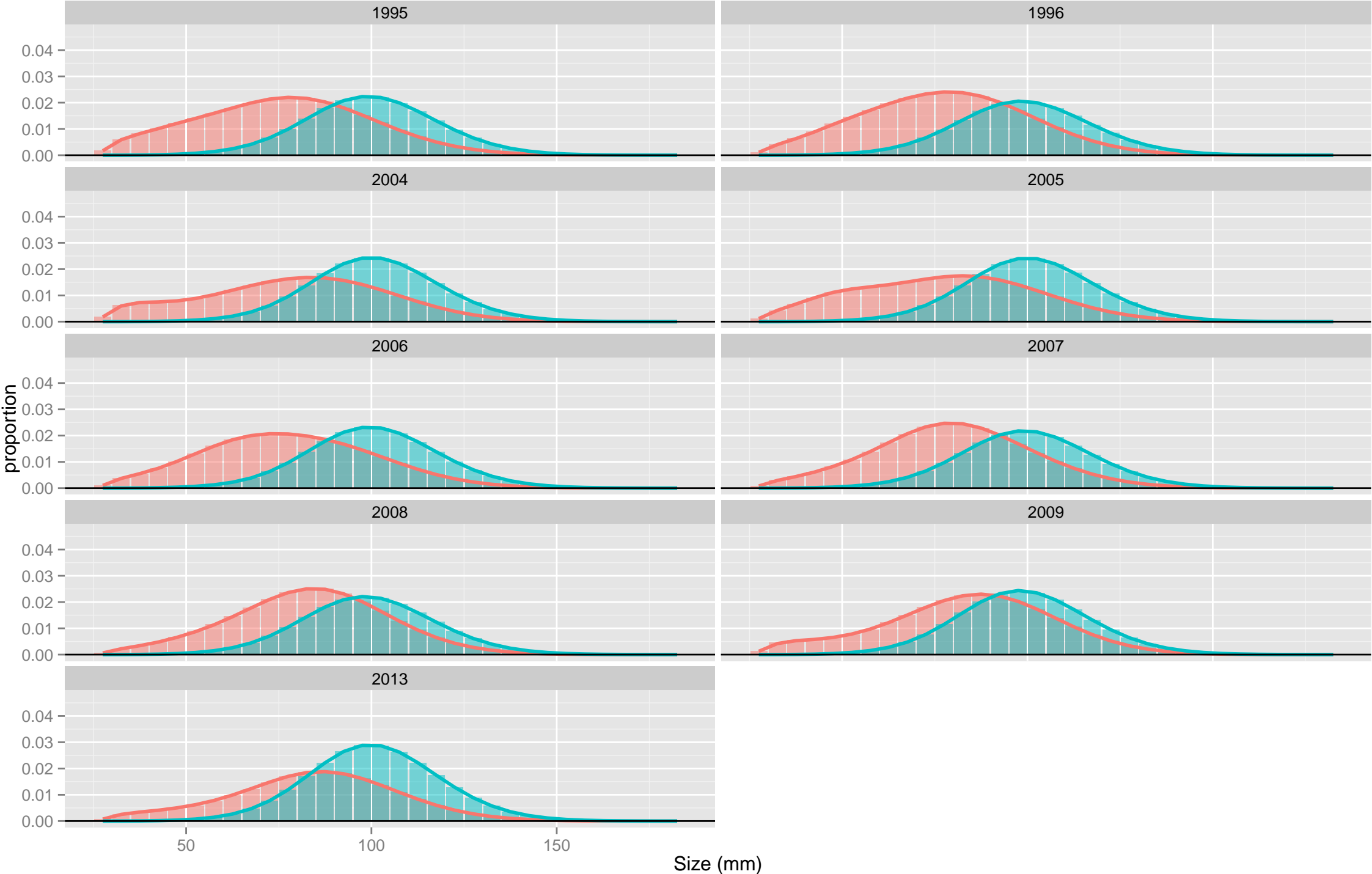
Total Catch: TCF: female



Total Catch: TCF: female

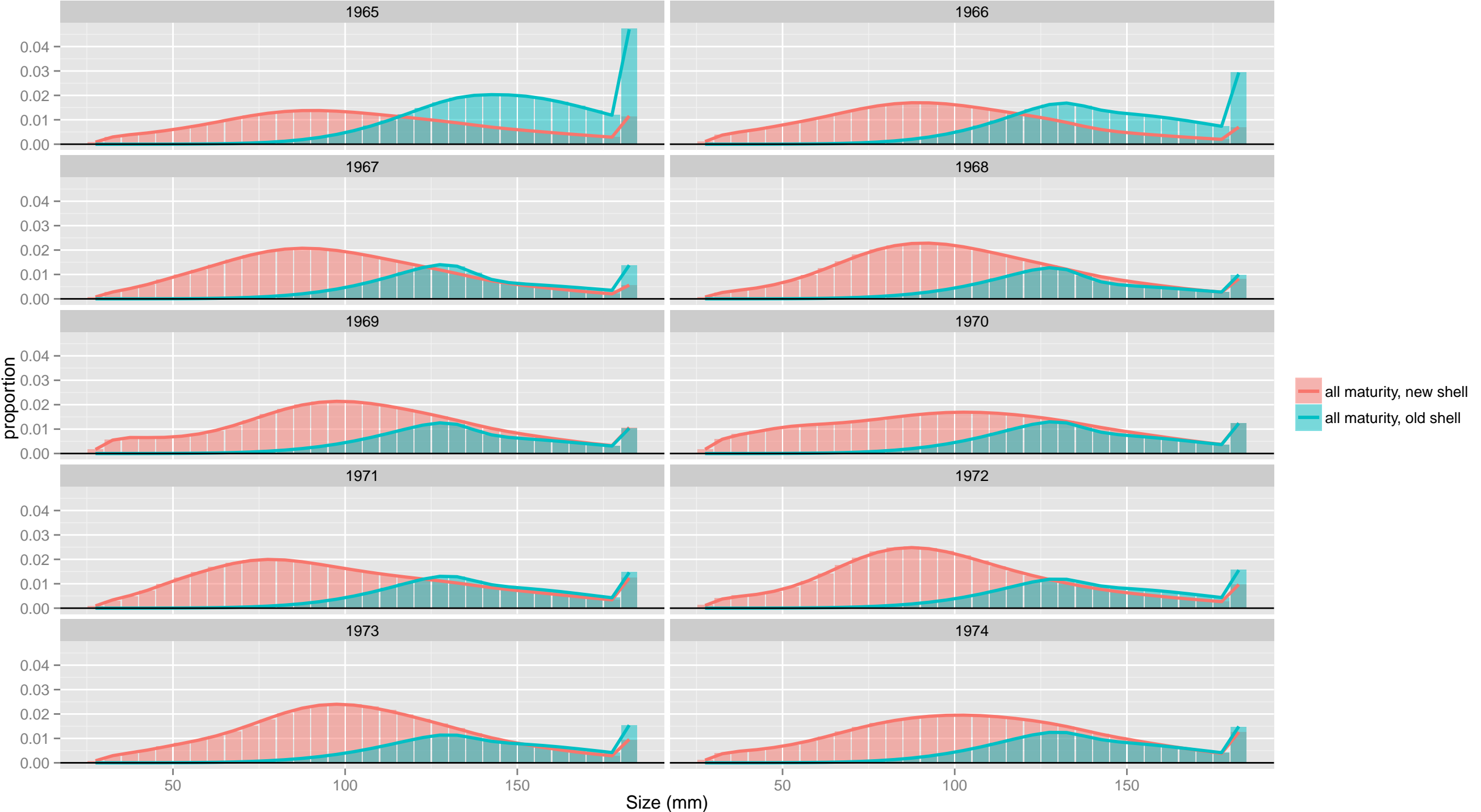


Total Catch: TCF: female

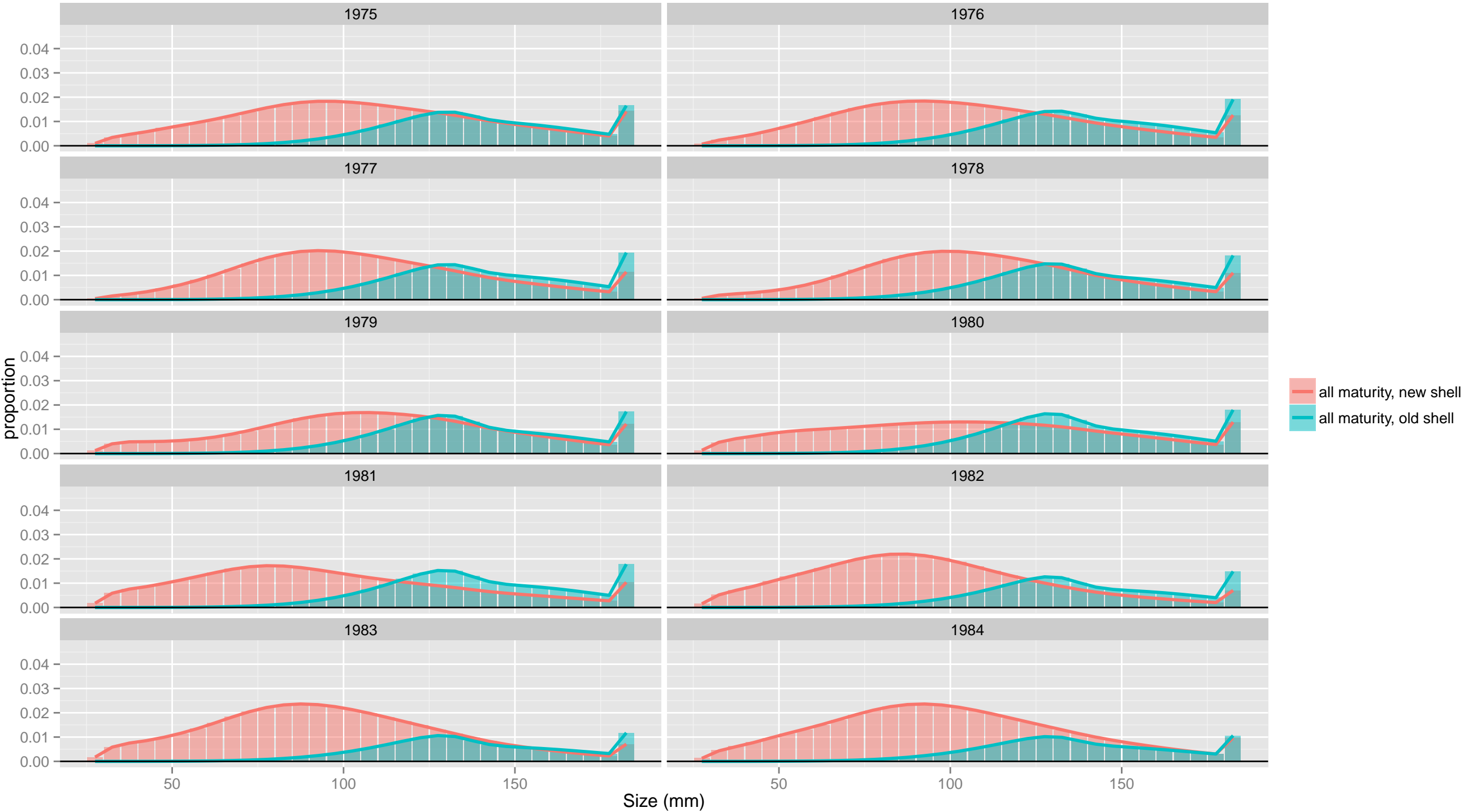


all maturity, new shell
all maturity, old shell

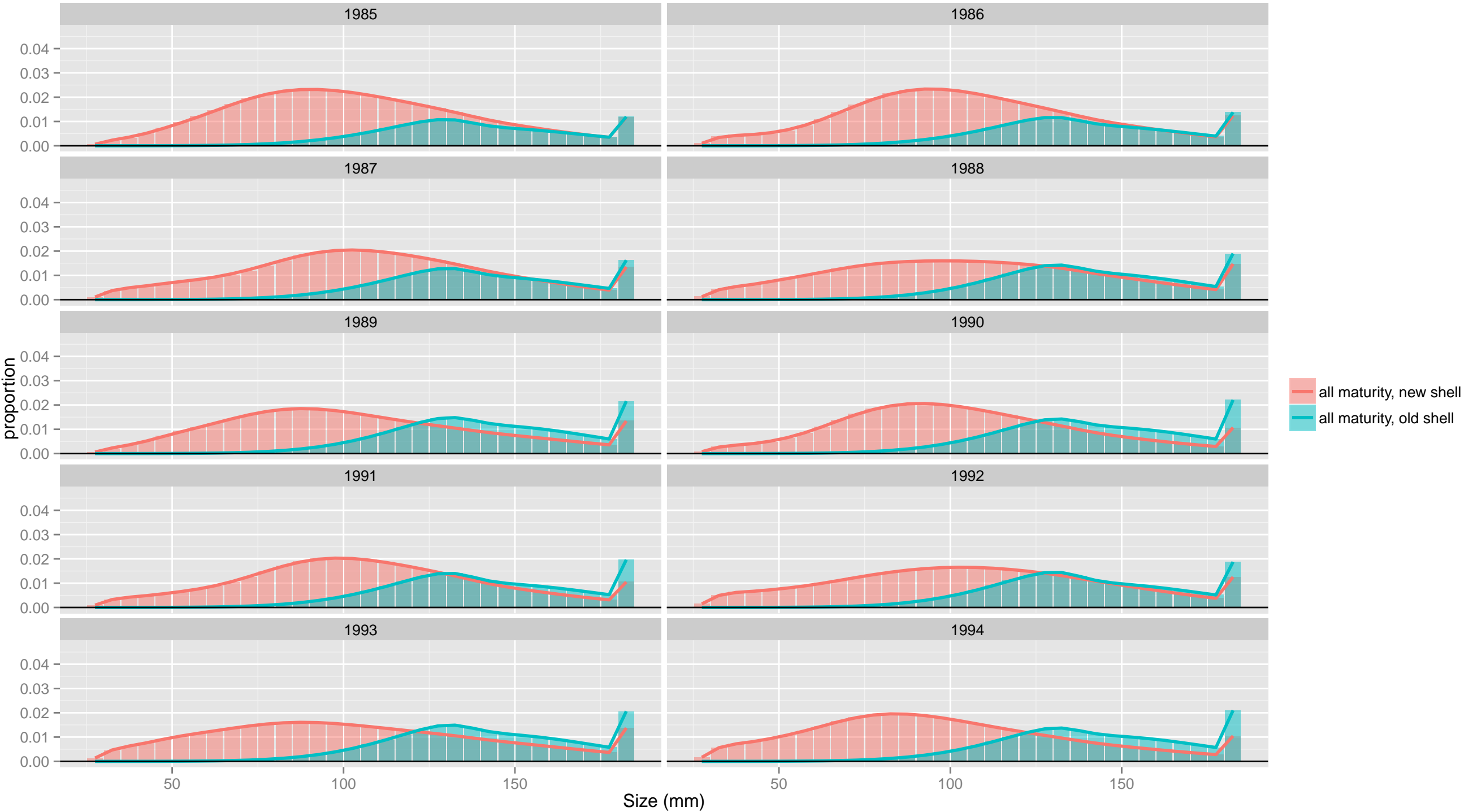
Total Catch: TCF: male



Total Catch: TCF: male



Total Catch: TCF: male



Total Catch: TCF: male



Total Catch: TCF

male

female

0.025
0.020
0.015
0.010
0.005
0.000

50

100

150

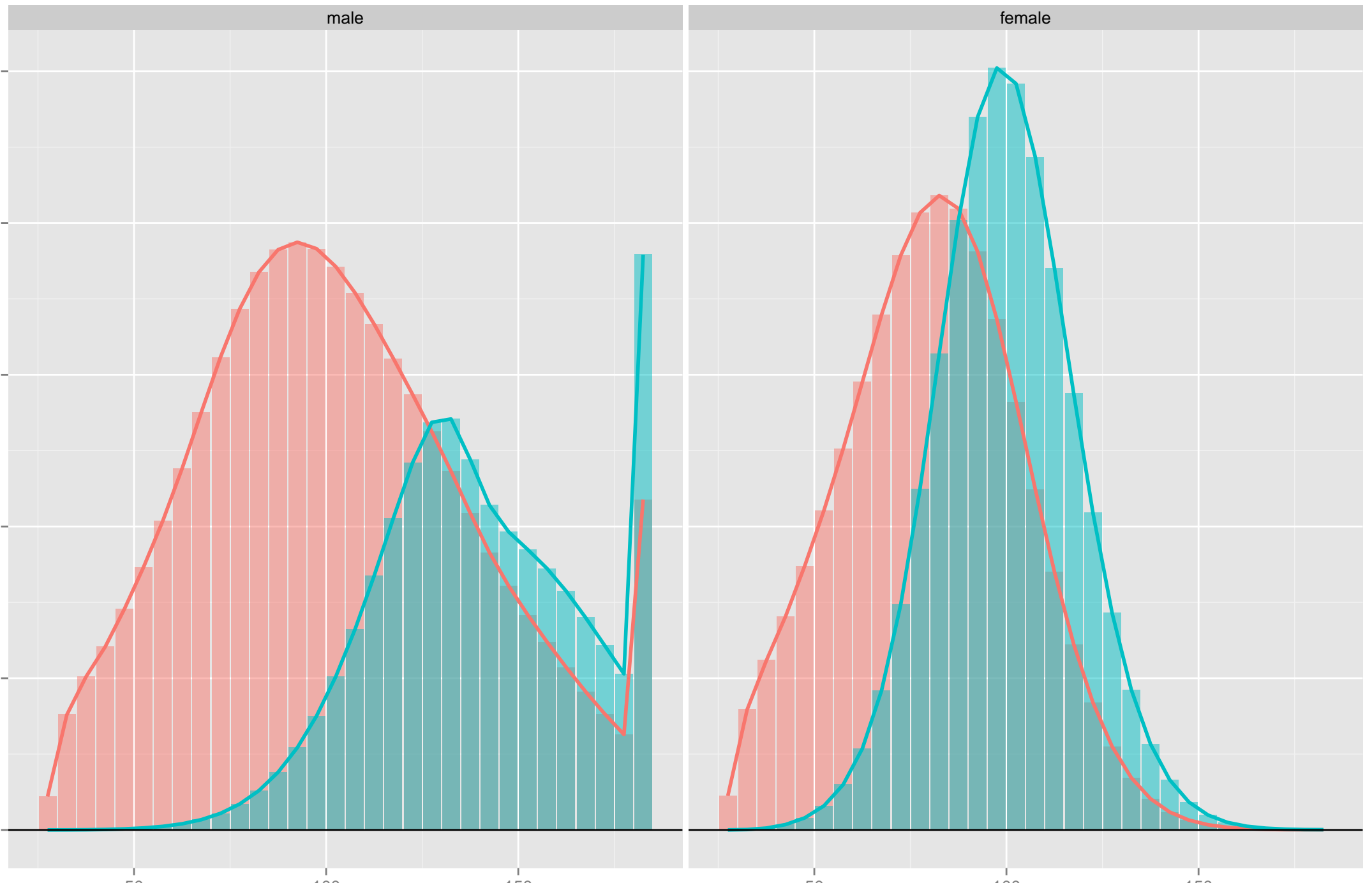
Size (mm)

50

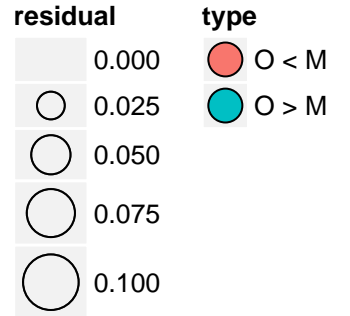
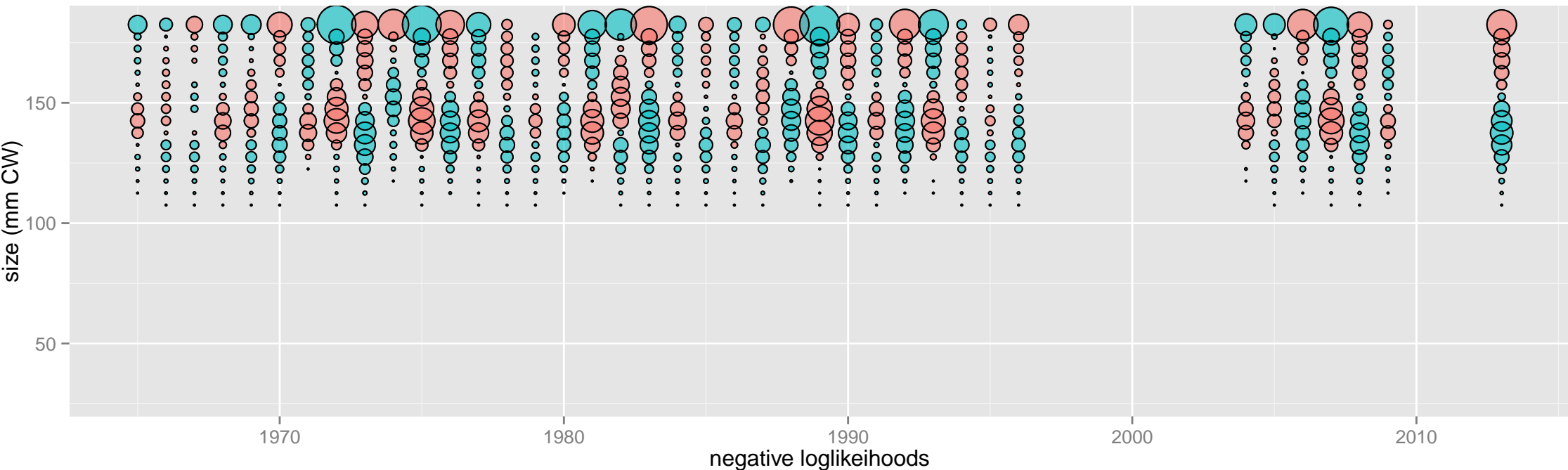
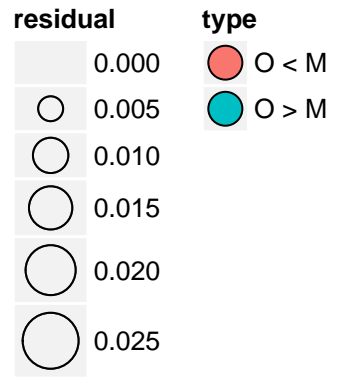
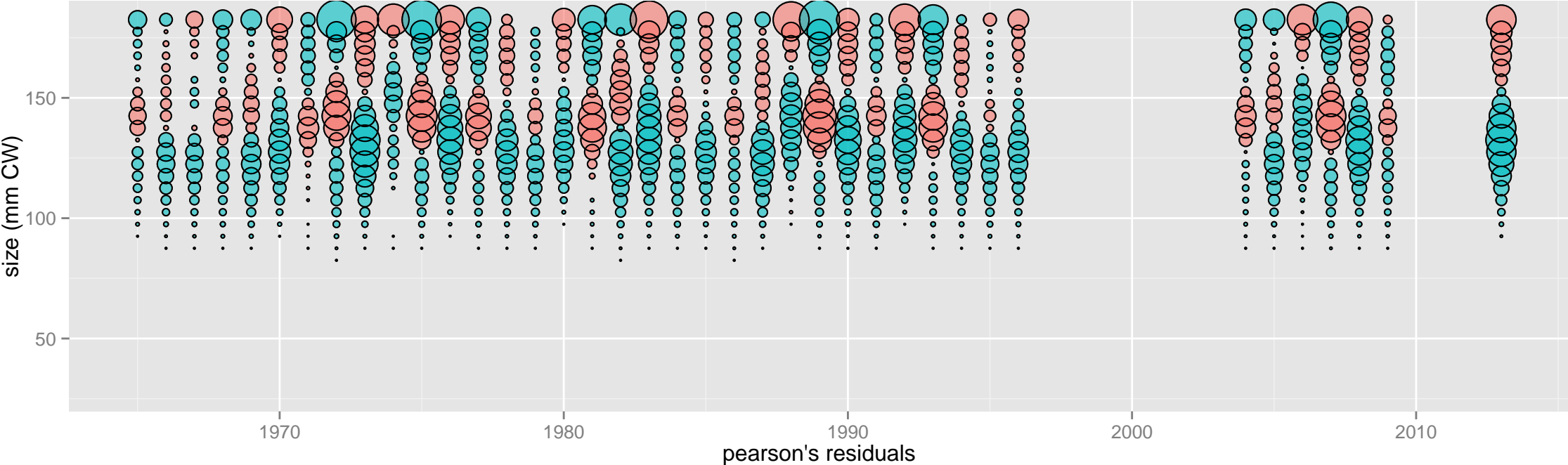
100

150

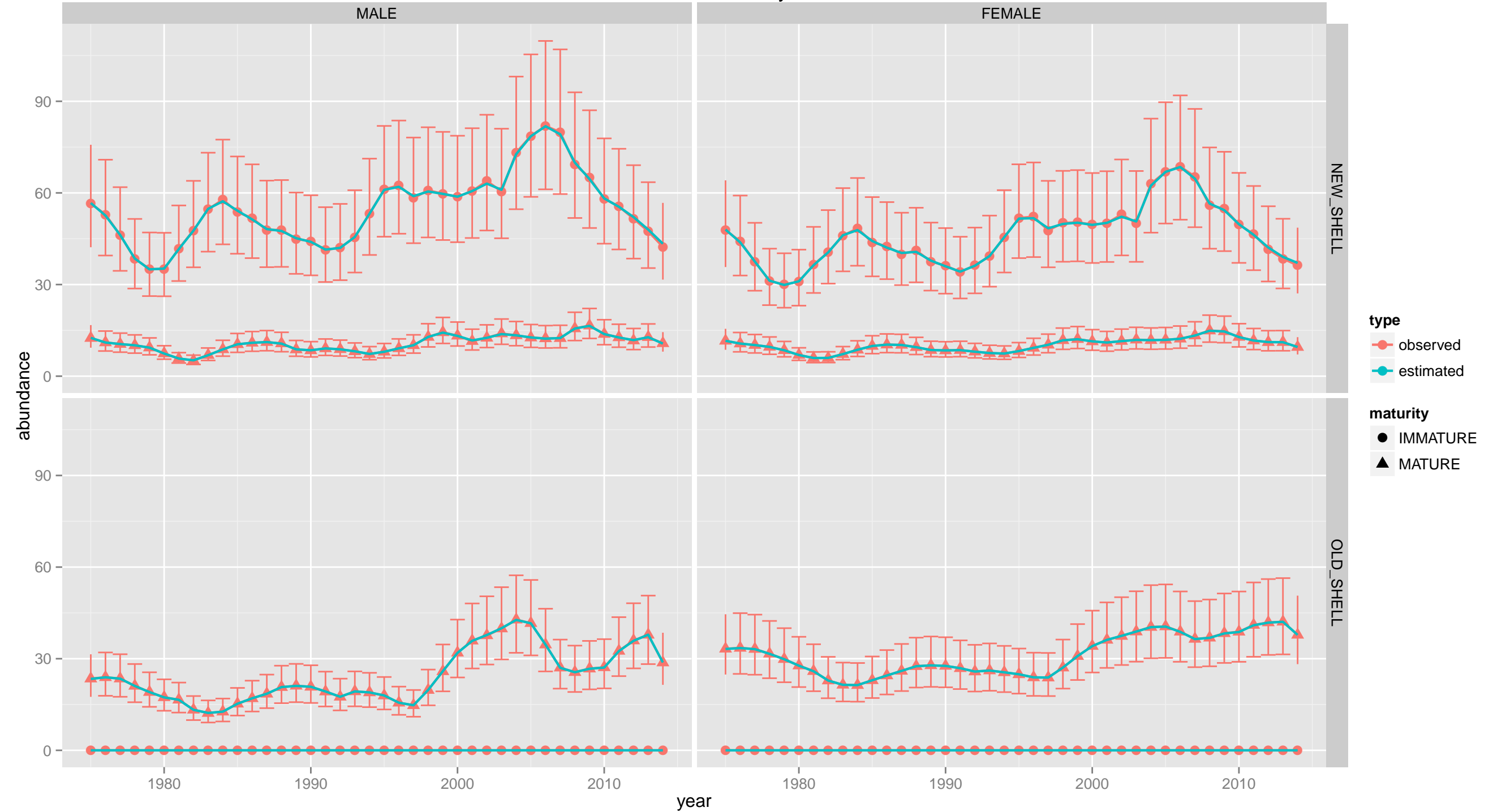
- all maturity, new shell
- all maturity, old shell



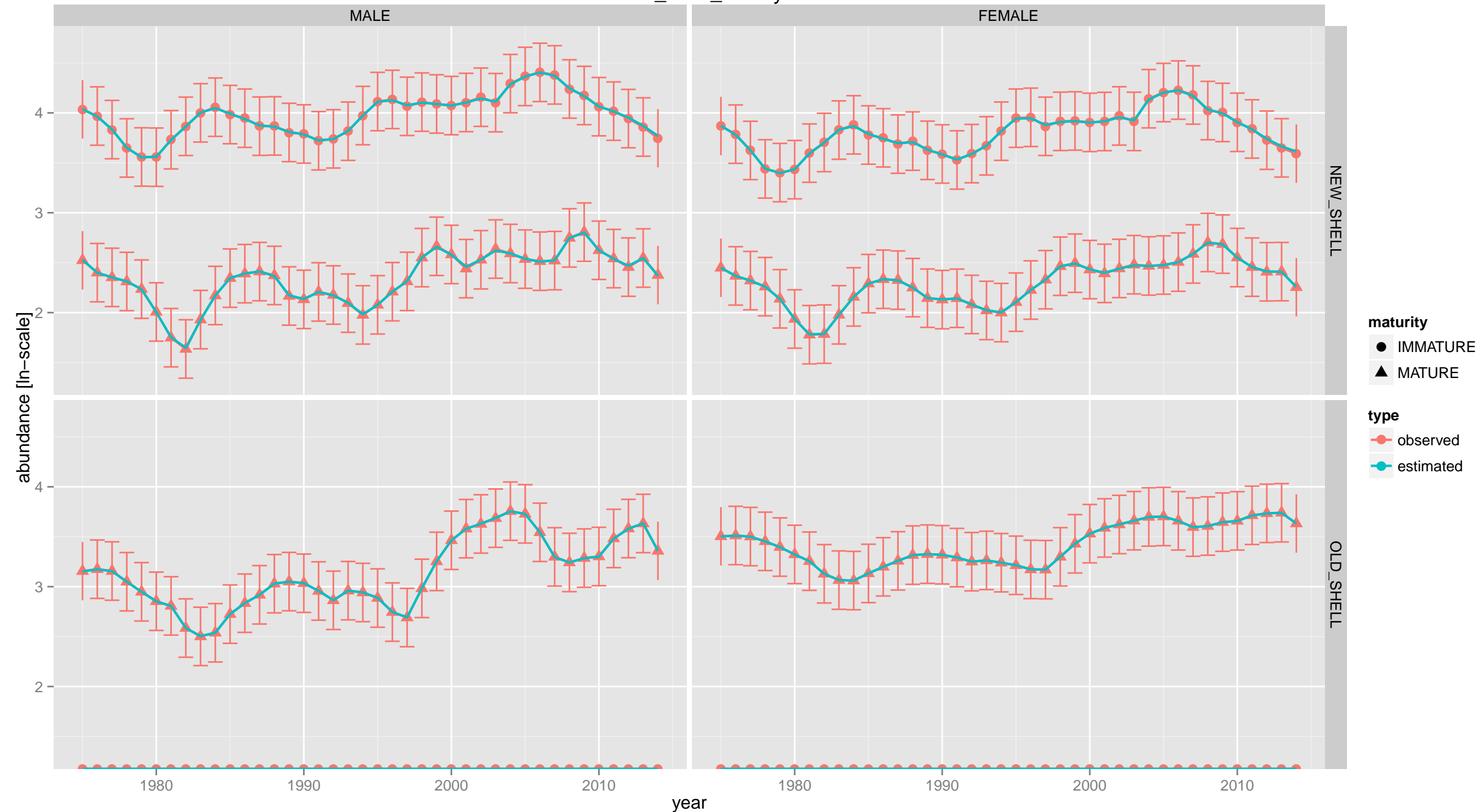
TCF: retained catch:



NMFS_trawl_survey



NMFS_trawl_survey



NMFS_trawl_survey

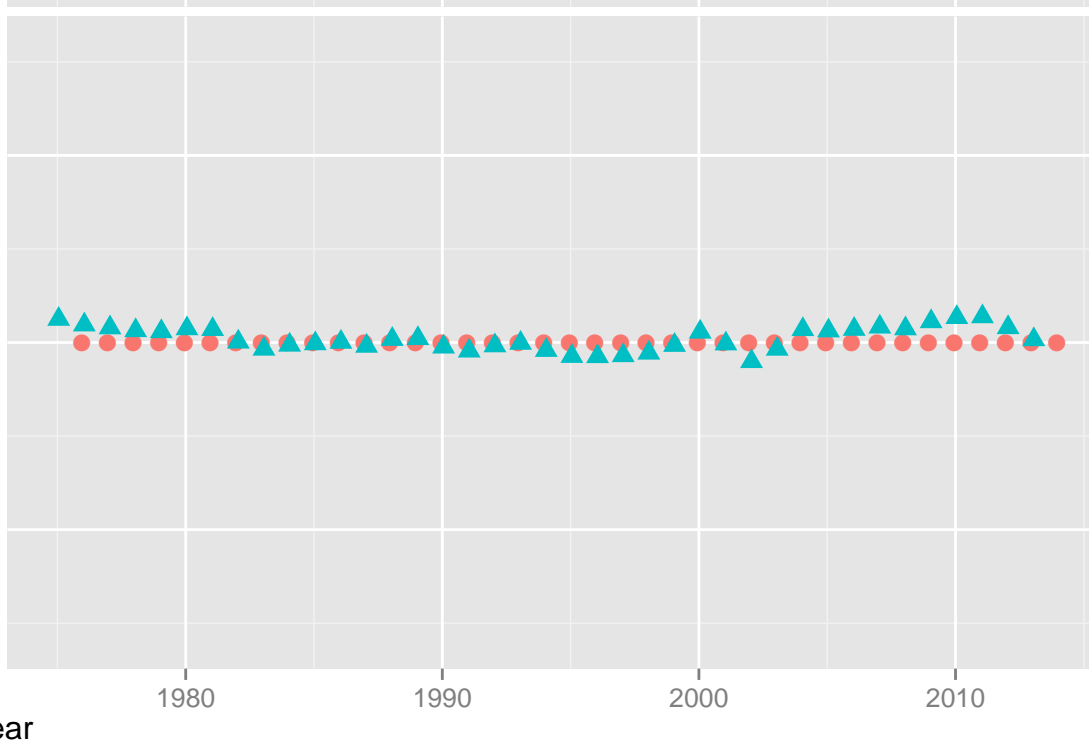
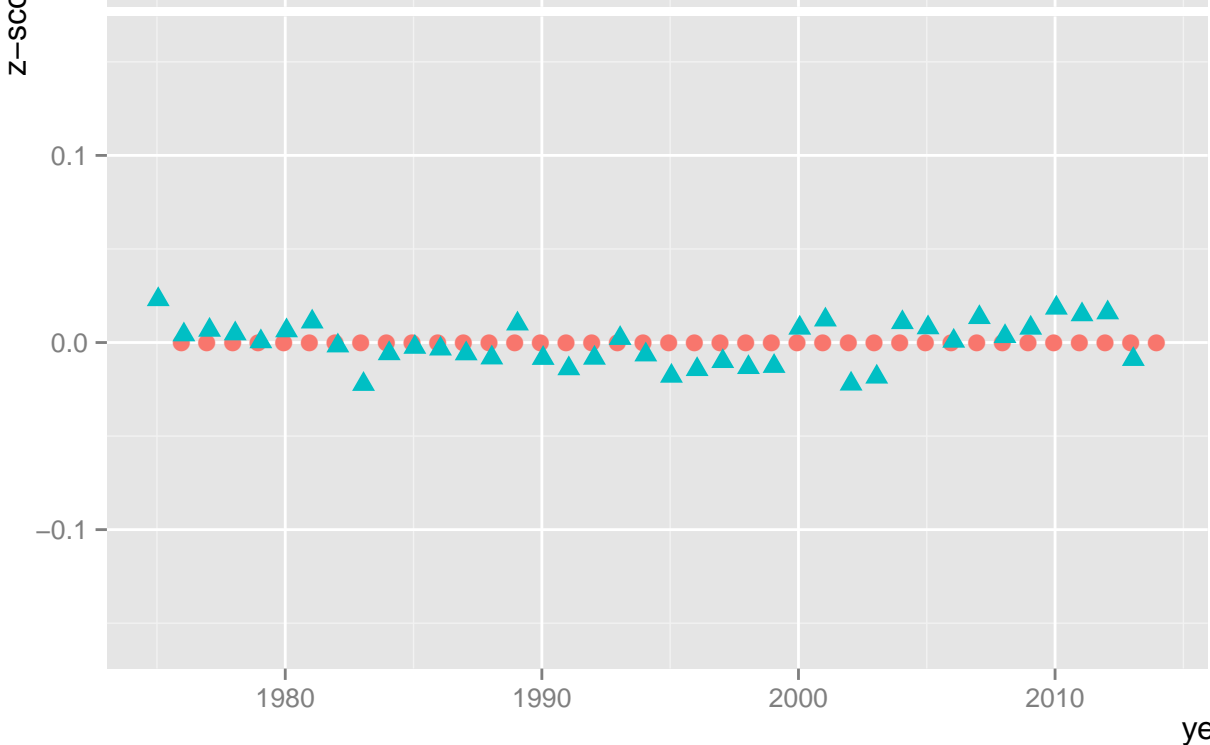
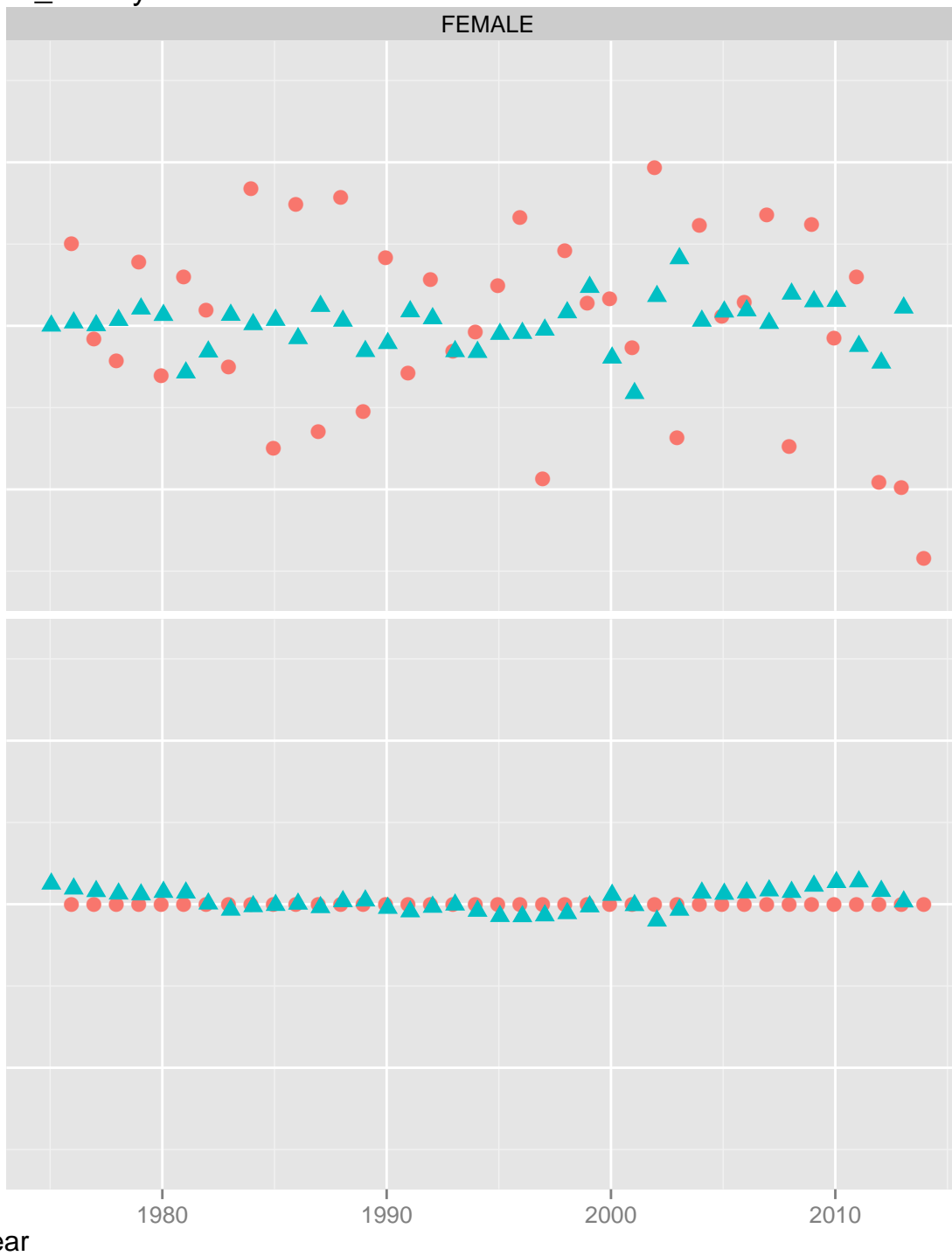
MALE

FEMALE

NEW_SHELL

OLD_SHELL

maturity
● IMMATURE
▲ MATURE



NMFS_trawl_survey

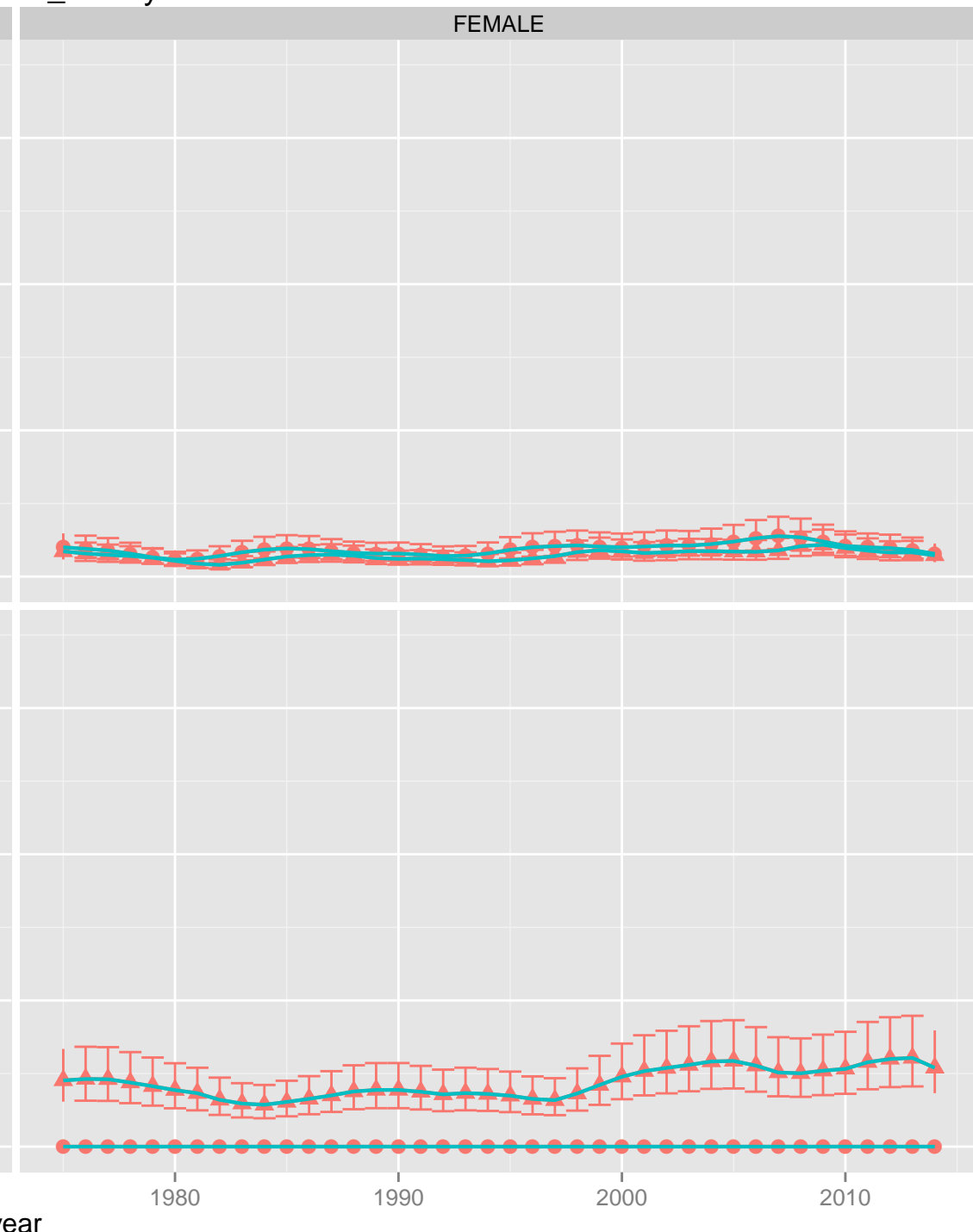
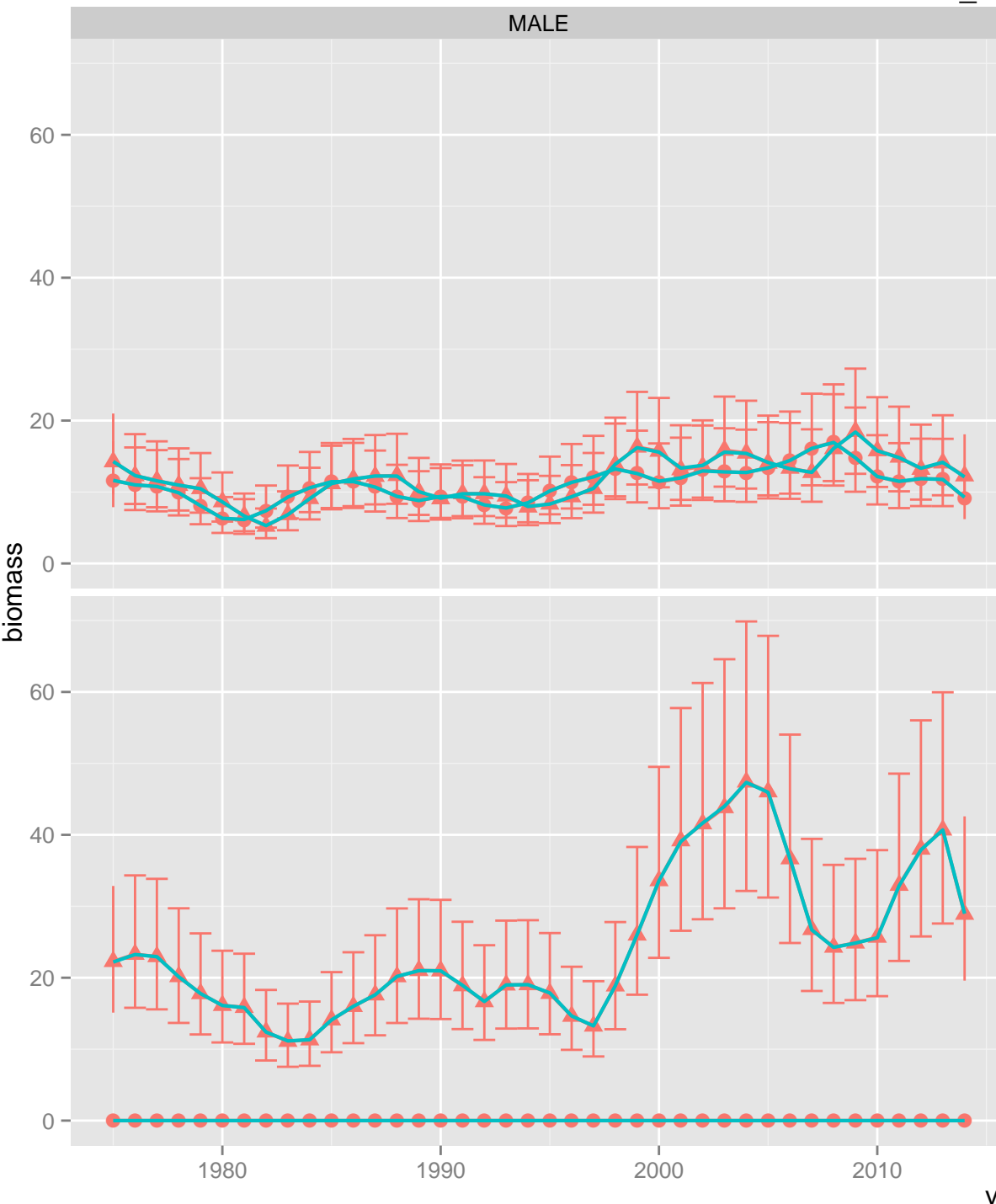
MALE

FEMALE

NEW_SHELL

OLD_SHELL

- type**
- observed
 - estimated
- maturity**
- IMMATURE
 - MATURE



NMFS_trawl_survey

MALE

FEMALE

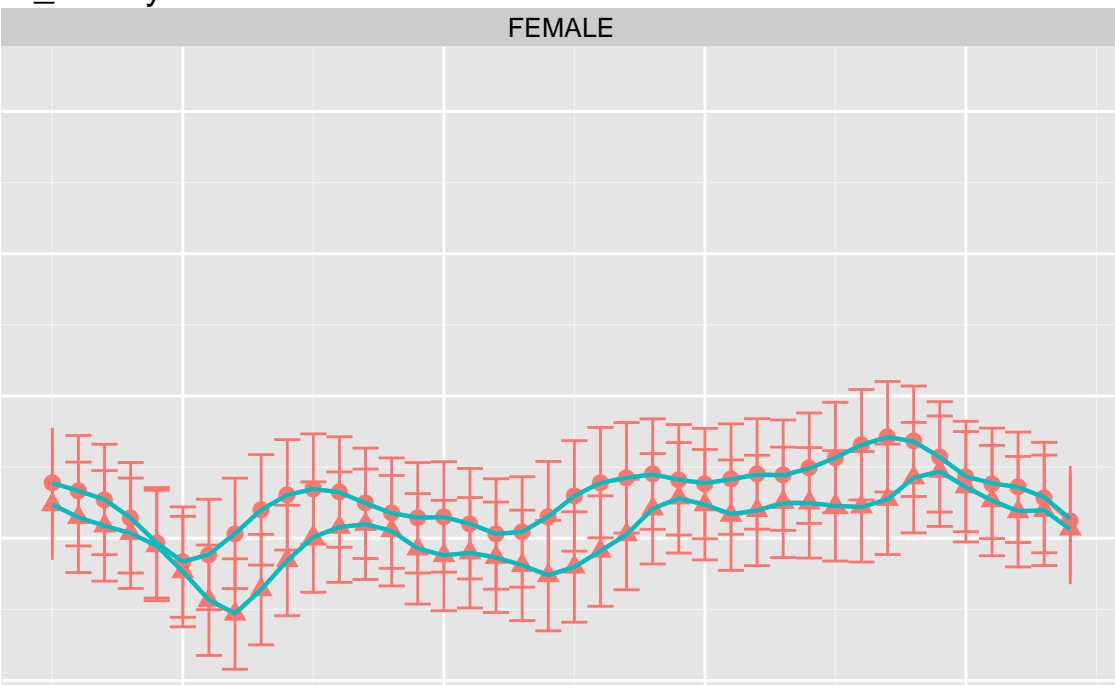
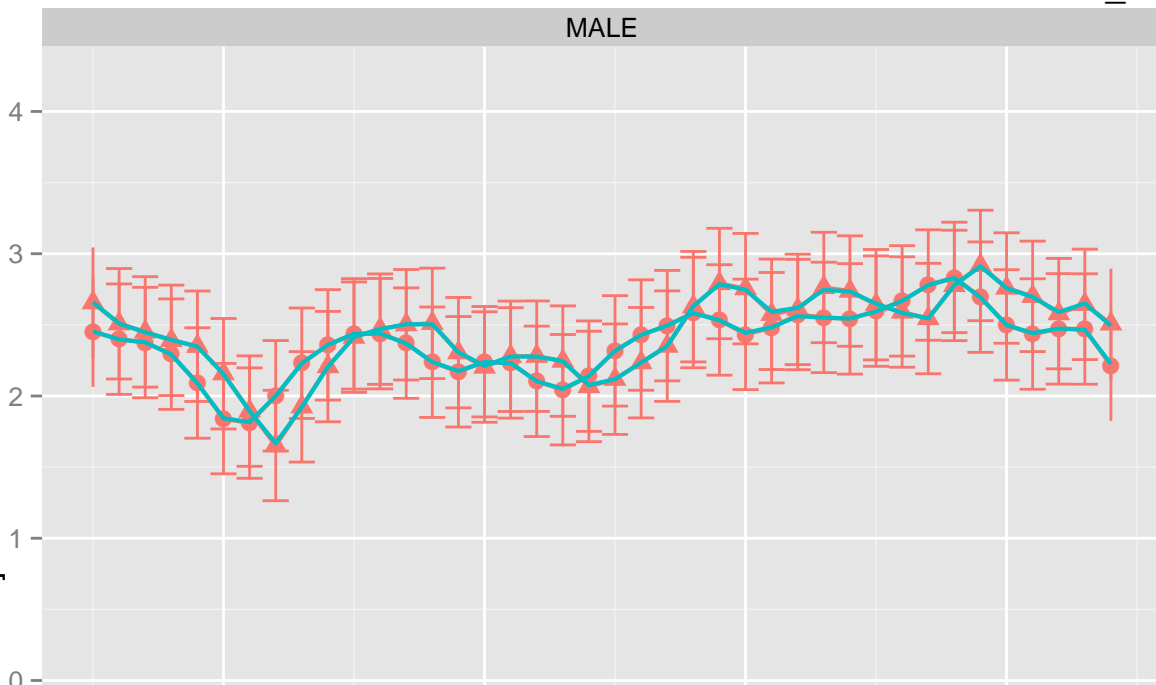
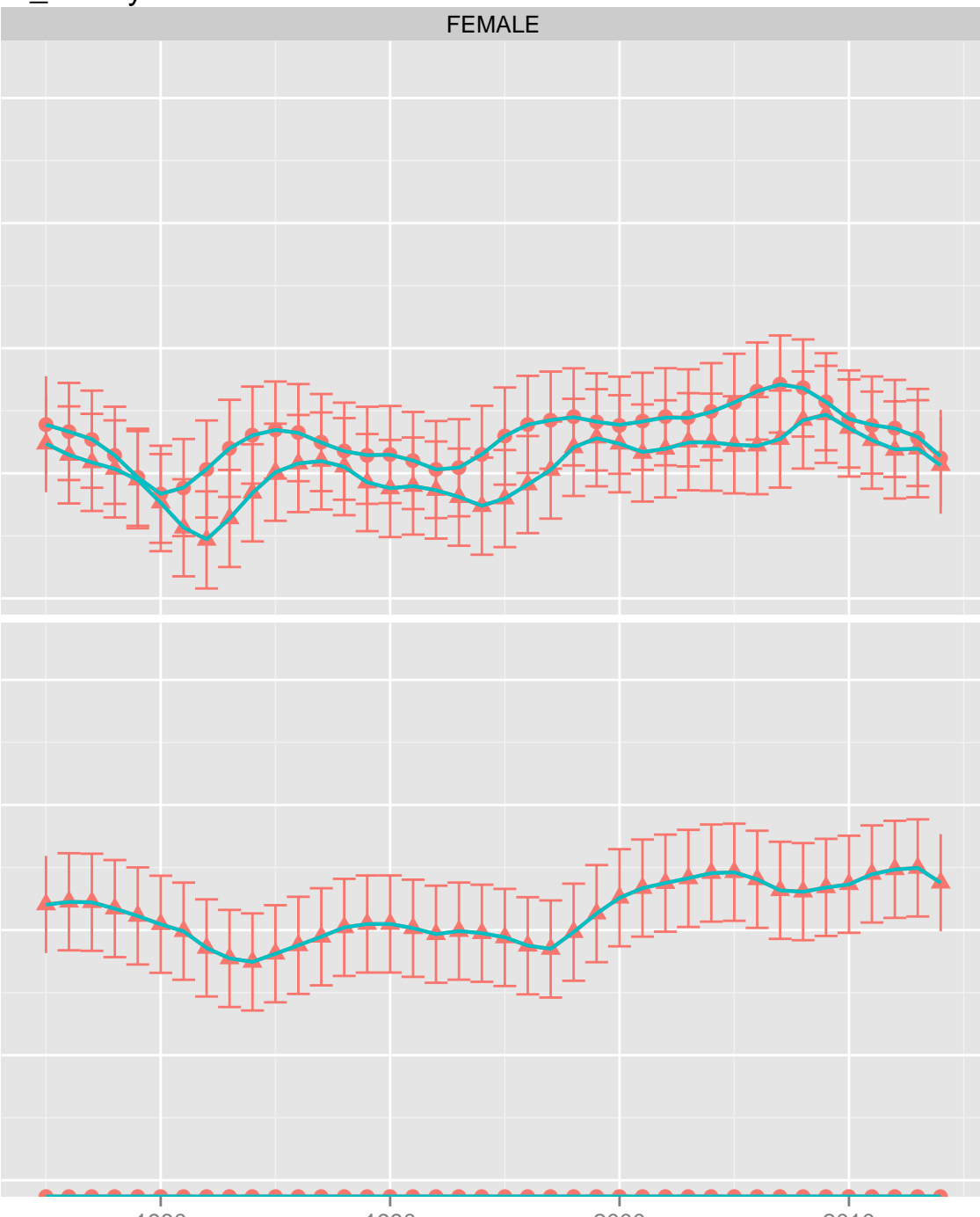
NEW_SHELL

OLD_SHELL

biomass [ln-scale]

year

- maturity**
- IMMATURE
 - ▲ MATURE
- type**
- observed
 - estimated



NMFS_trawl_survey

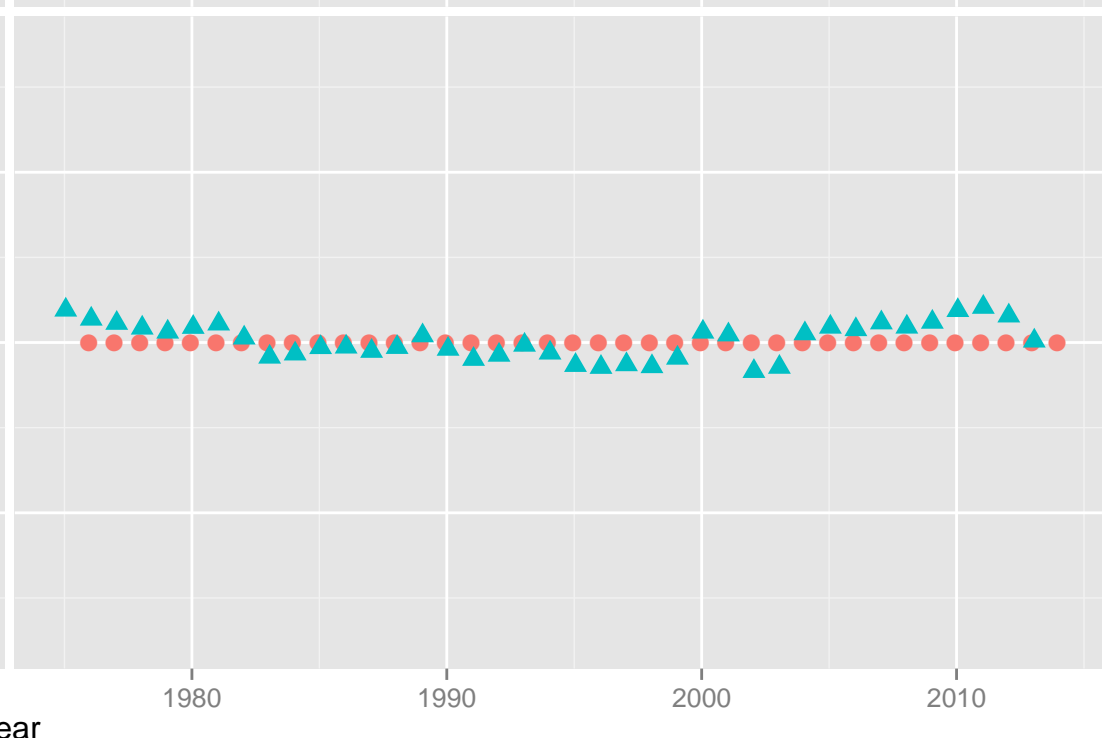
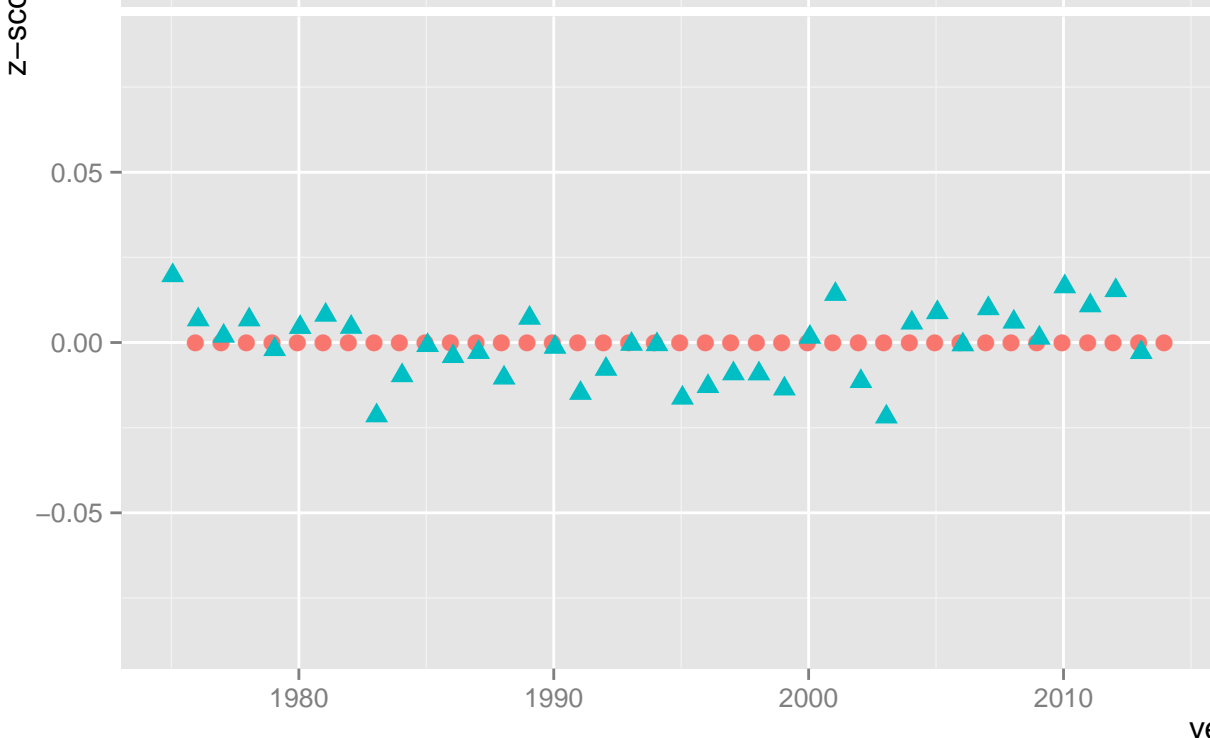
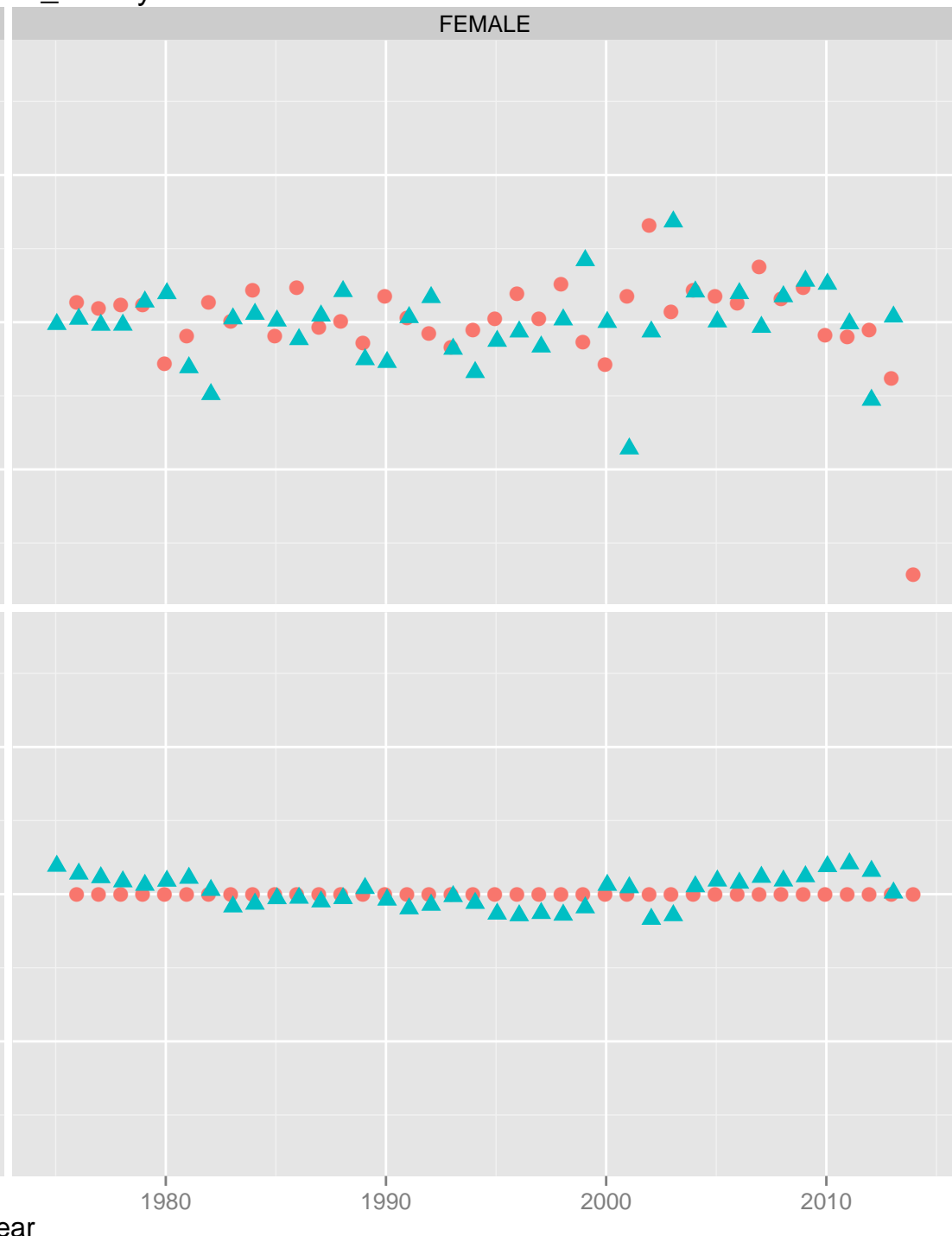
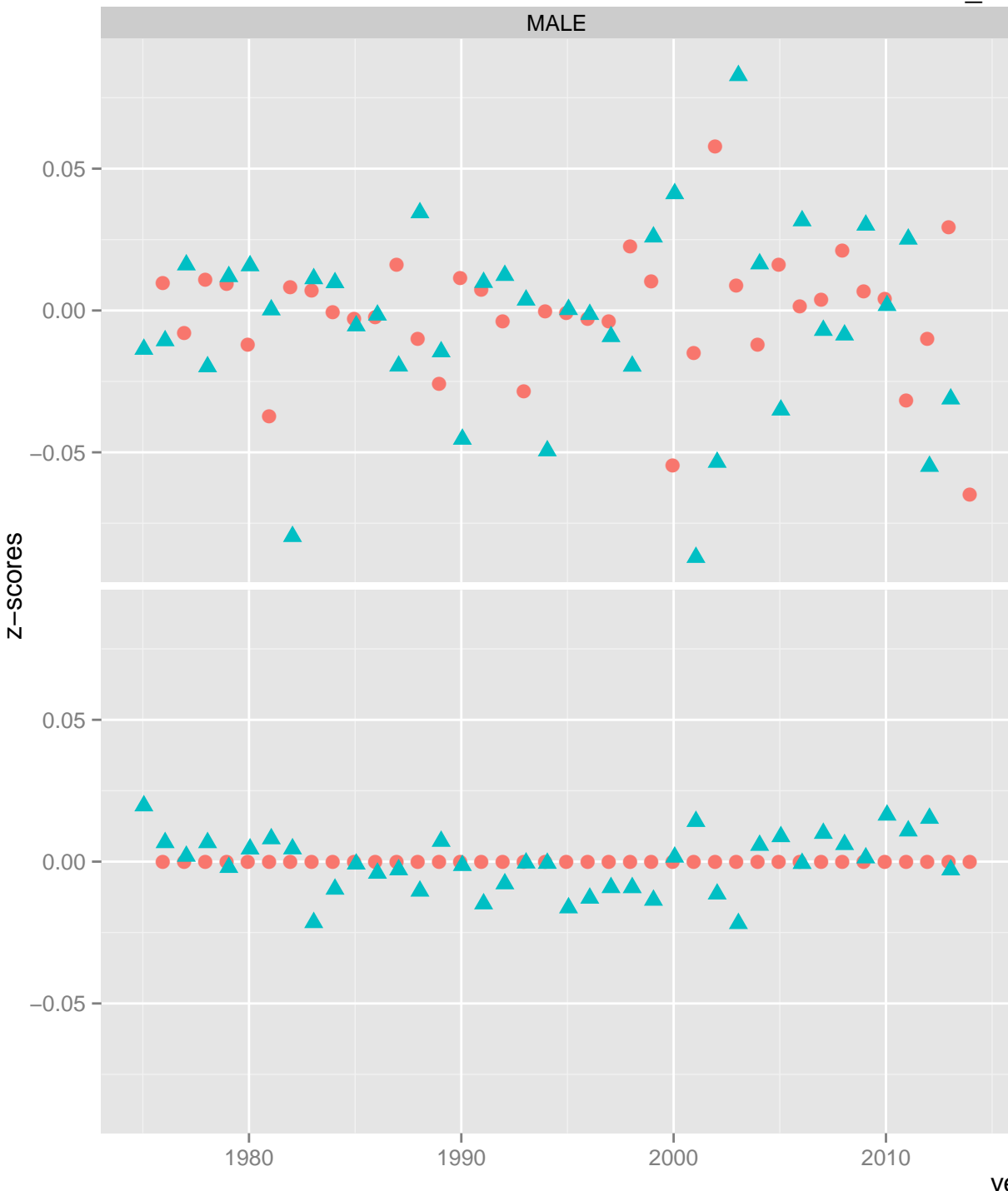
MALE

FEMALE

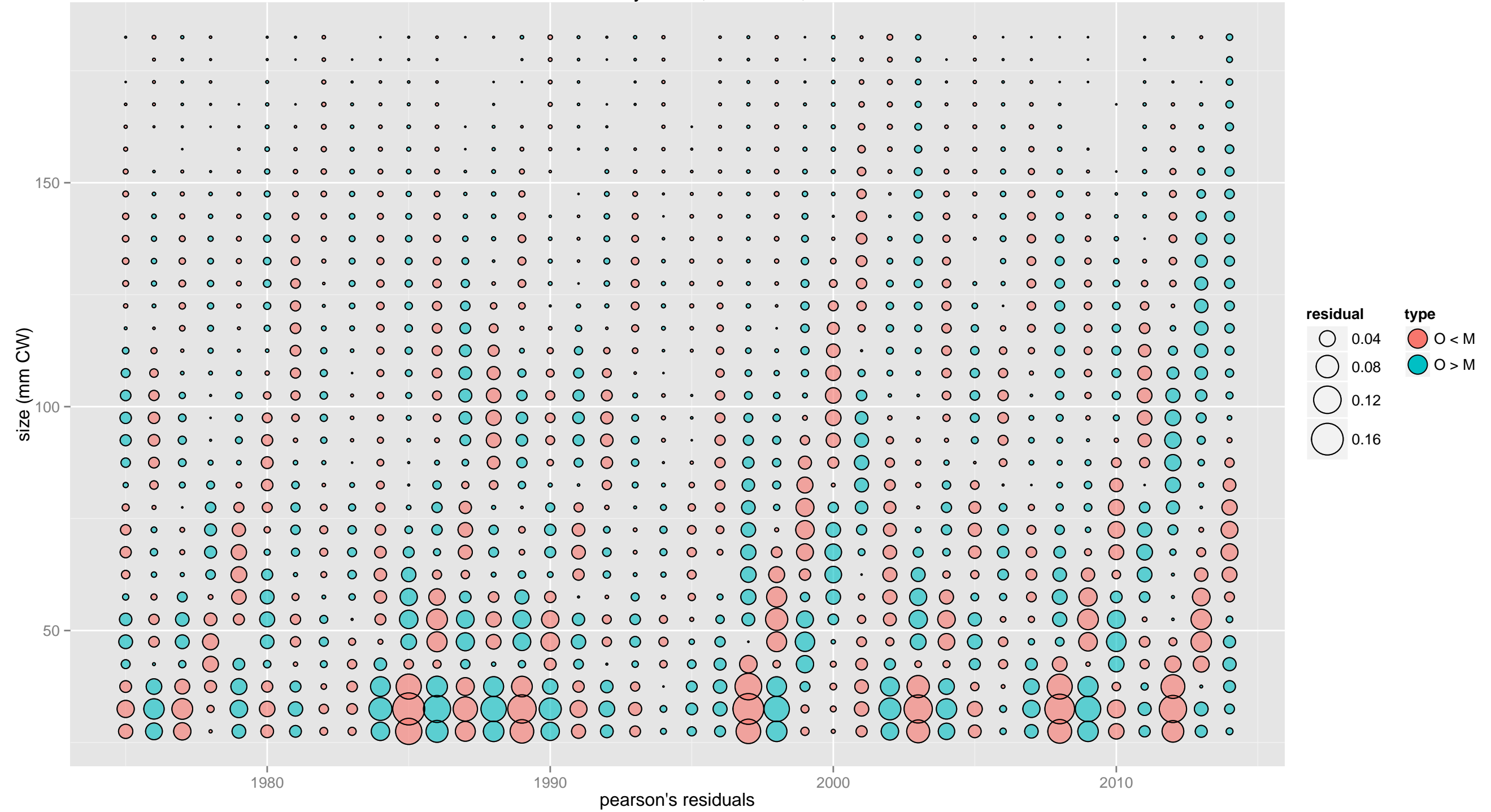
NEW_SHELL

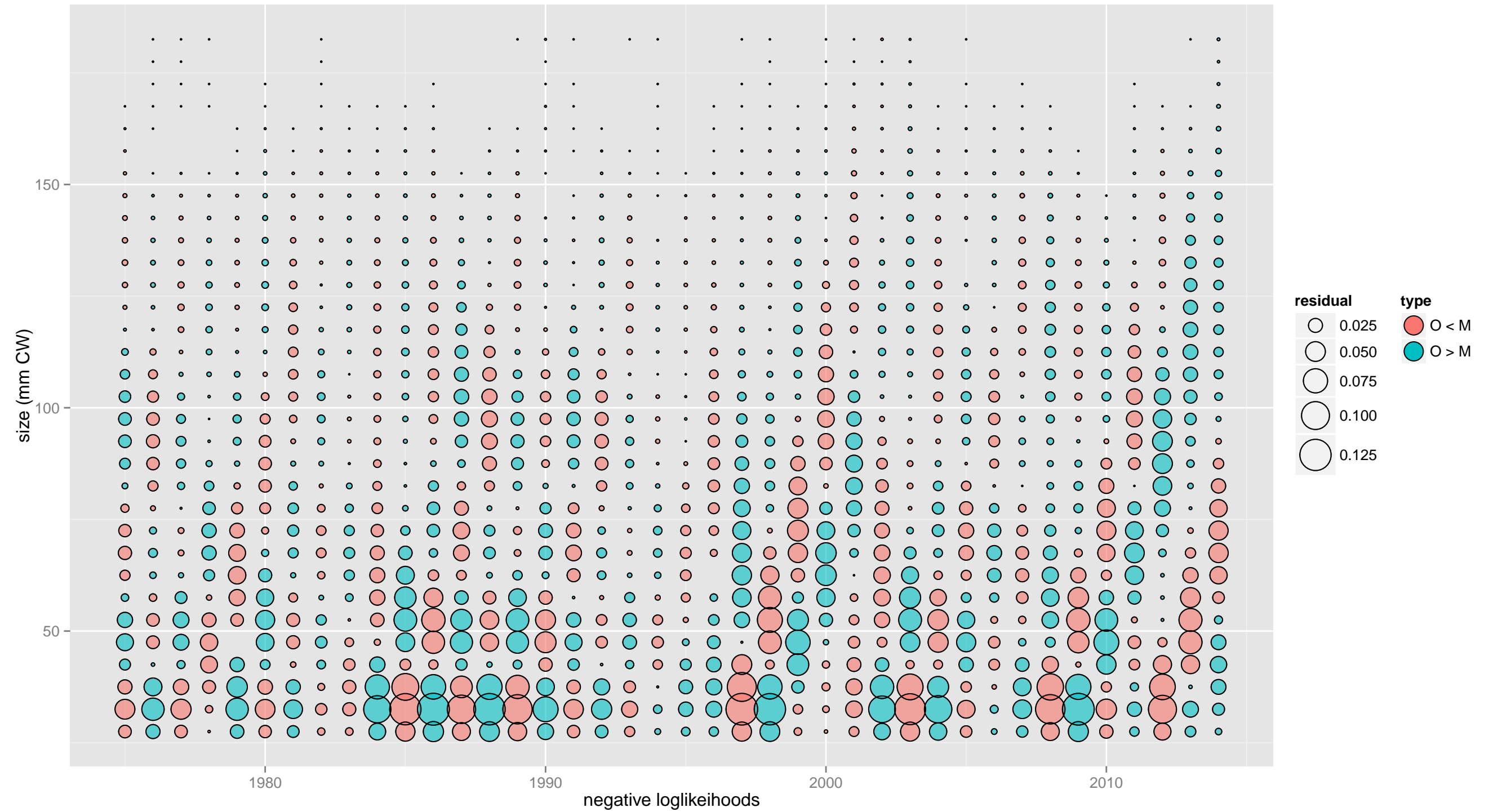
OLD_SHELL

maturity
● IMMATURE
▲ MATURE

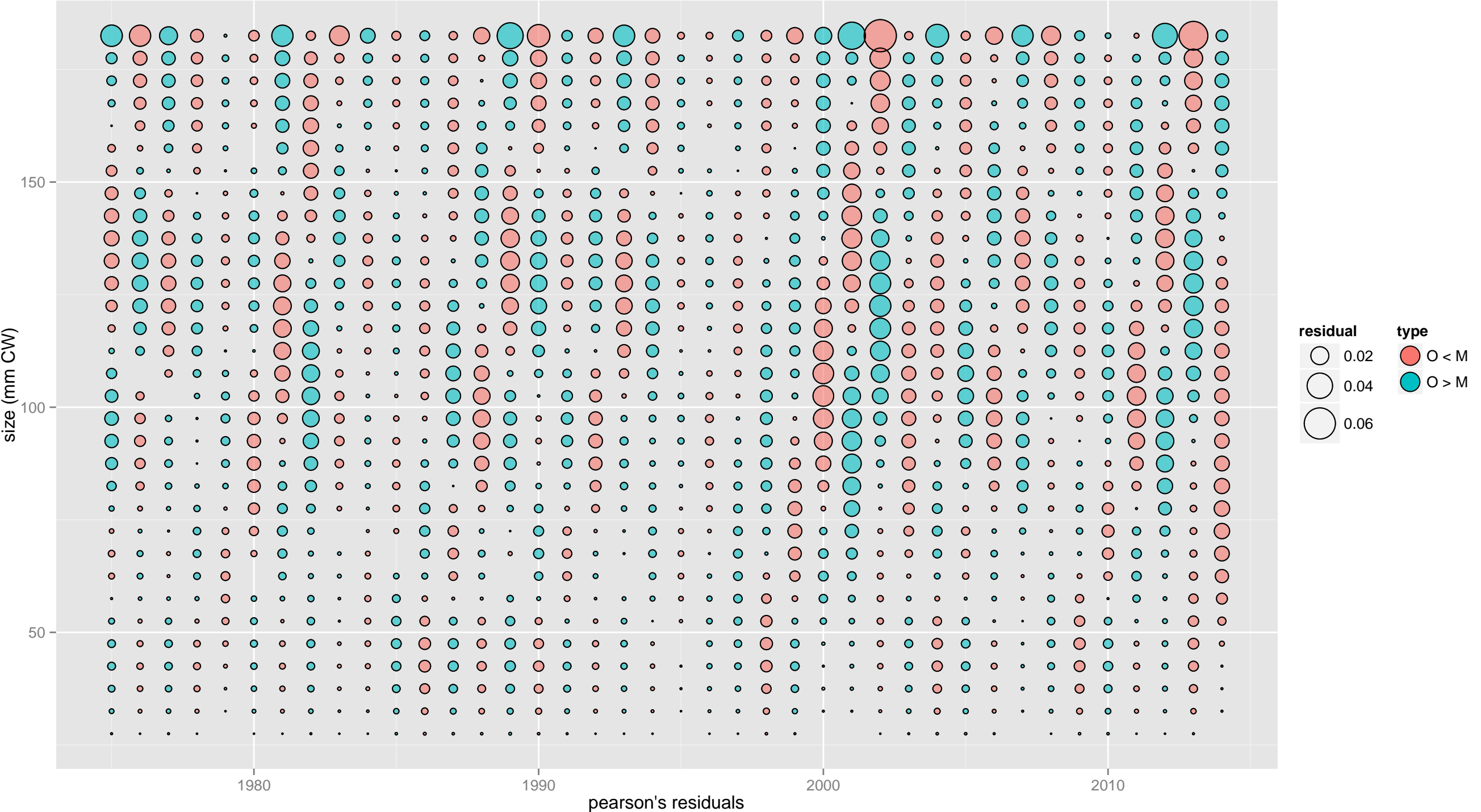


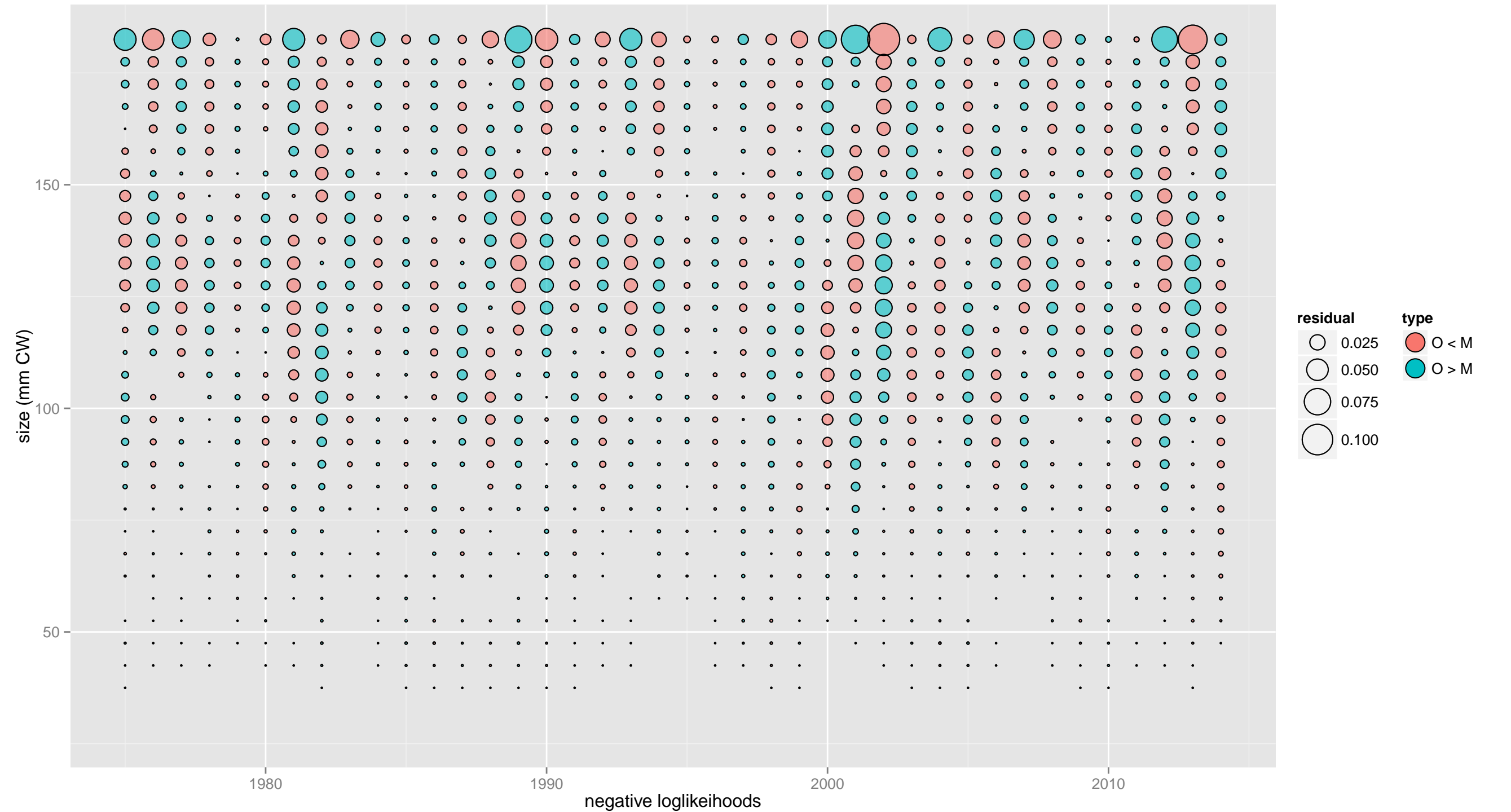
NMFS_trawl_survey: male, immature, new shell



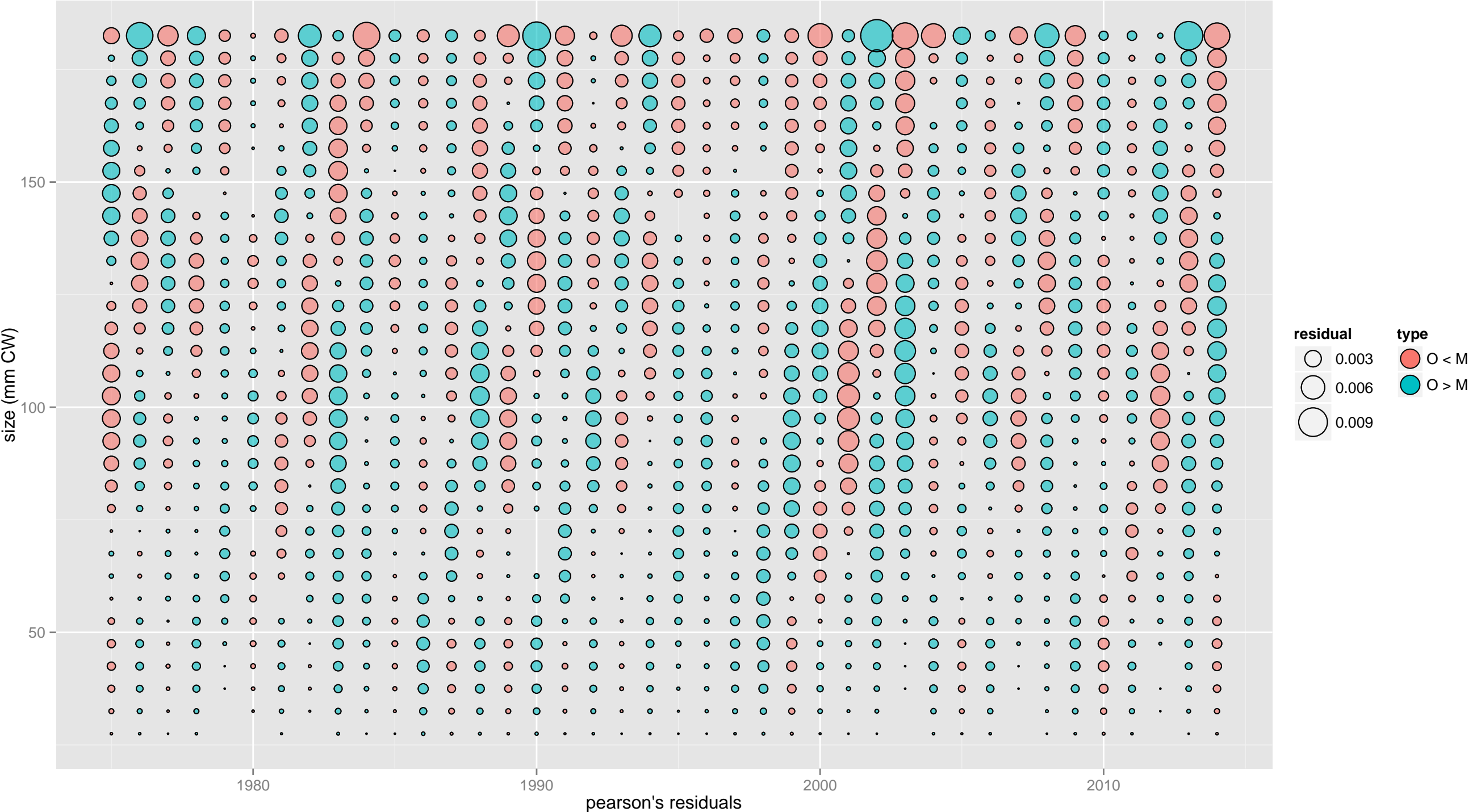


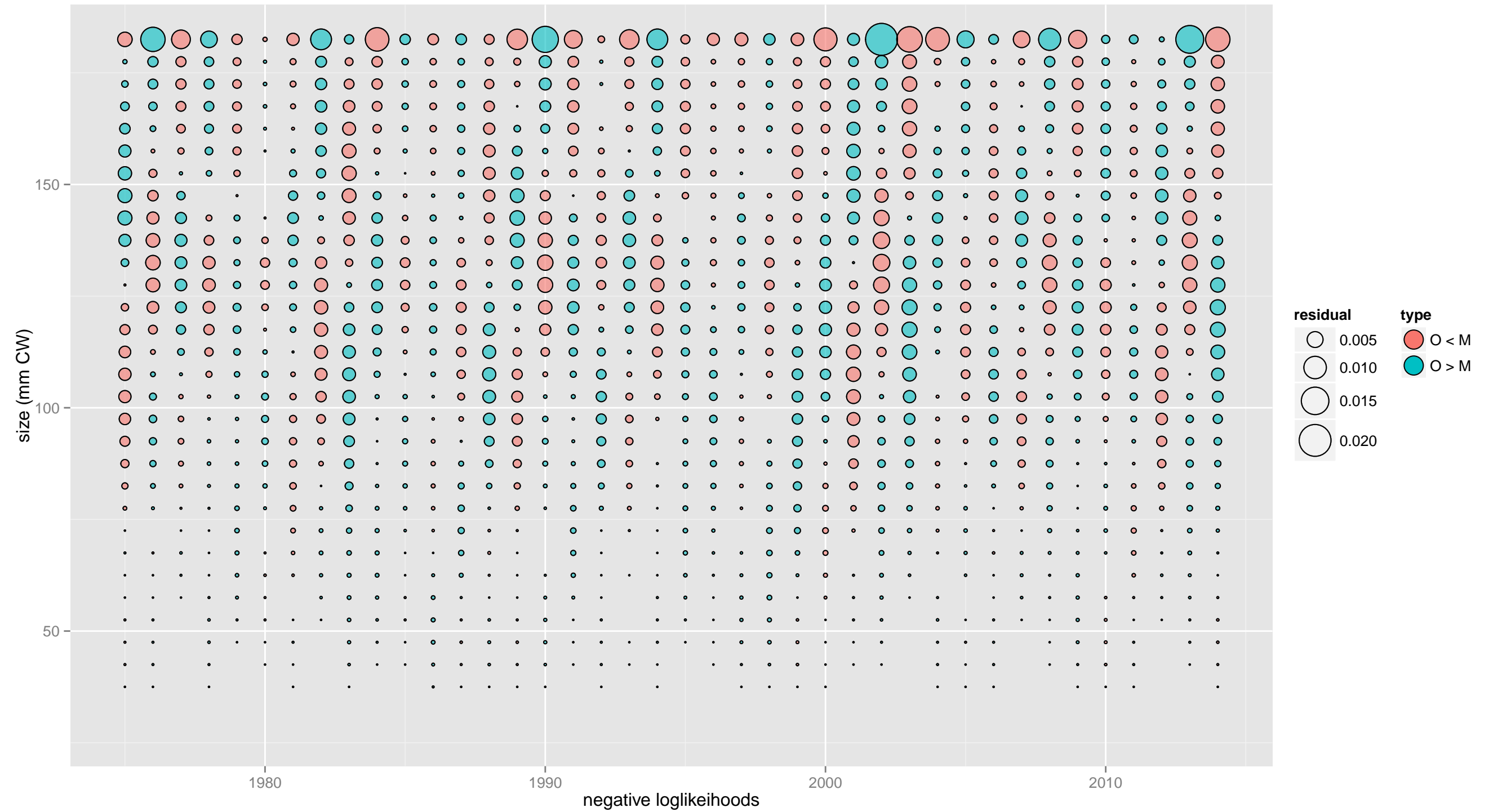
NMFS_trawl_survey: male, mature, new shell



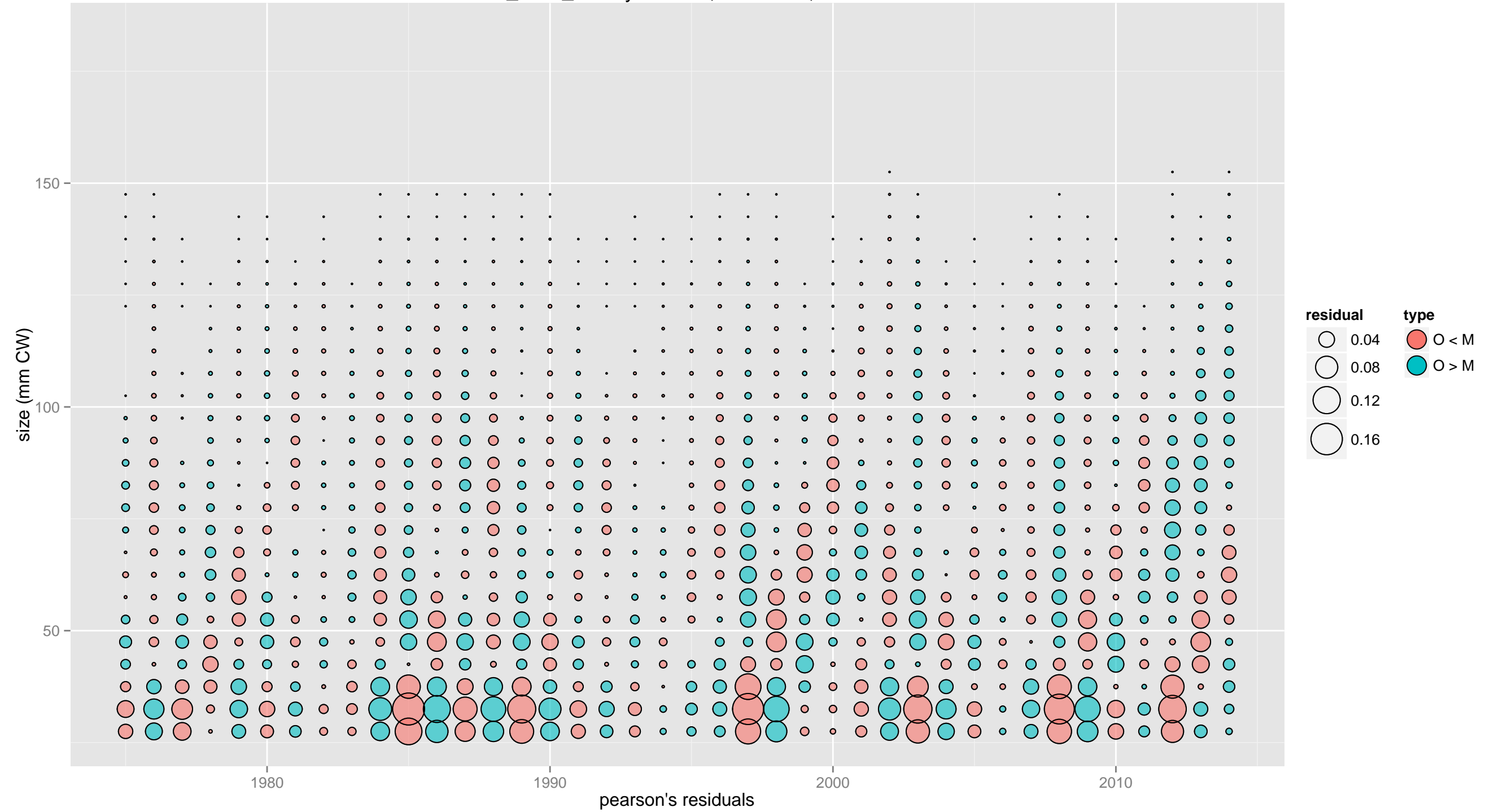


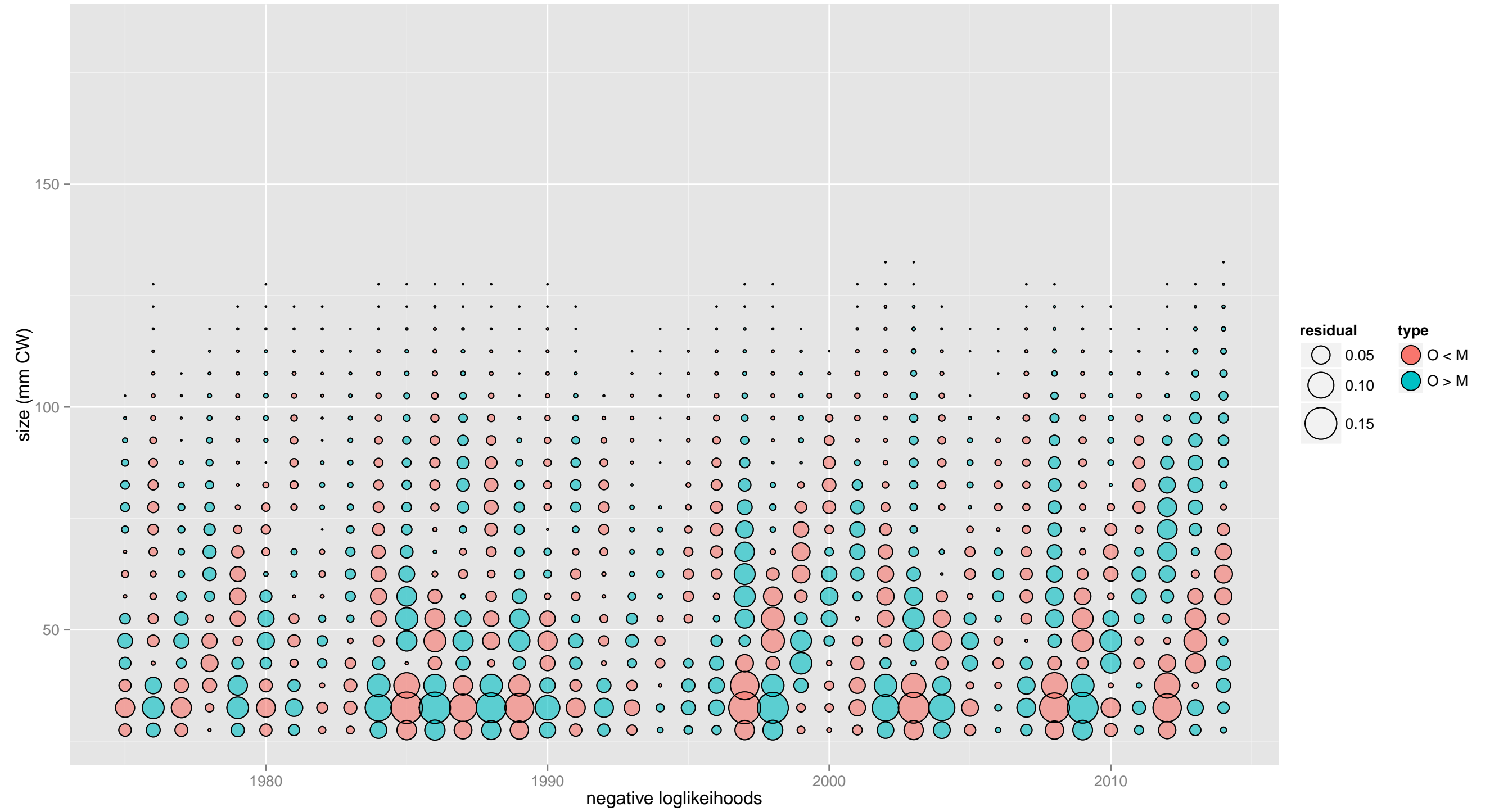
NMFS_trawl_survey: male, mature, old shell





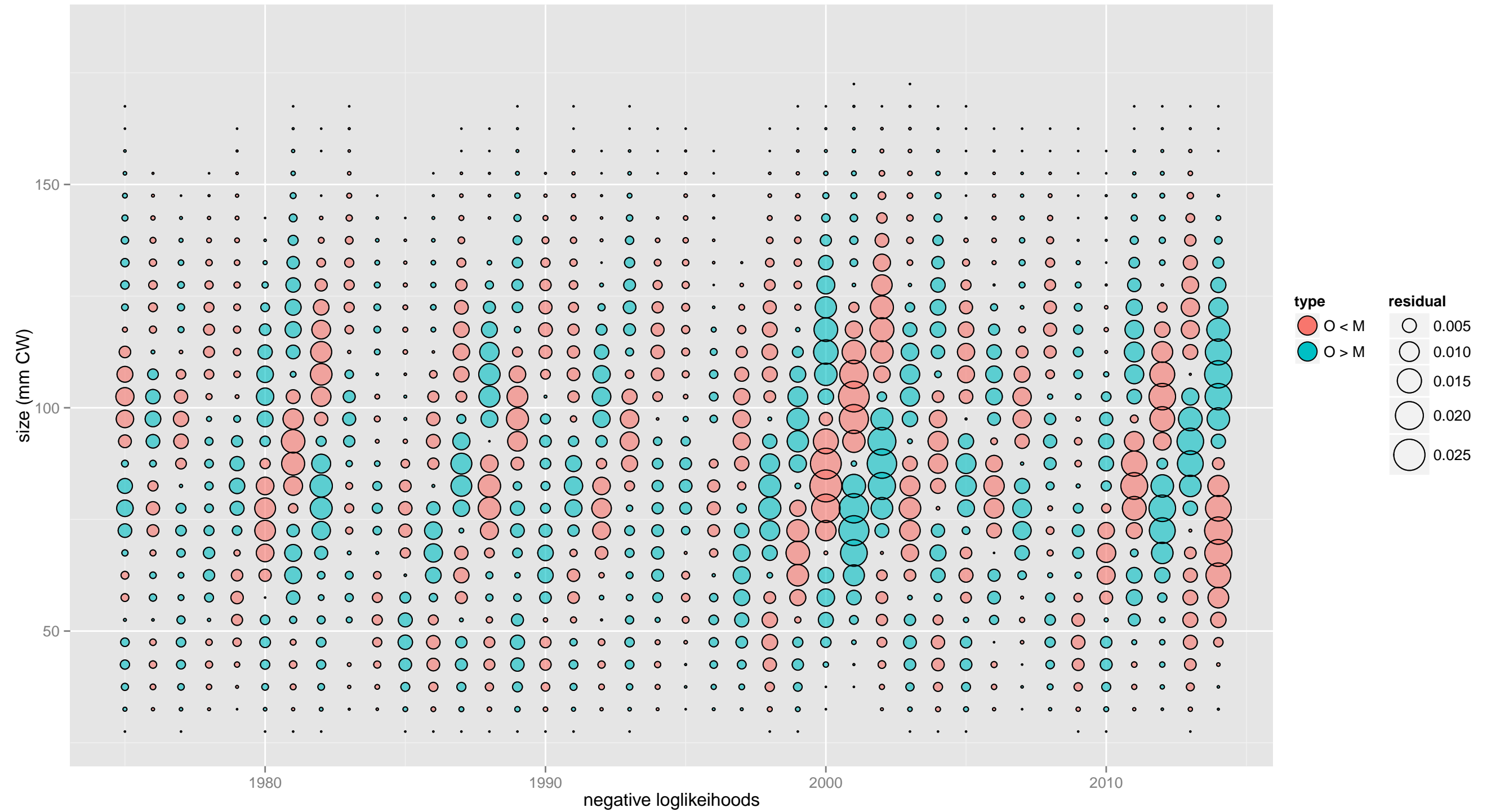
NMFS_trawl_survey: female, immature, new shell



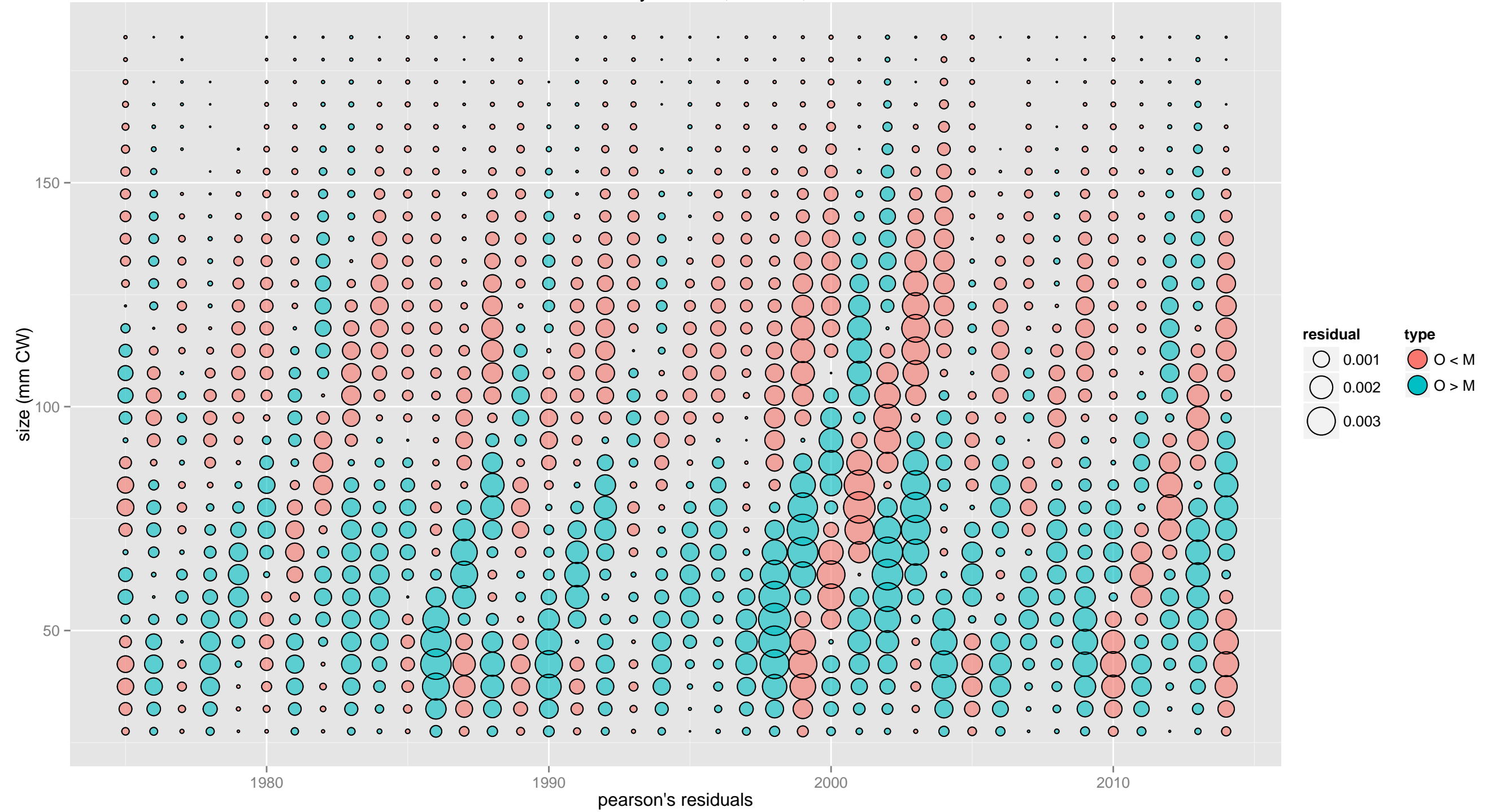


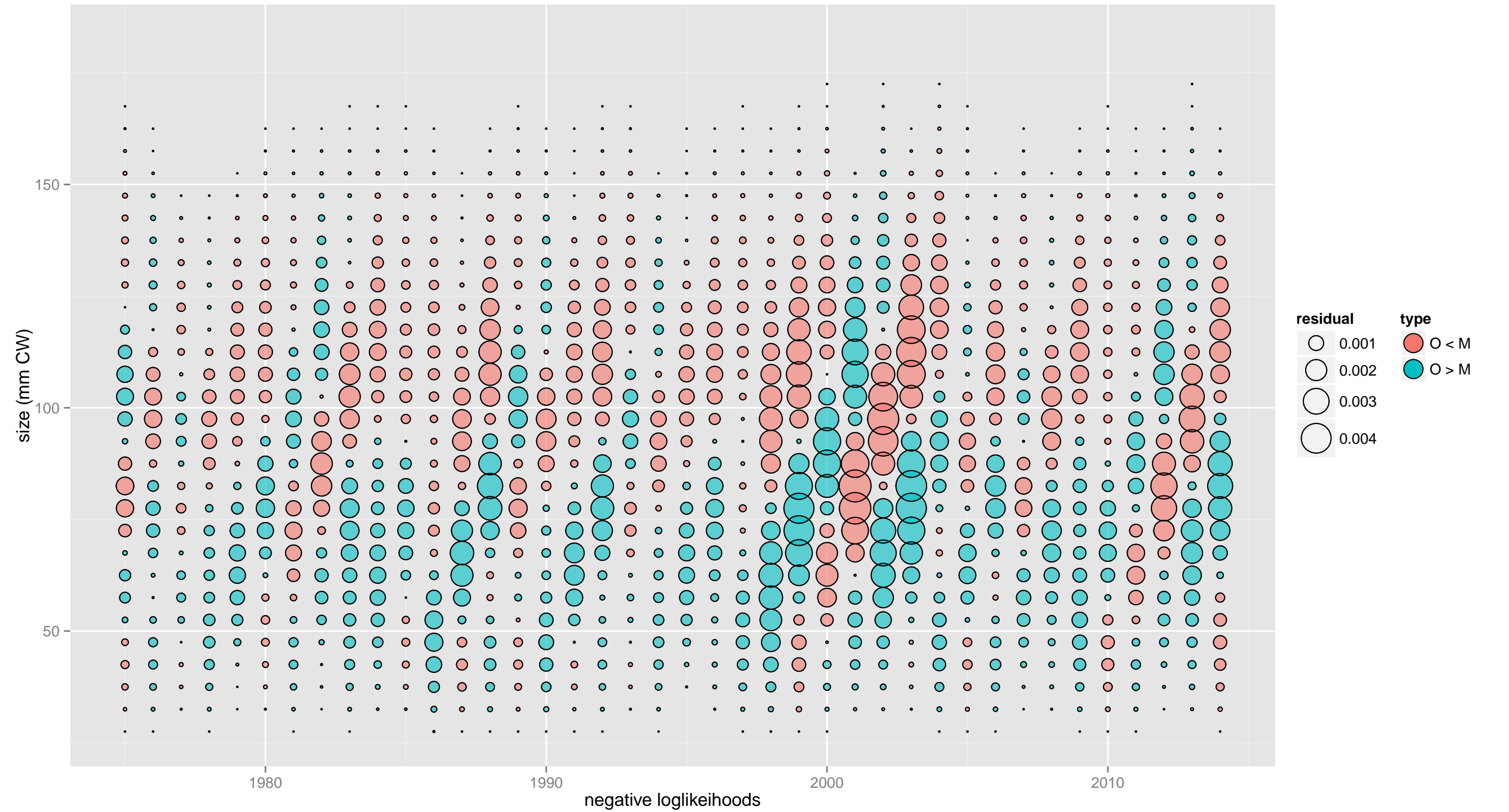
NMFS_trawl_survey: female, mature, new shell



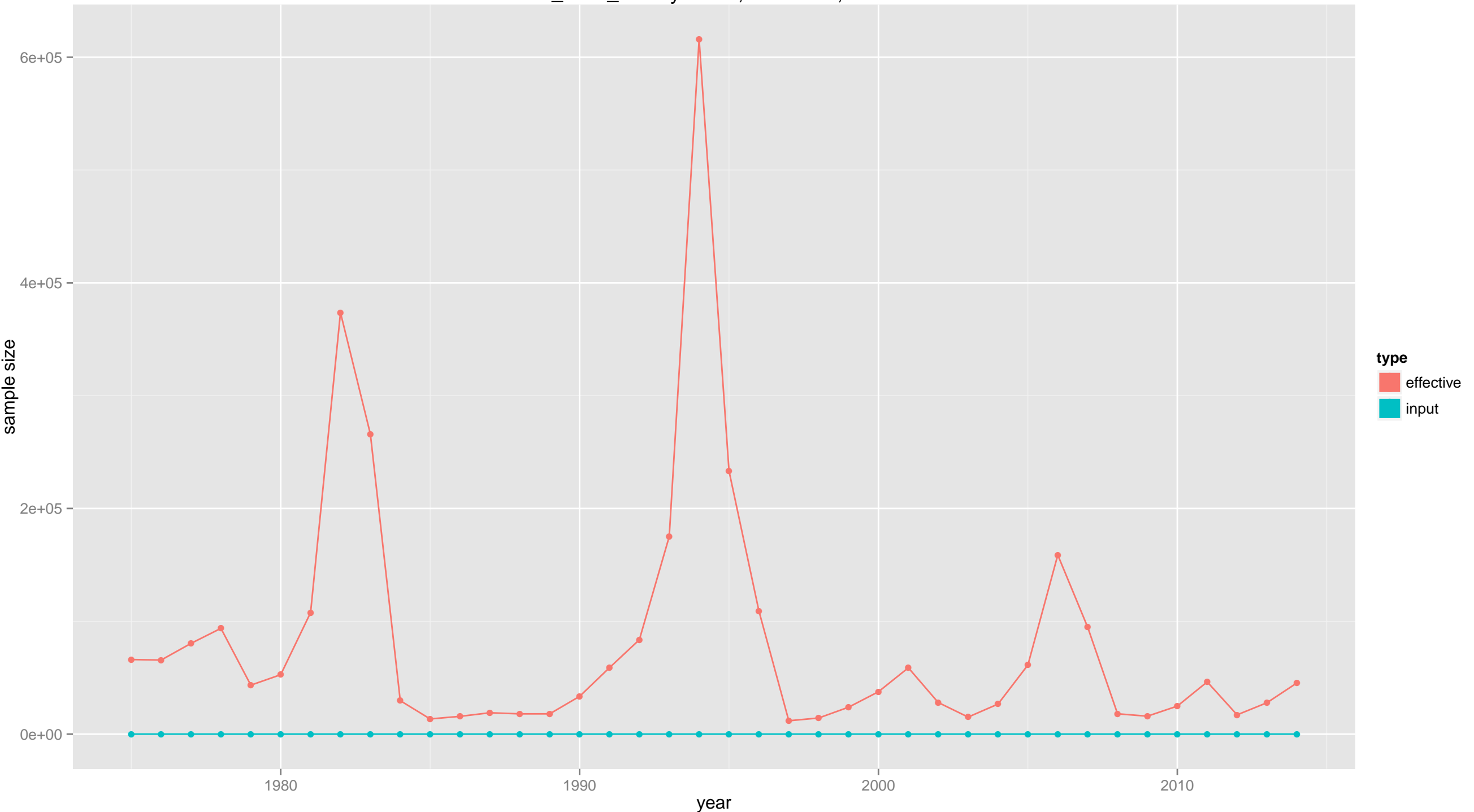


NMFS_trawl_survey: female, mature, old shell

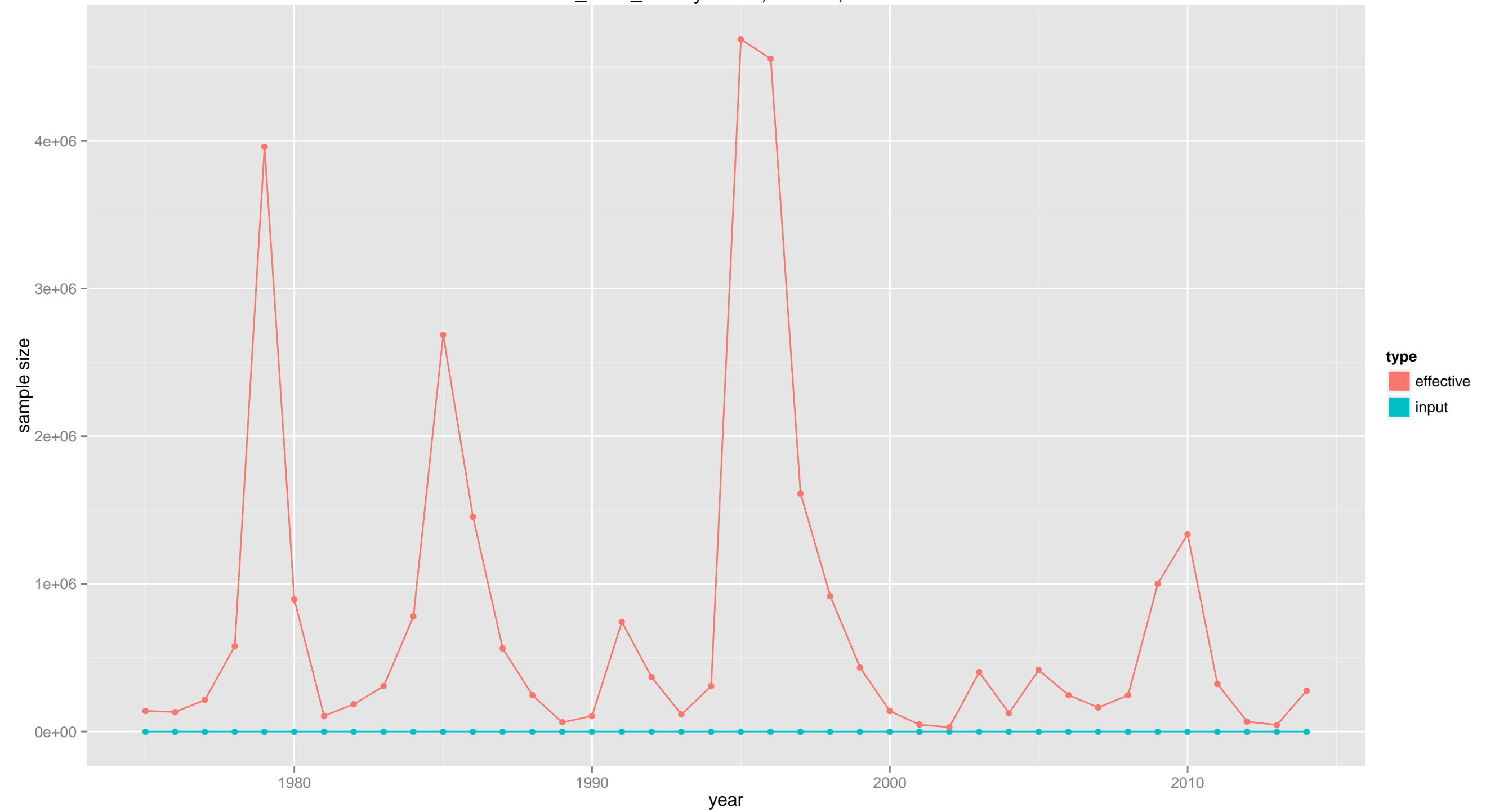




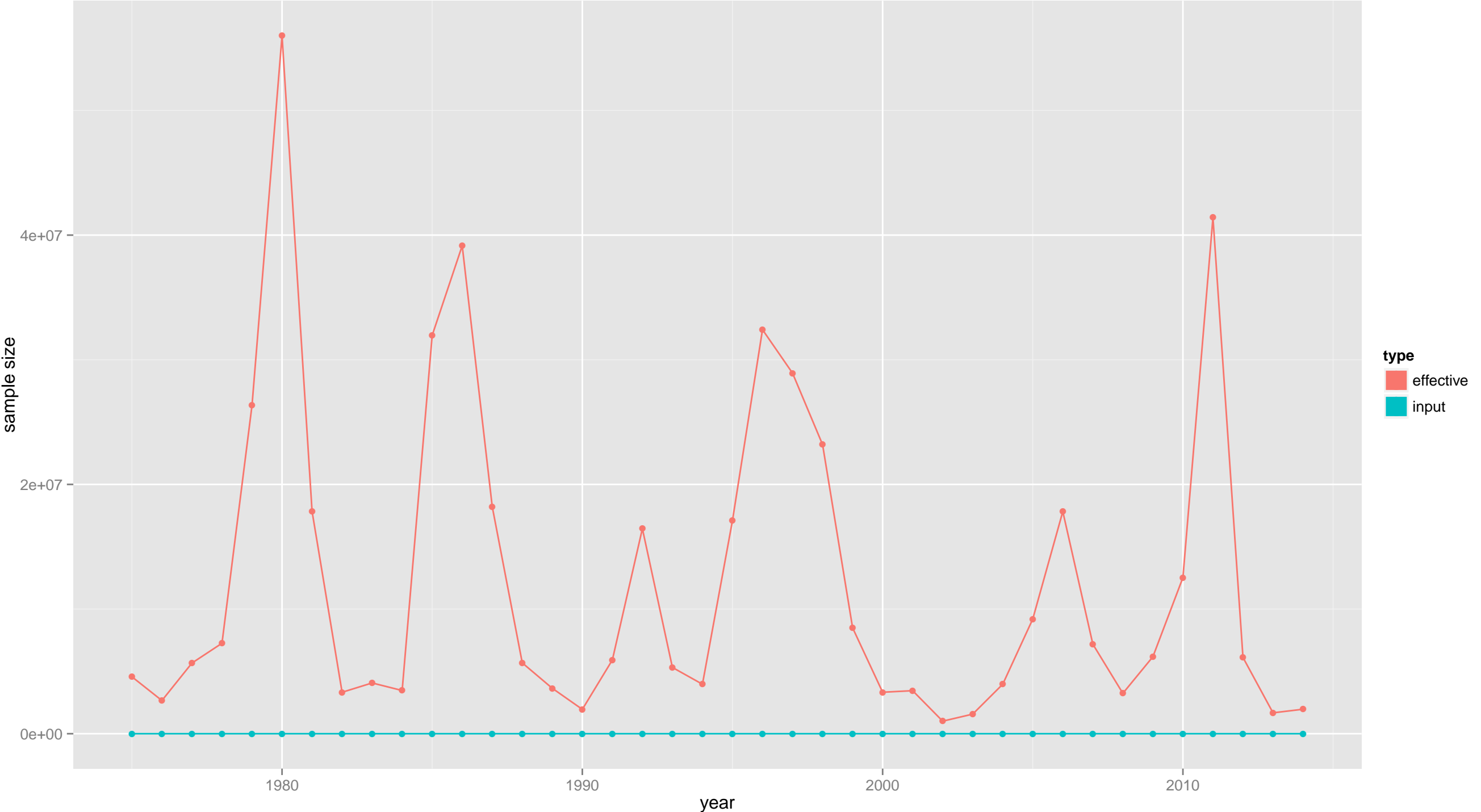
NMFS_trawl_survey: male, immature, new shell



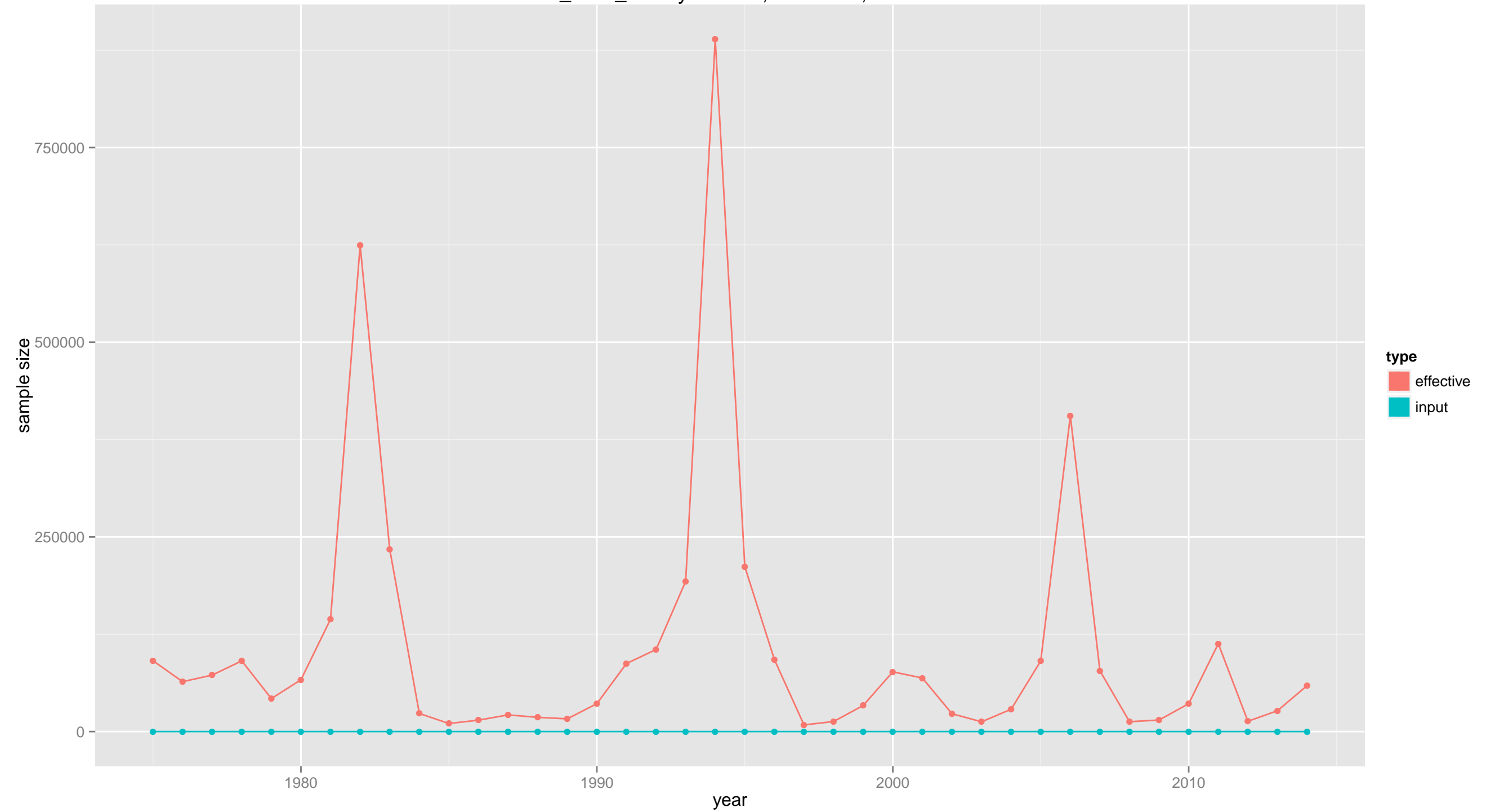
NMFS_trawl_survey: male, mature, new shell



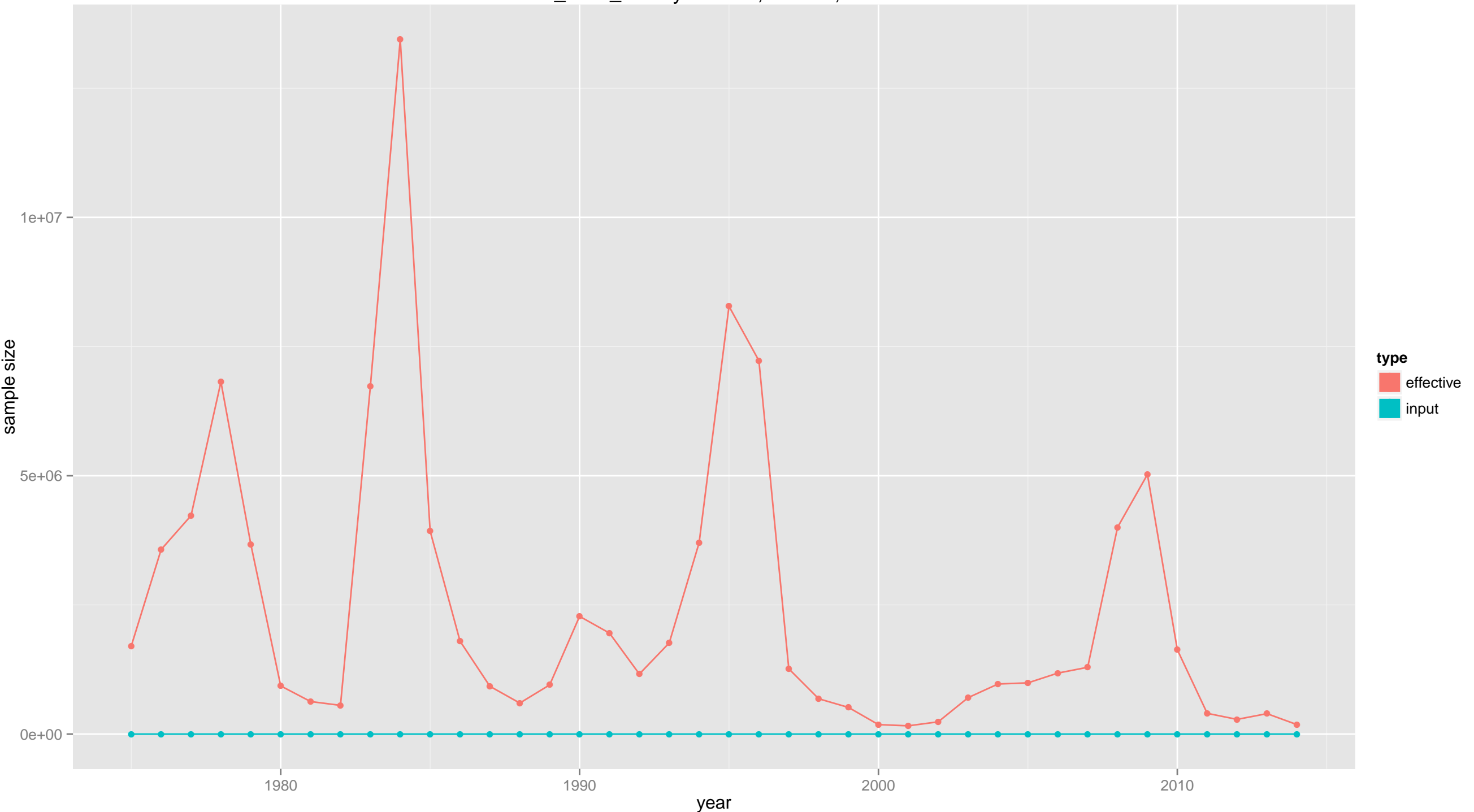
NMFS_trawl_survey: male, mature, old shell



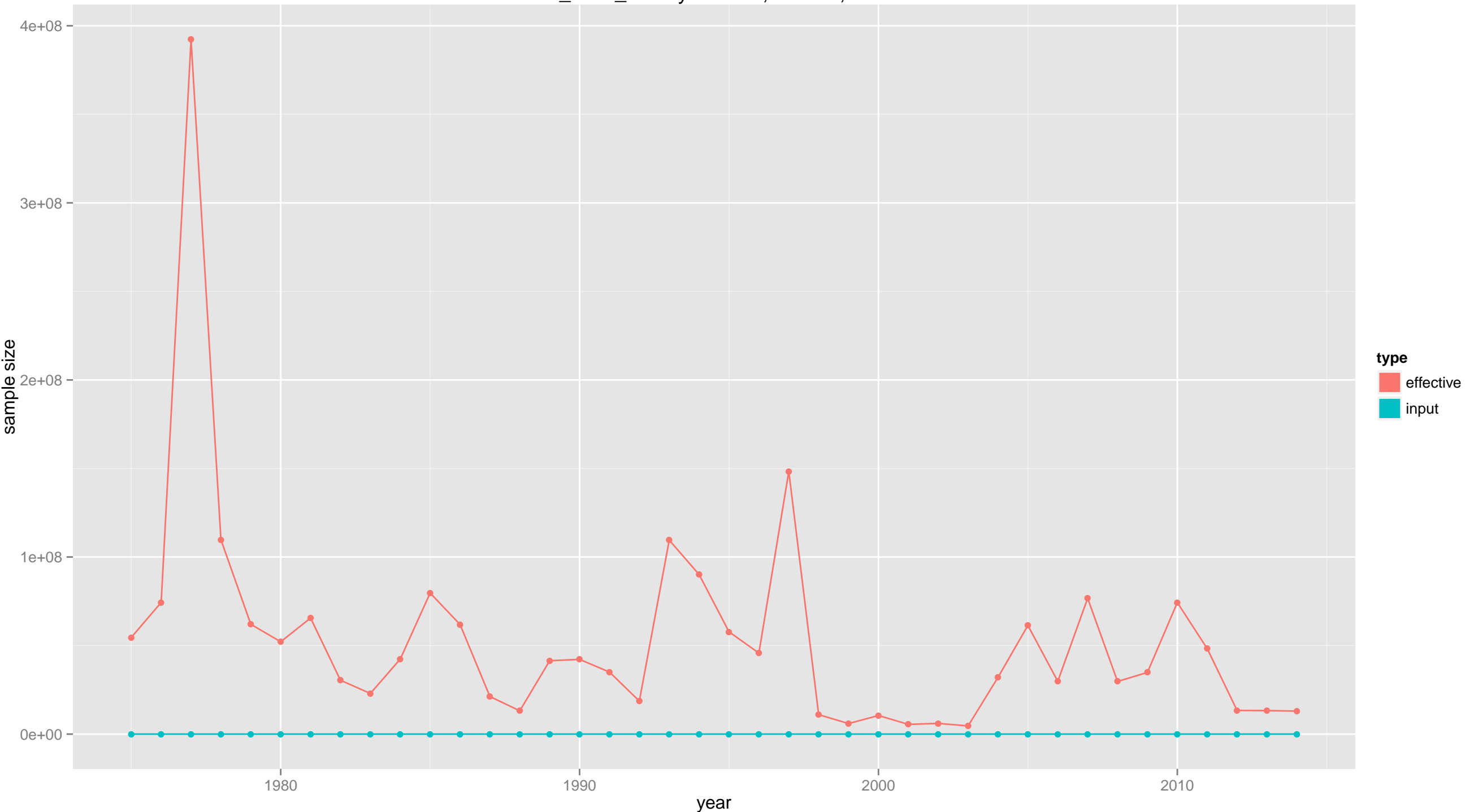
NMFS_trawl_survey: female, immature, new shell



NMFS_trawl_survey: female, mature, new shell



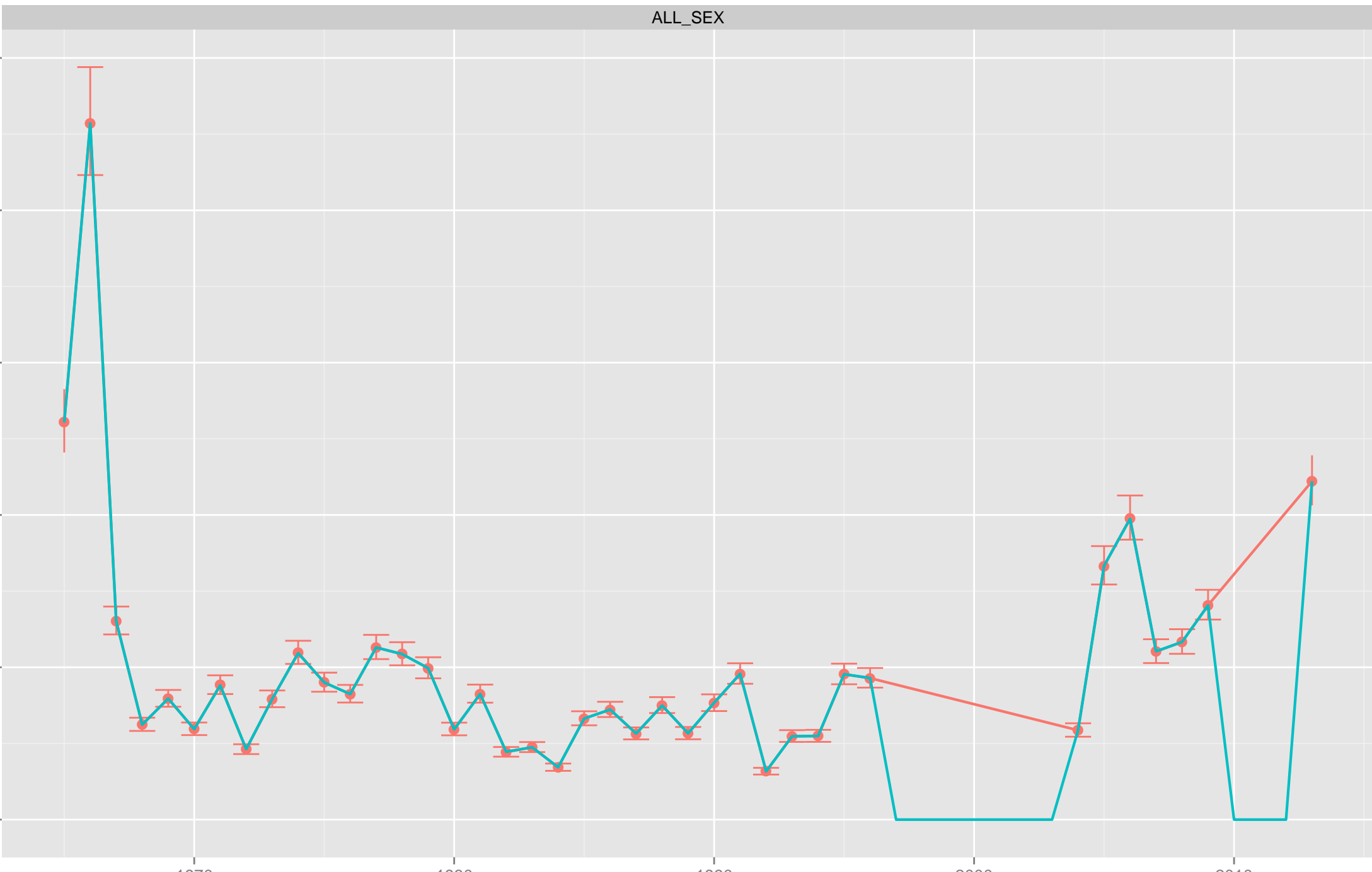
NMFS_trawl_survey: female, mature, old shell



TCF: retained catch abundance

ALL_SEX

abundance



ALL_SHELL

- type**
 - observed
 - estimated
- maturity**
 - ALL_MATURITY

year

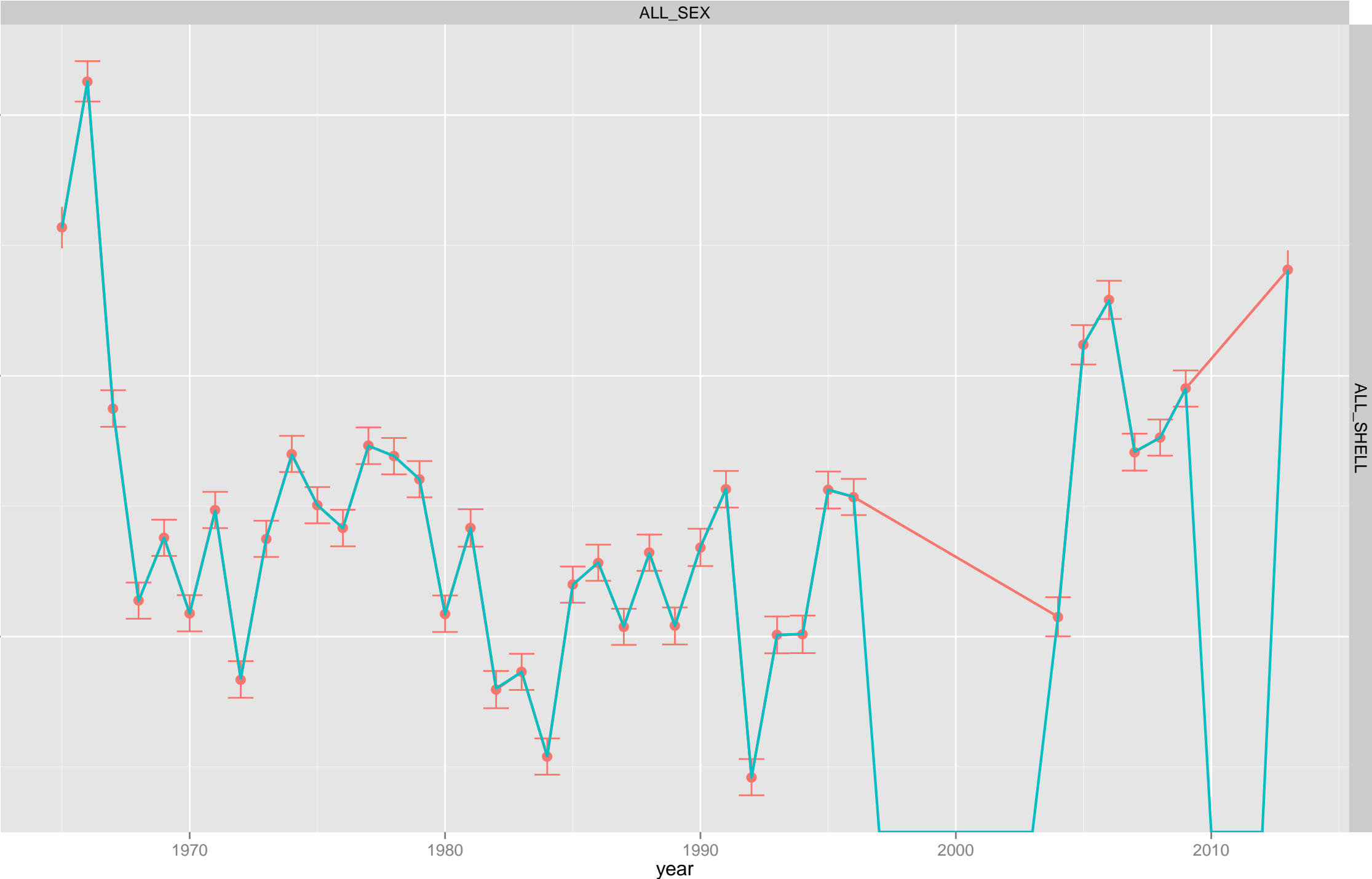
TCF: retained catch abundance

ALL_SEX

abundance [ln-scale]

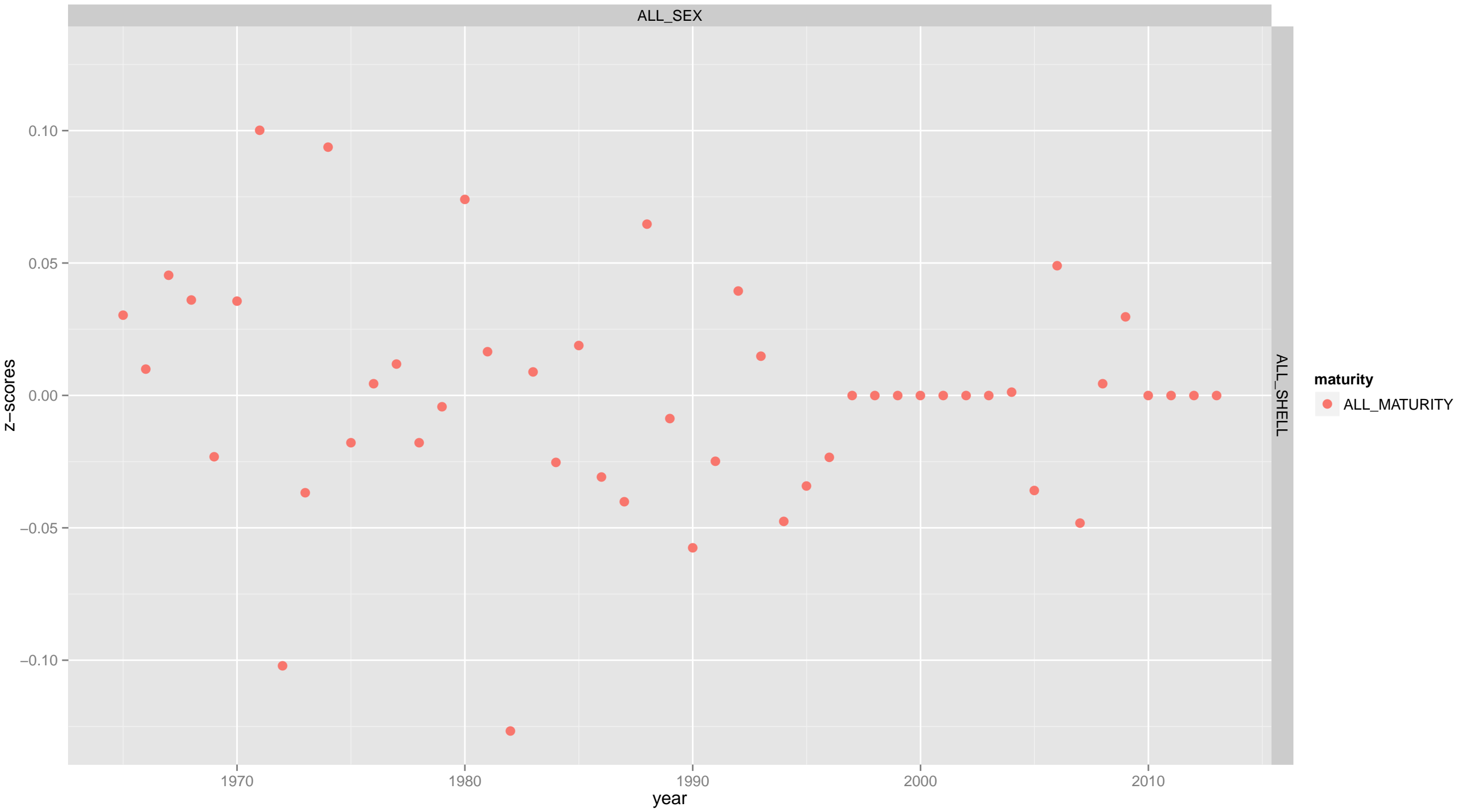
ALL_SHELL

- maturity**
 - ALL_MATURITY
- type**
 - observed
 - estimated



TCF: retained catch abundance

ALL_SEX



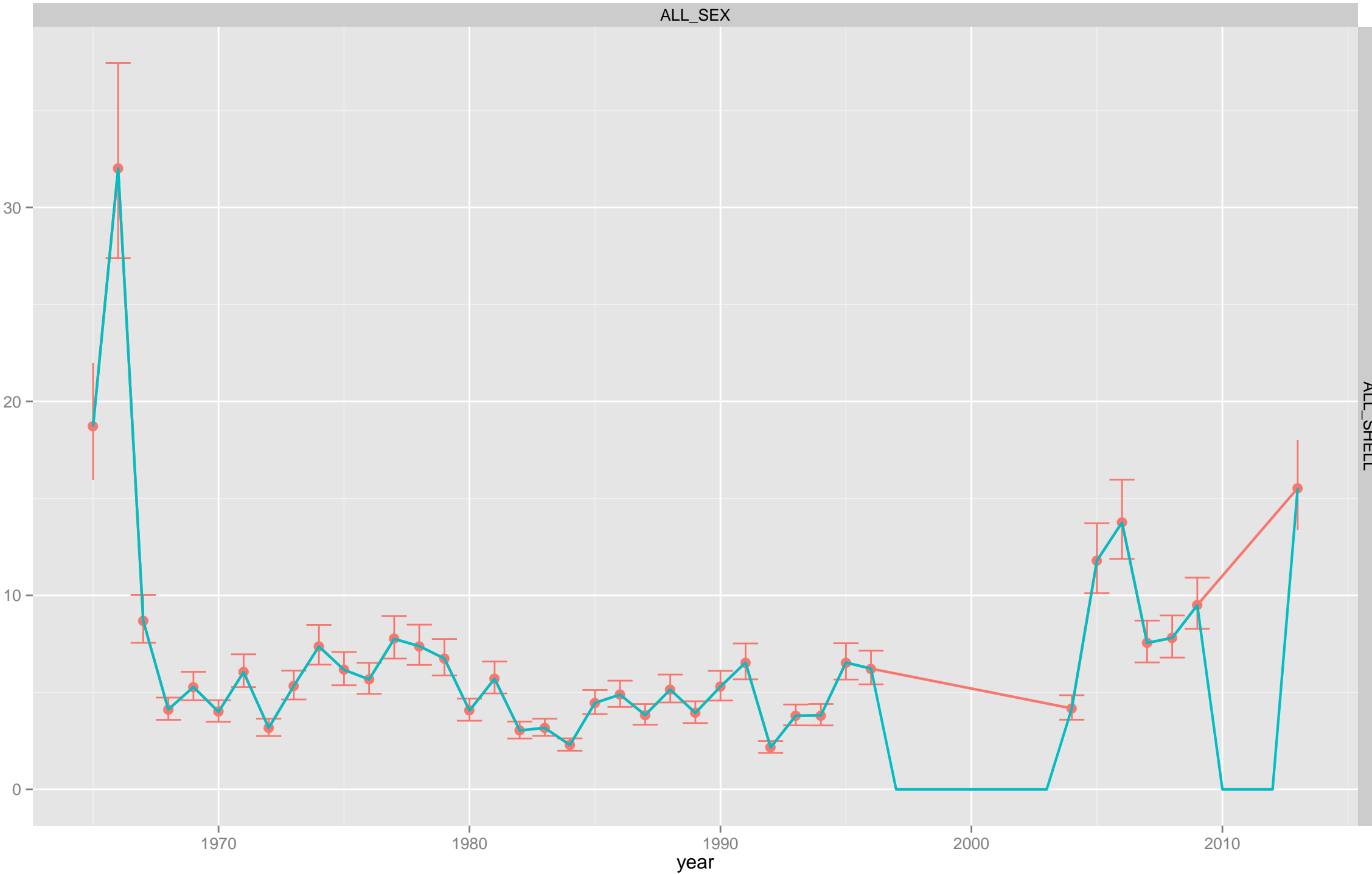
ALL_SHELL

maturity
ALL_MATURITY

TCF: retained catch biomass

ALL_SEX

biomass



type

- observed
- estimated

maturity

- ALL_MATURITY

ALL_SHELL

TCF: retained catch biomass

ALL_SEX

biomass [ln-scale]

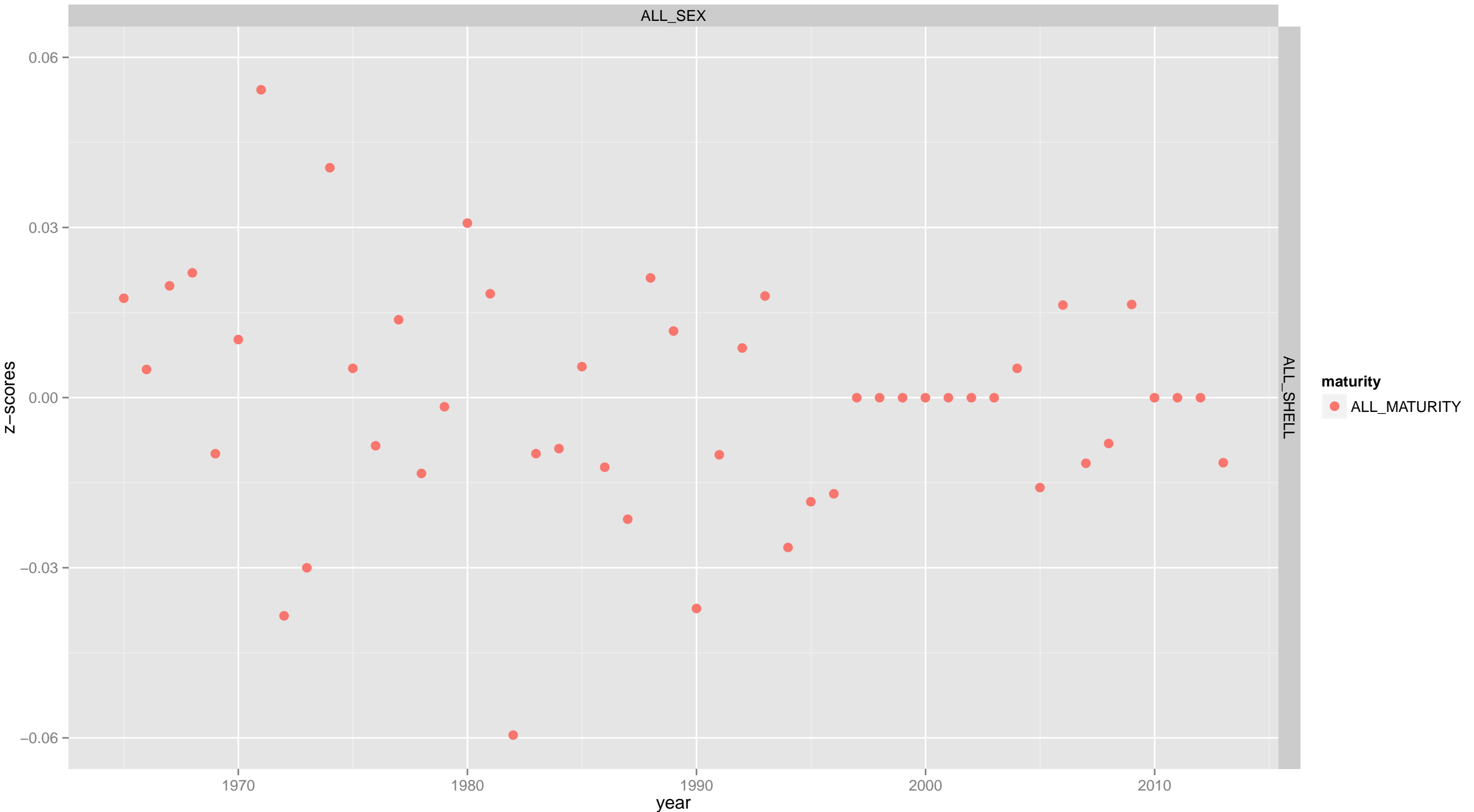
ALL_SHELL

- maturity**
 - ALL_MATURITY
- type**
 - observed
 - estimated



TCF: retained catch biomass

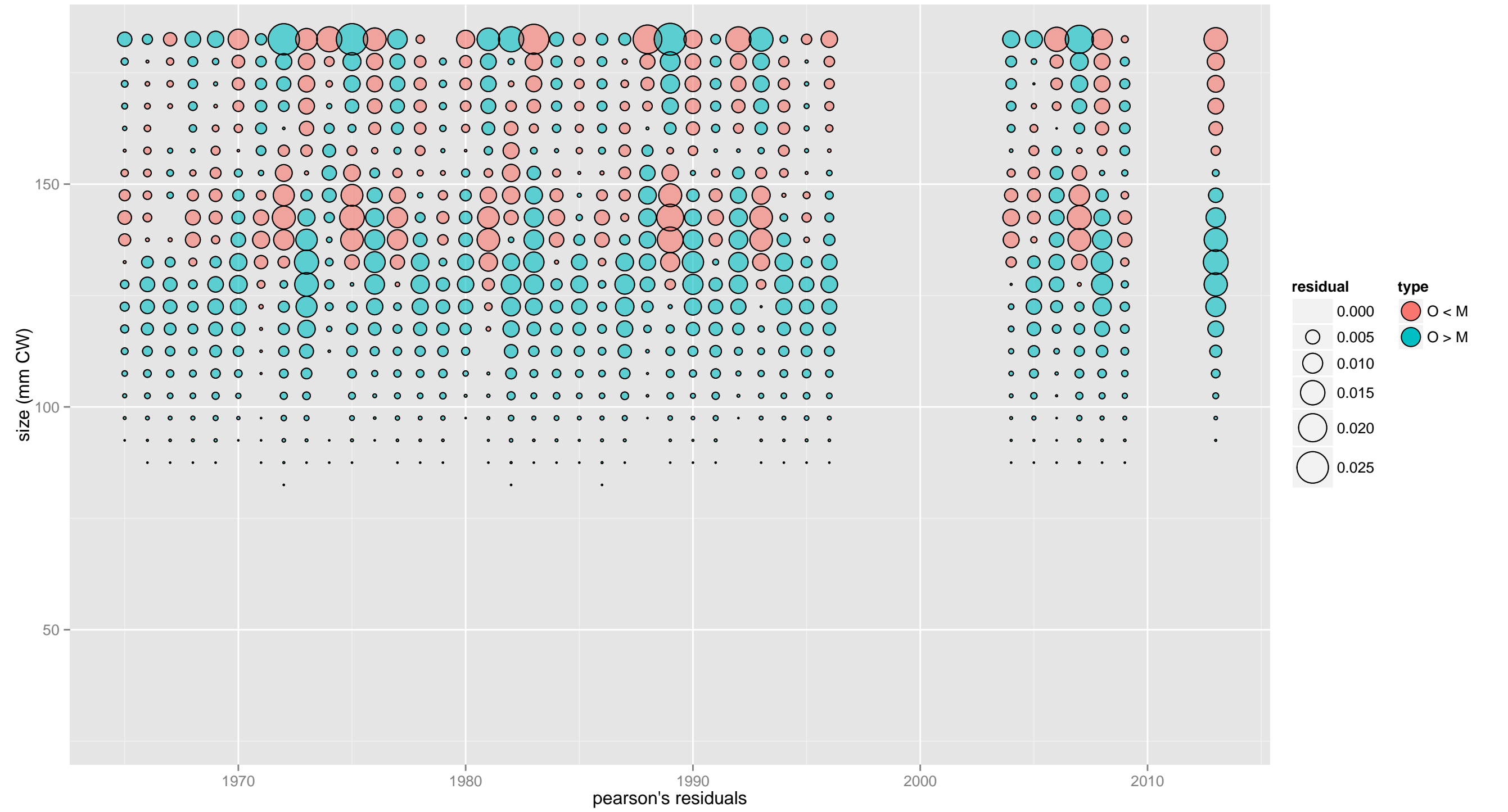
ALL_SEX



maturity
● ALL_MATURITY

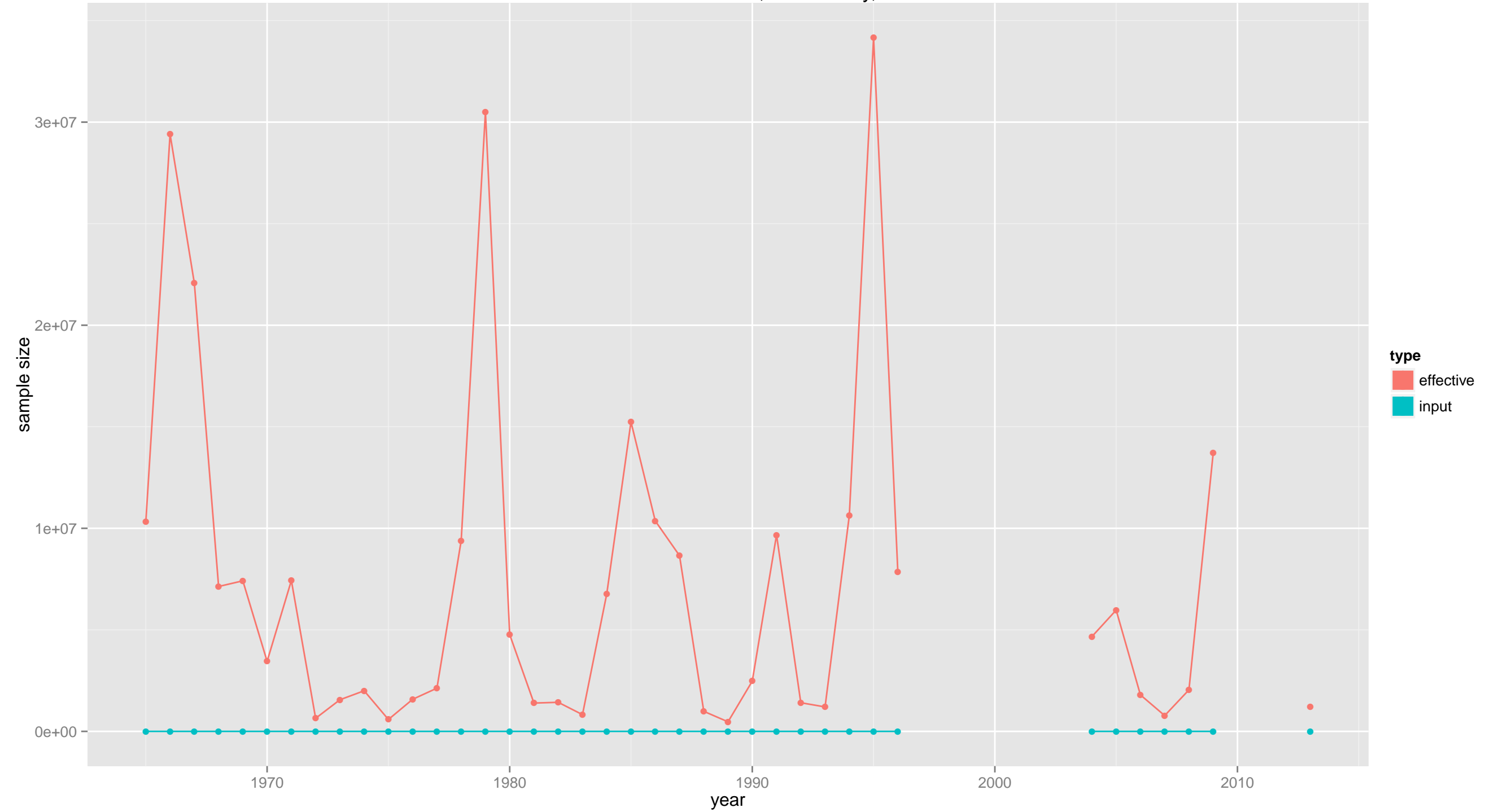
ALL_SHELL

TCF: retained catch:





TCF: retained catch: all sex, all maturity, all shell



TCF: discard catch abundance



TCF: discard catch abundance



TCF: discard catch abundance



TCF: discard catch biomass

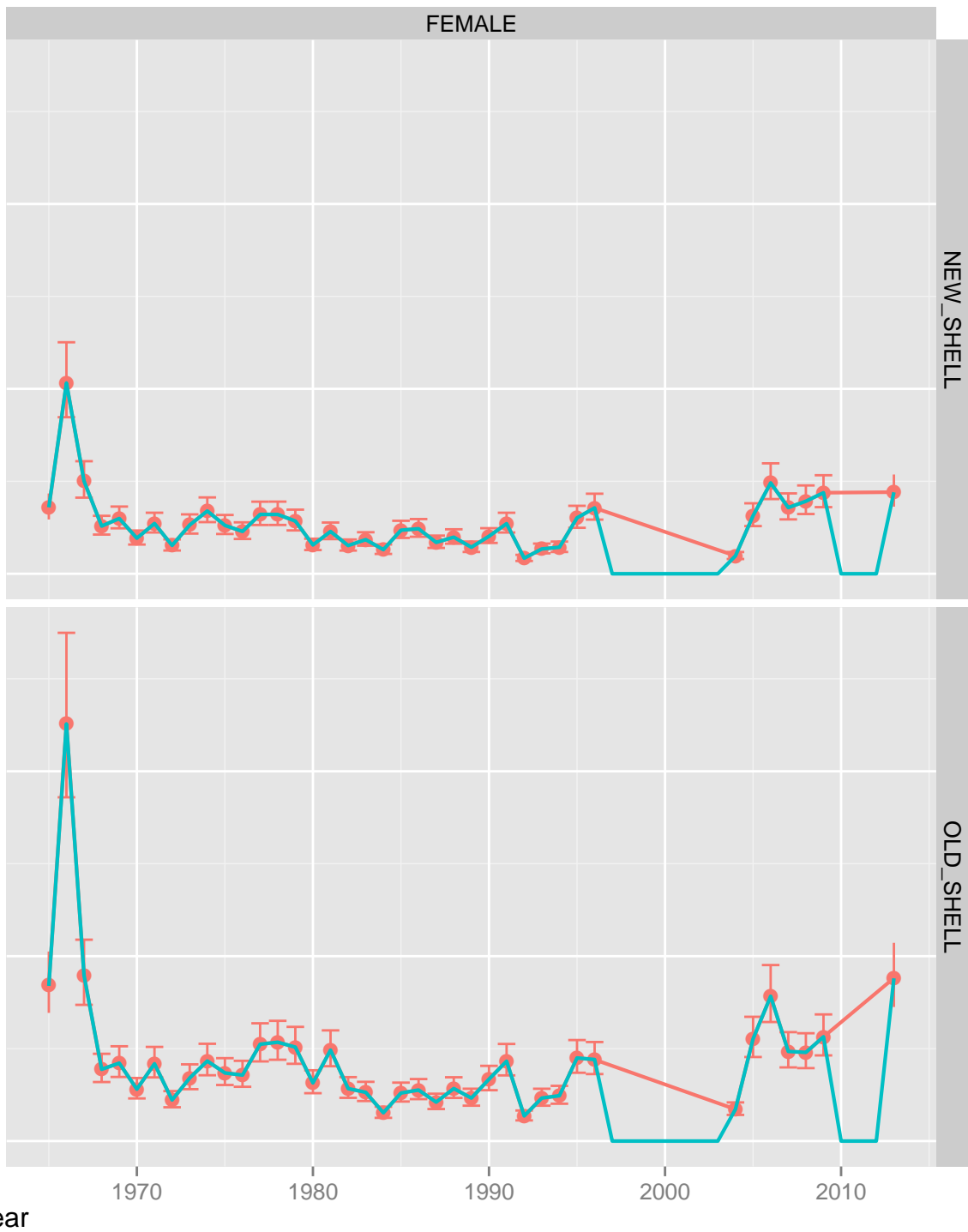
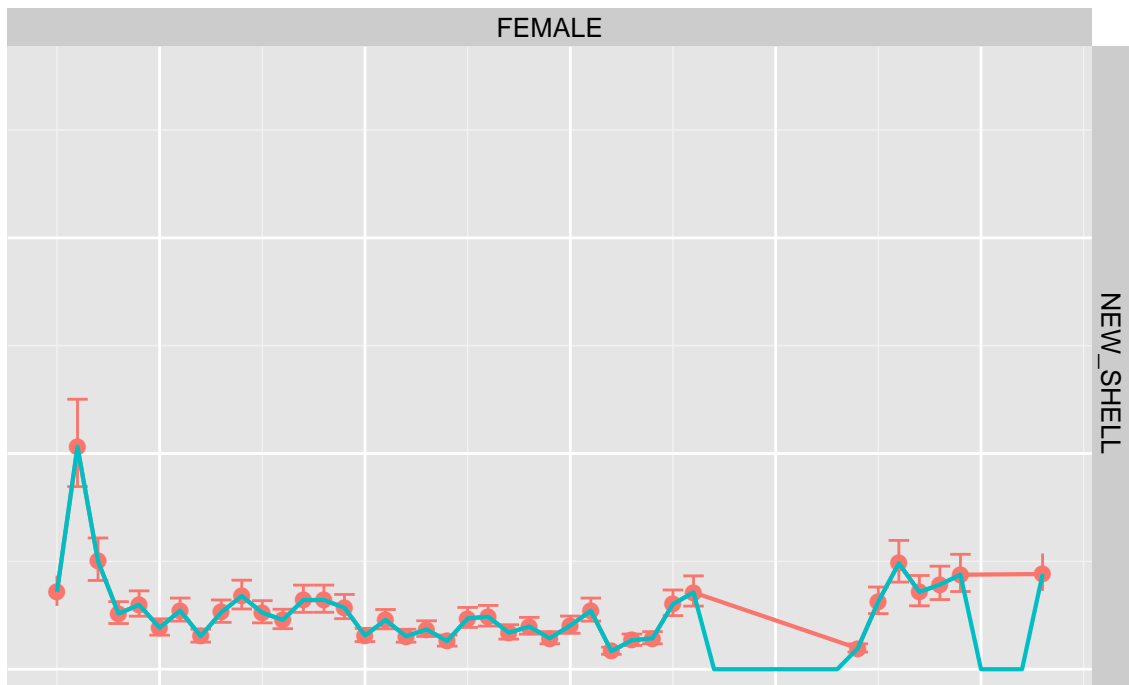
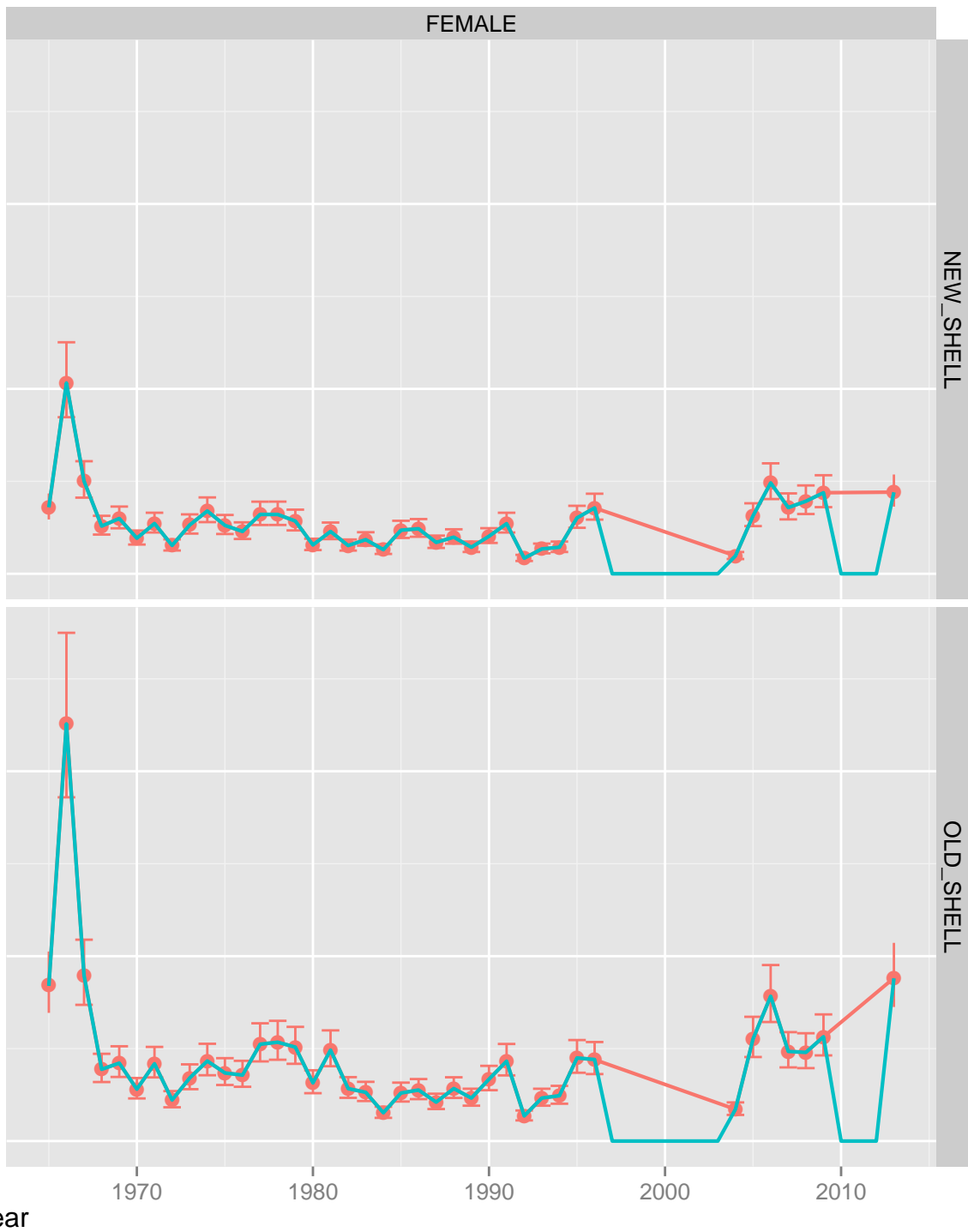
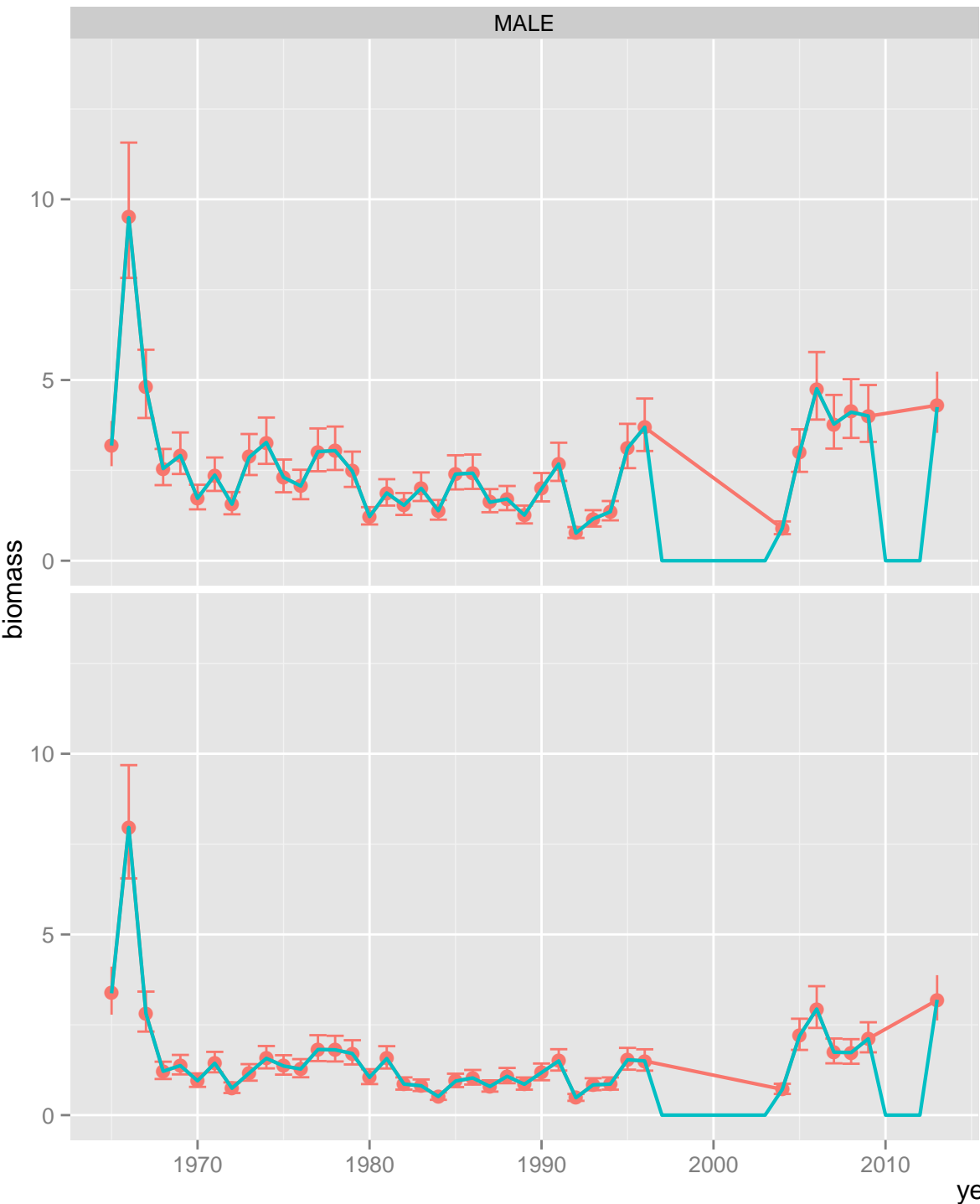
MALE

FEMALE

NEW_SHELL

OLD_SHELL

- type**
 - observed
 - estimated
- maturity**
 - ALL_MATURITY



TCF: discard catch biomass

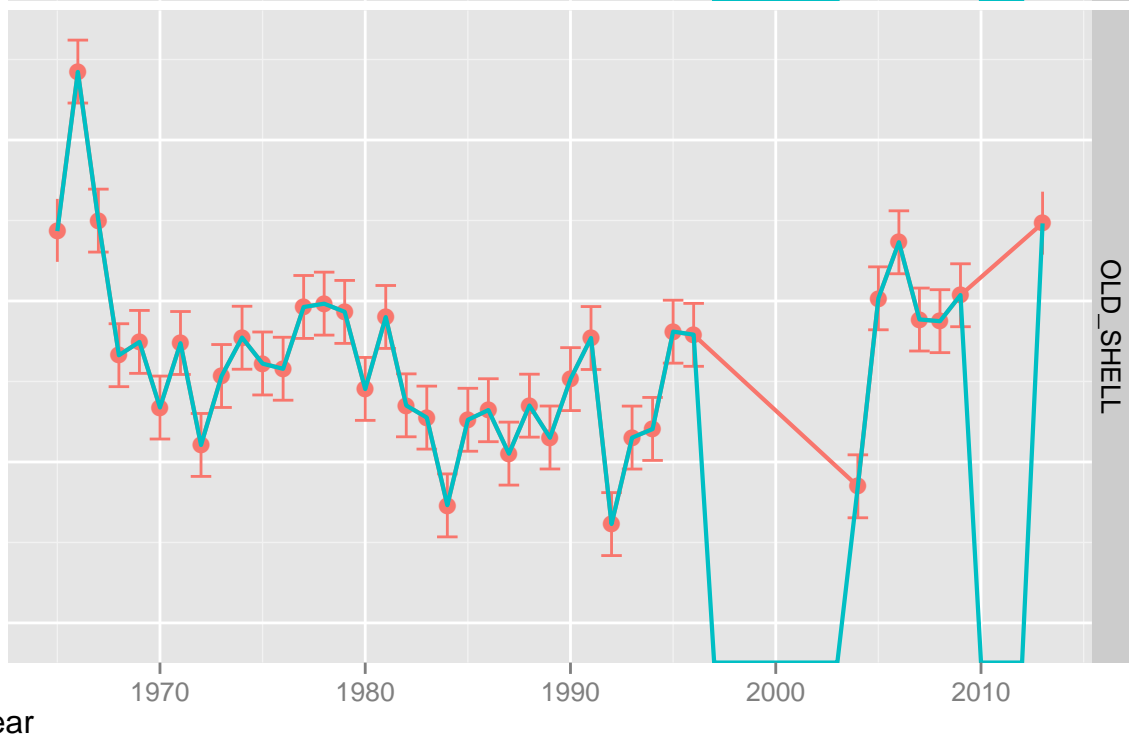
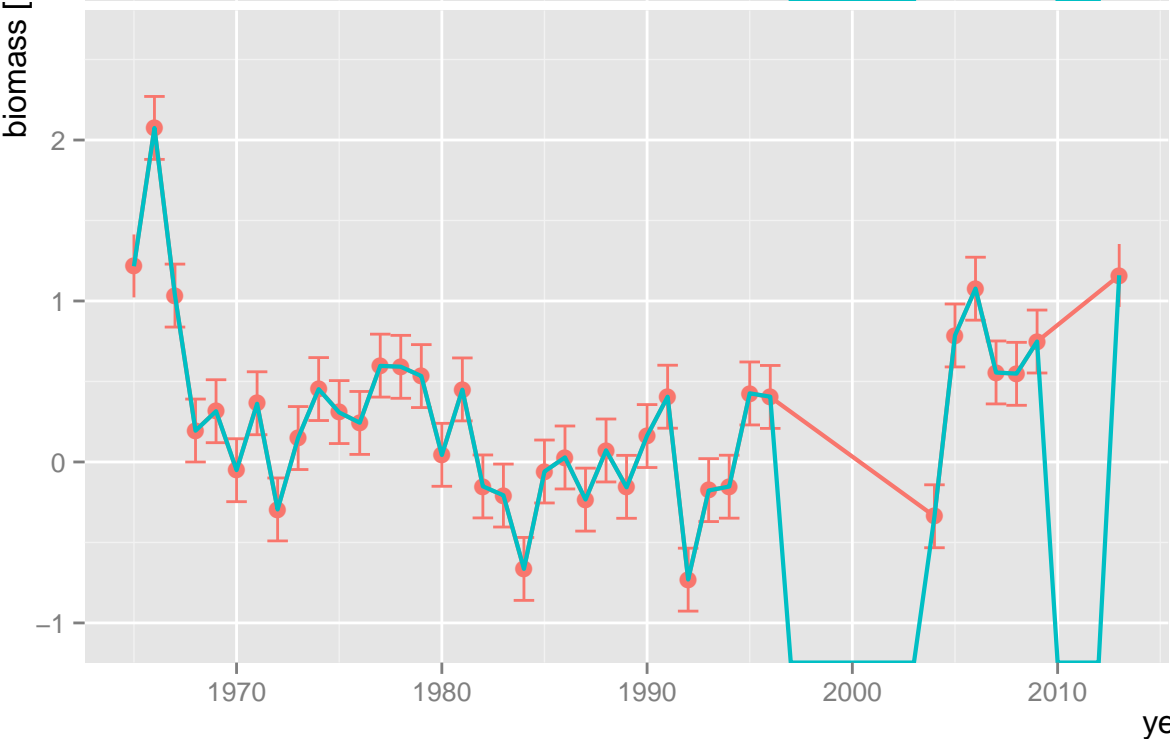
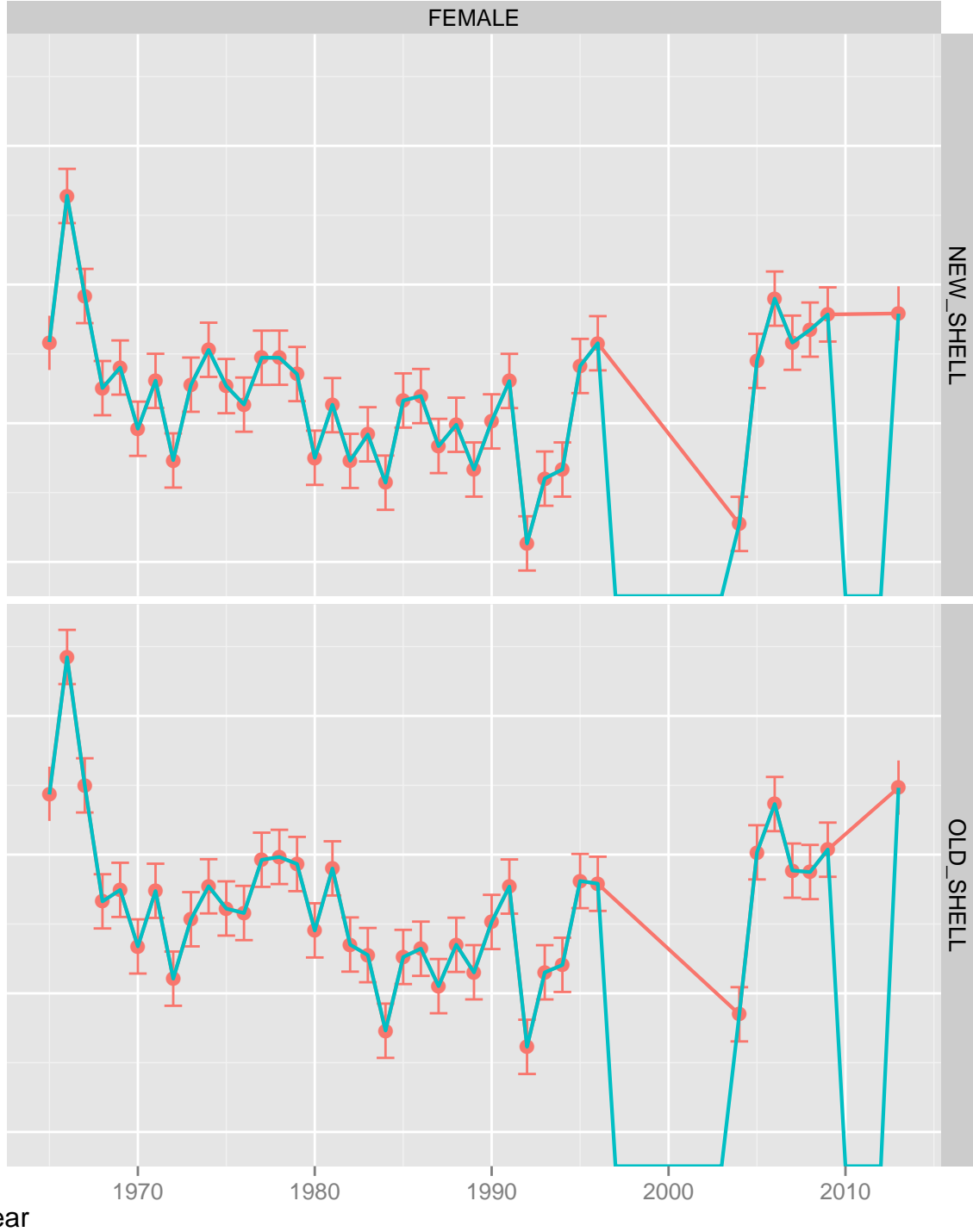
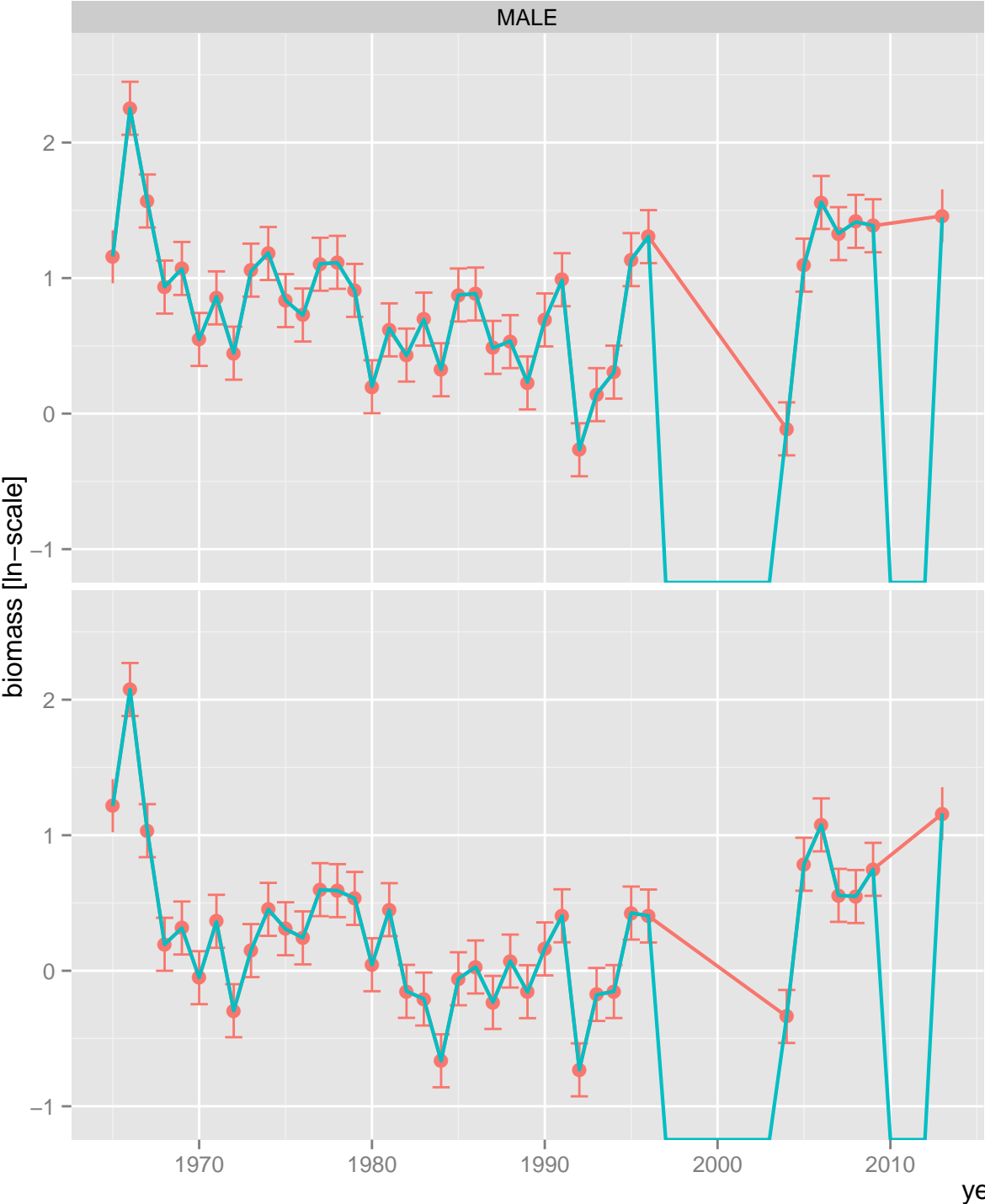
MALE

FEMALE

NEW_SHELL

OLD_SHELL

- maturity**
- ALL_MATURITY
- type**
- observed
 - estimated



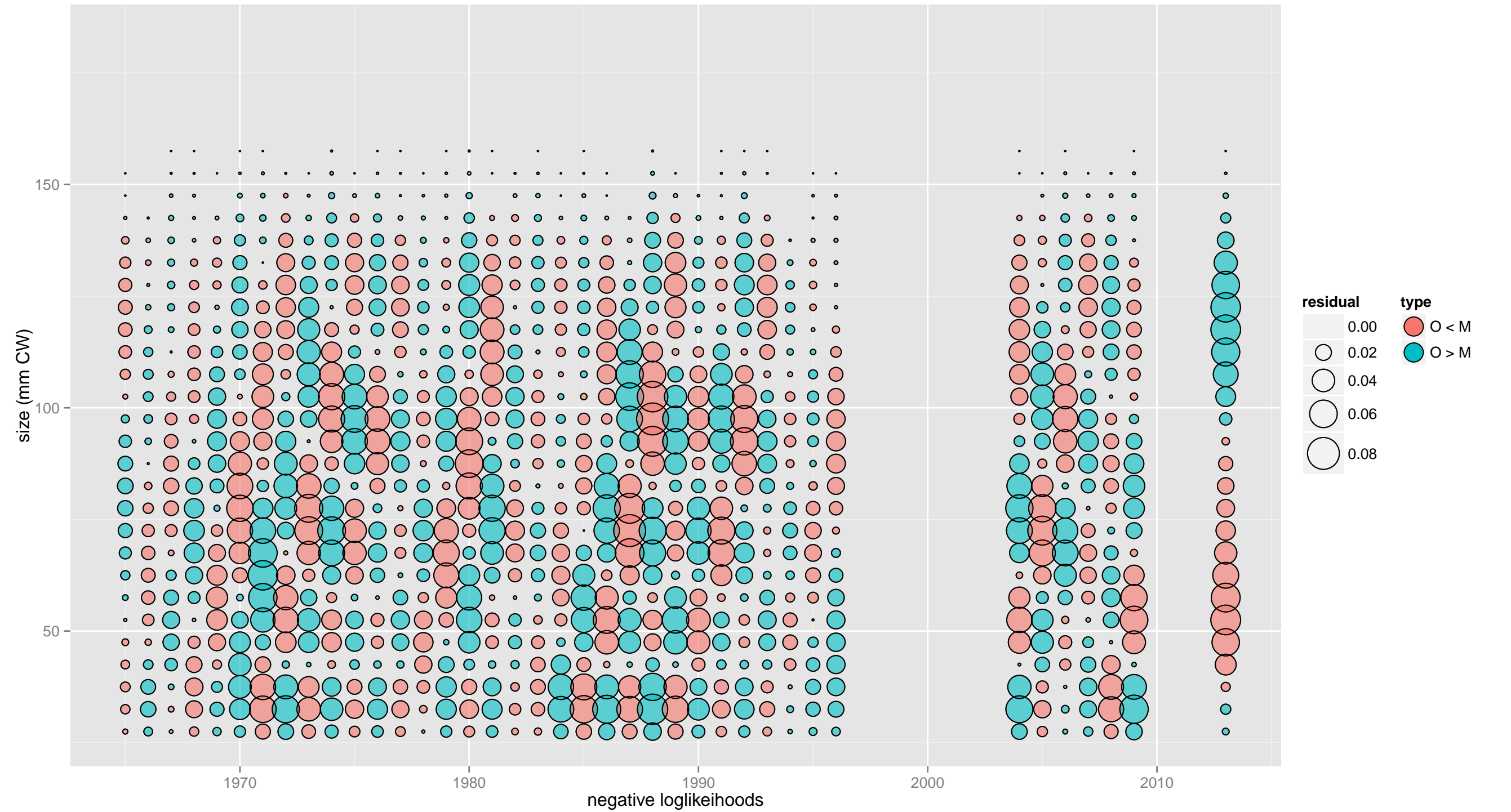
year

TCF: discard catch biomass

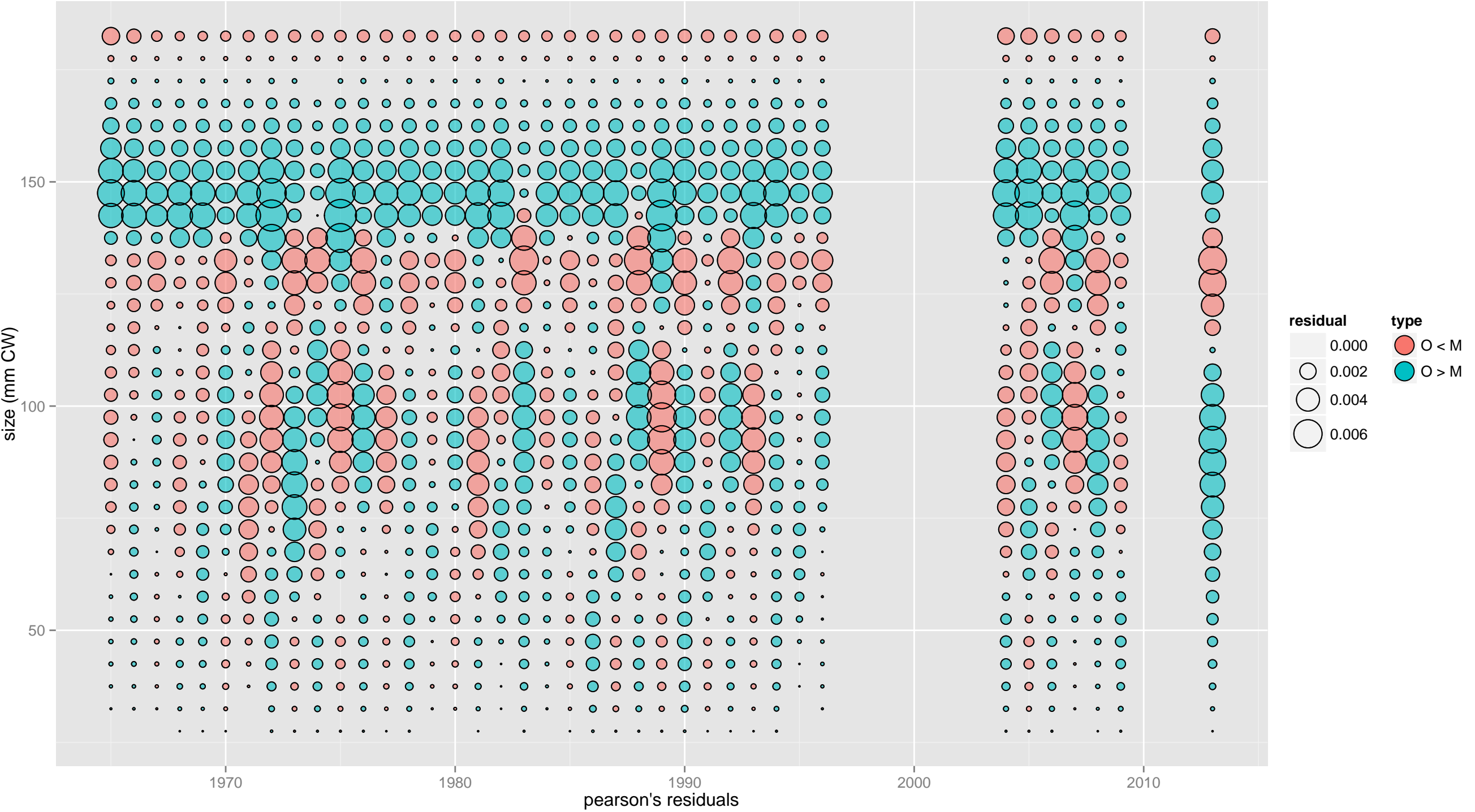


TCF: discard catch: male, new shell



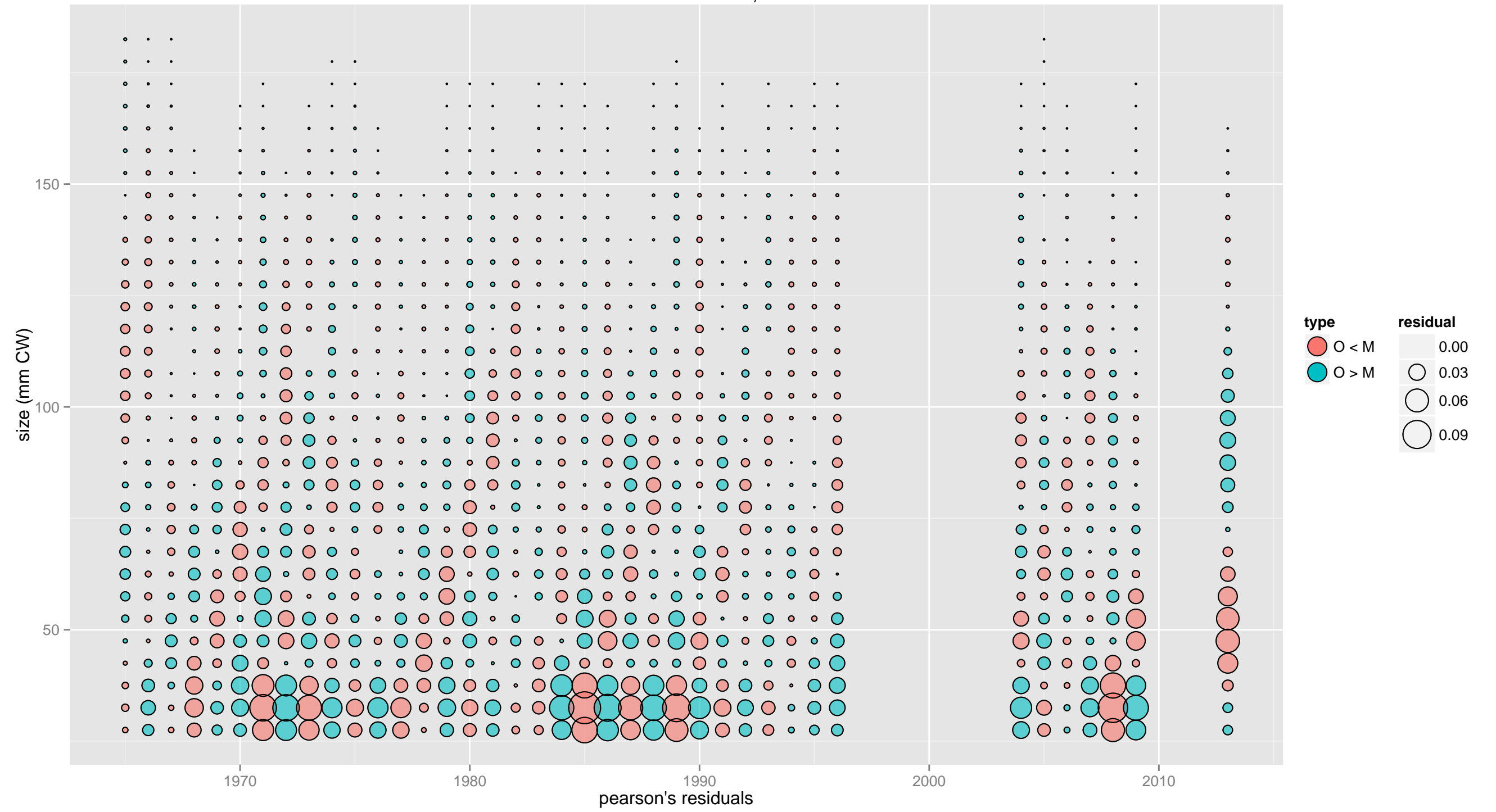


TCF: discard catch: male, old shell



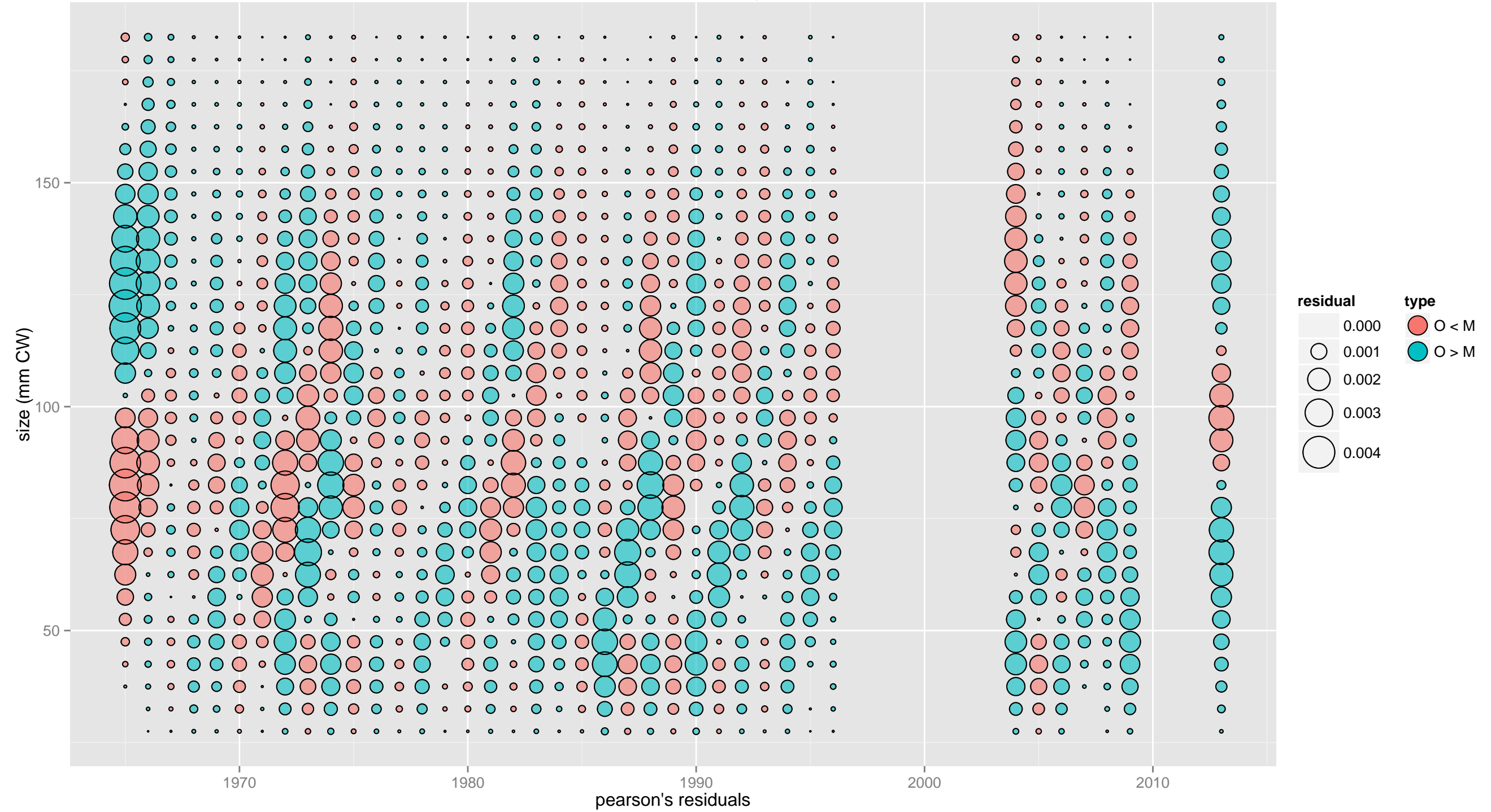


TCF: discard catch: female, new shell



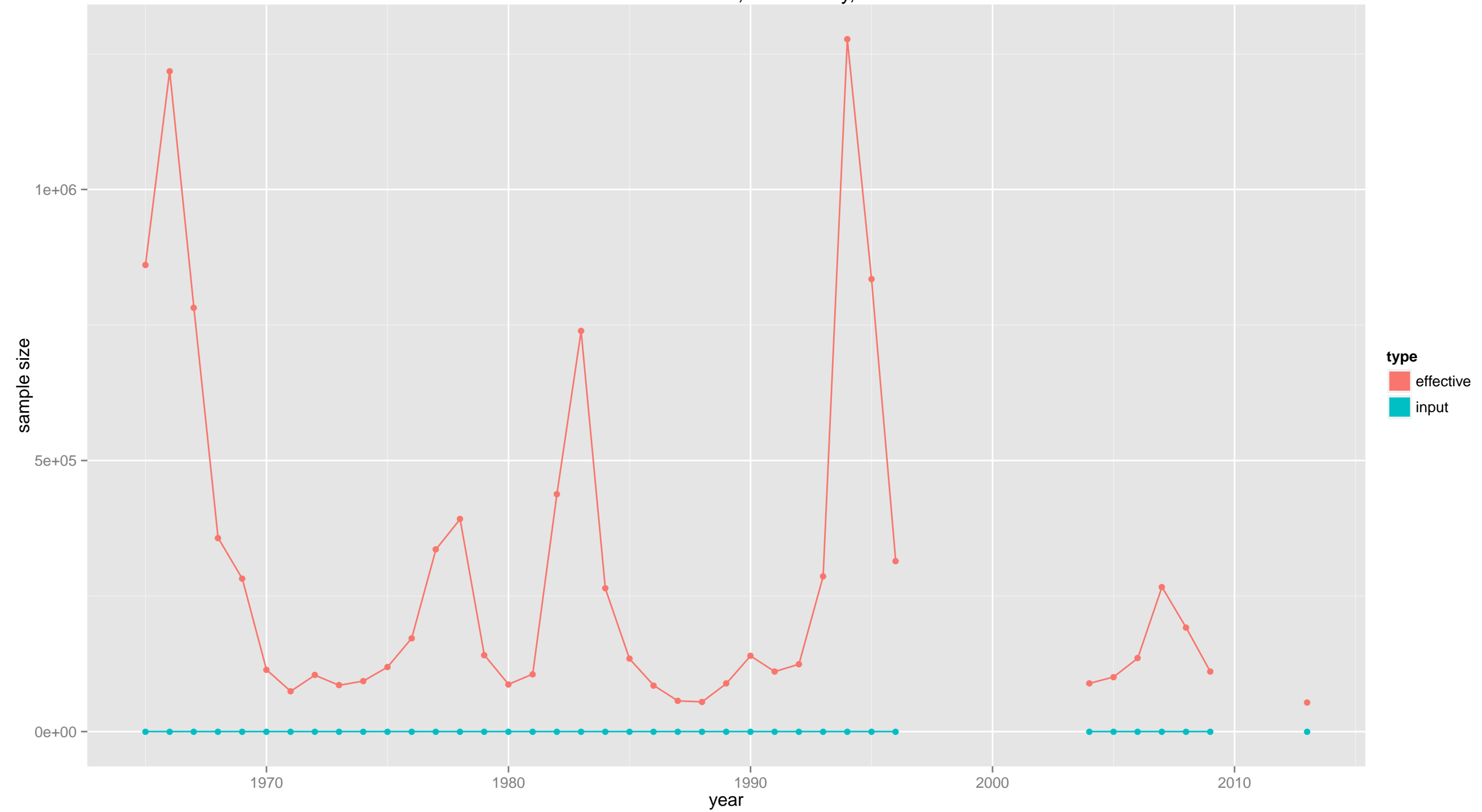


TCF: discard catch: female, old shell

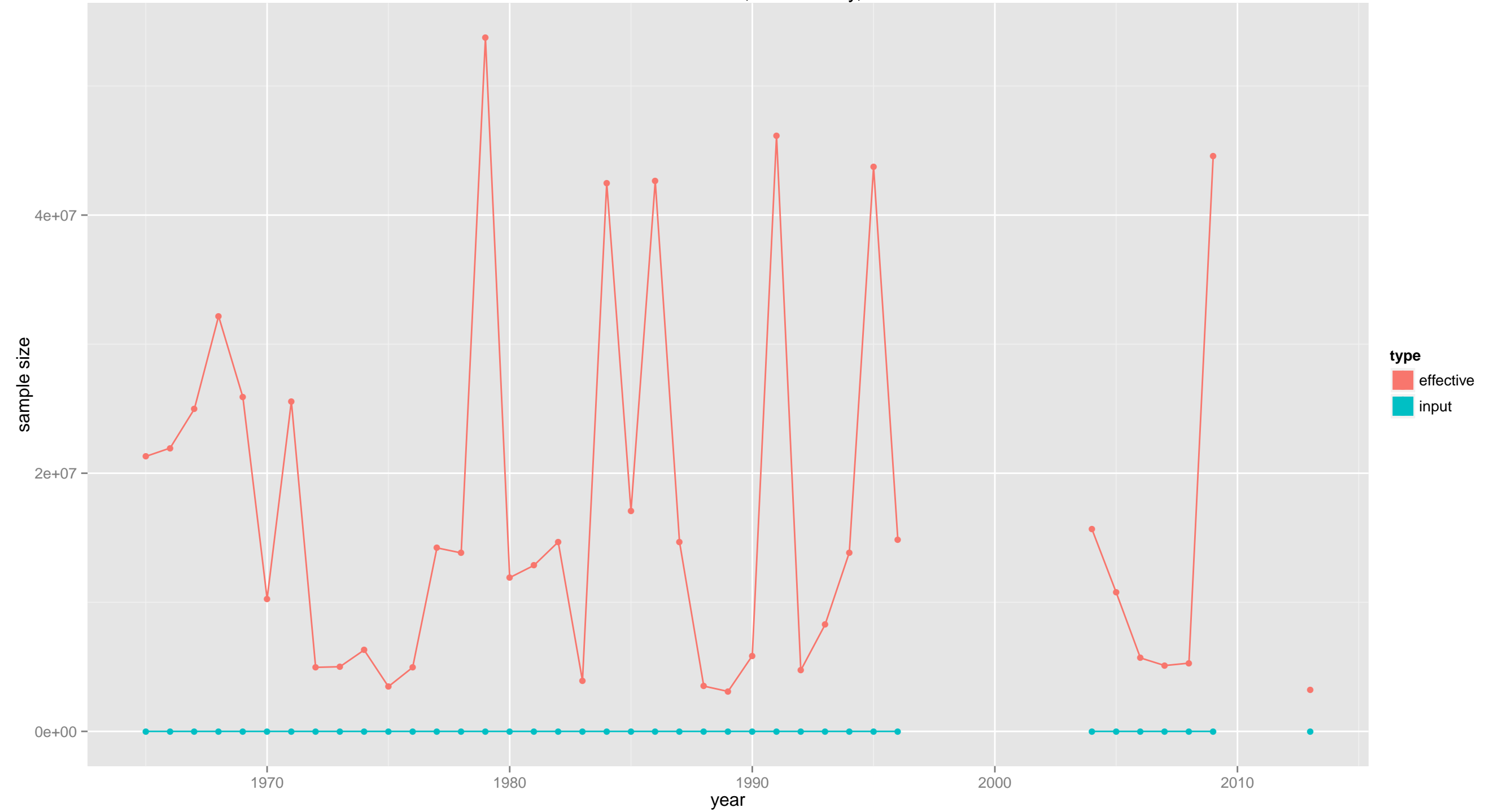




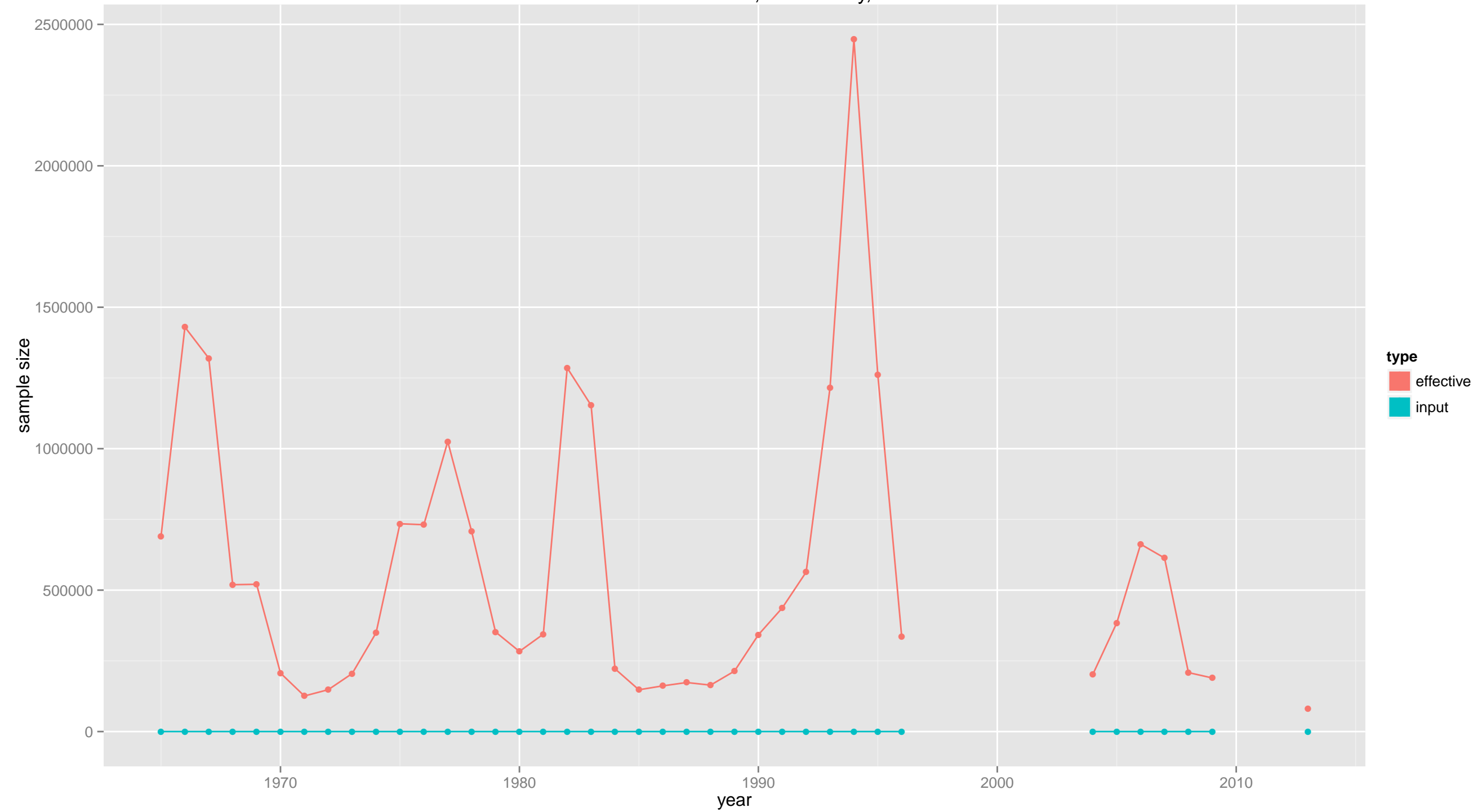
TCF: discard catch: male, all maturity, new shell



TCF: discard catch: male, all maturity, old shell



TCF: discard catch: female, all maturity, new shell



TCF: discard catch: female, all maturity, old shell



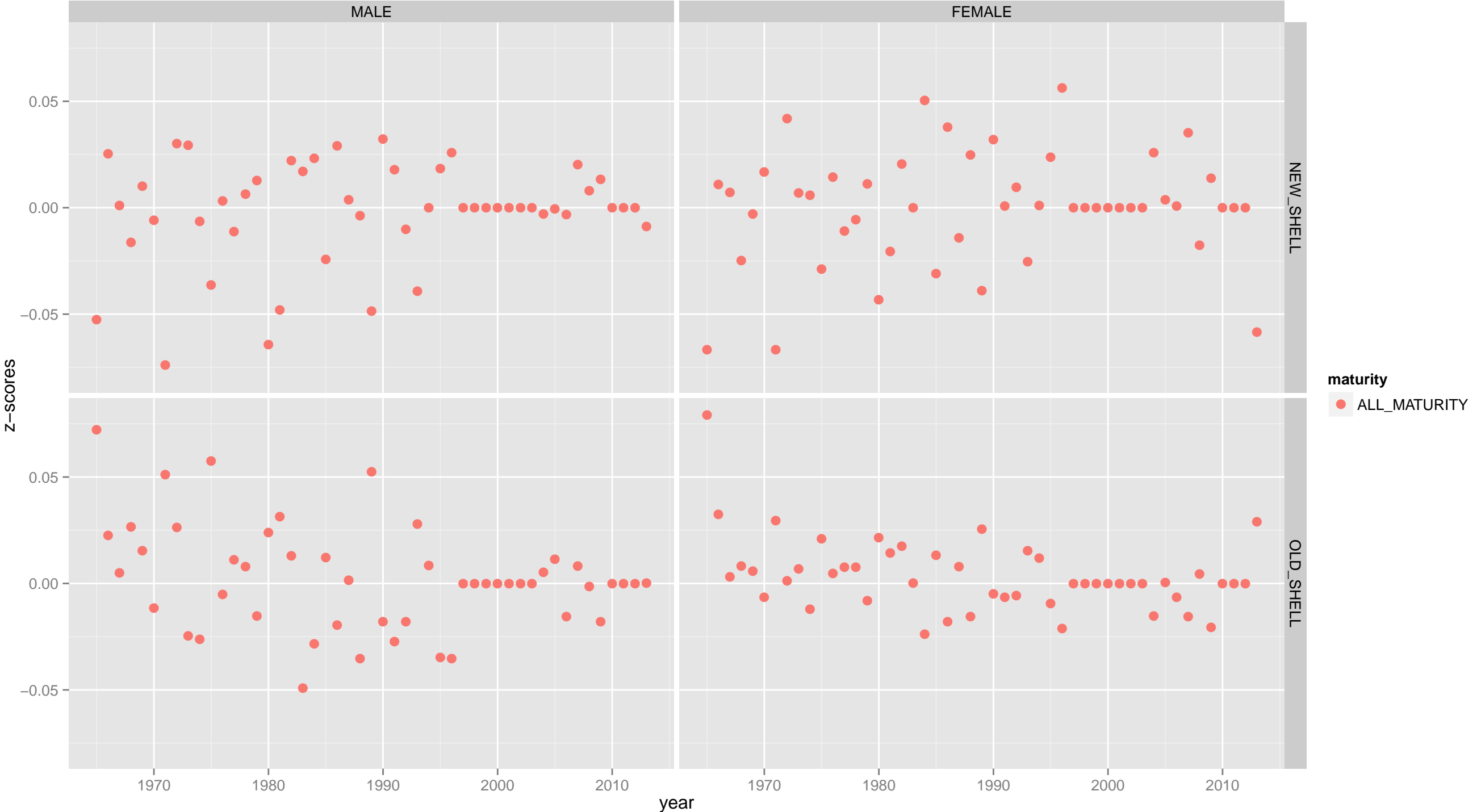
TCF: total catch abundance



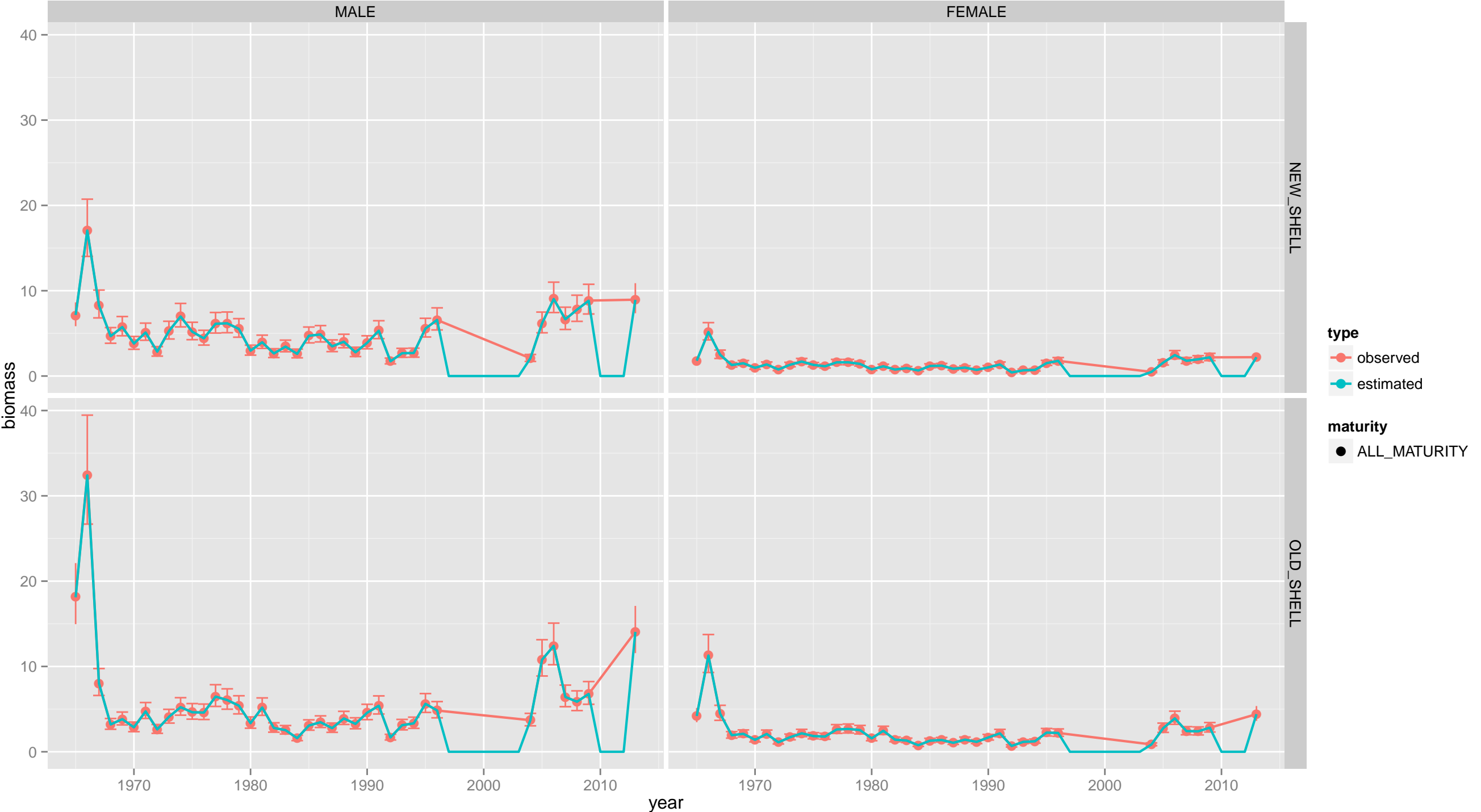
TCF: total catch abundance



TCF: total catch abundance



TCF: total catch biomass



TCF: total catch biomass

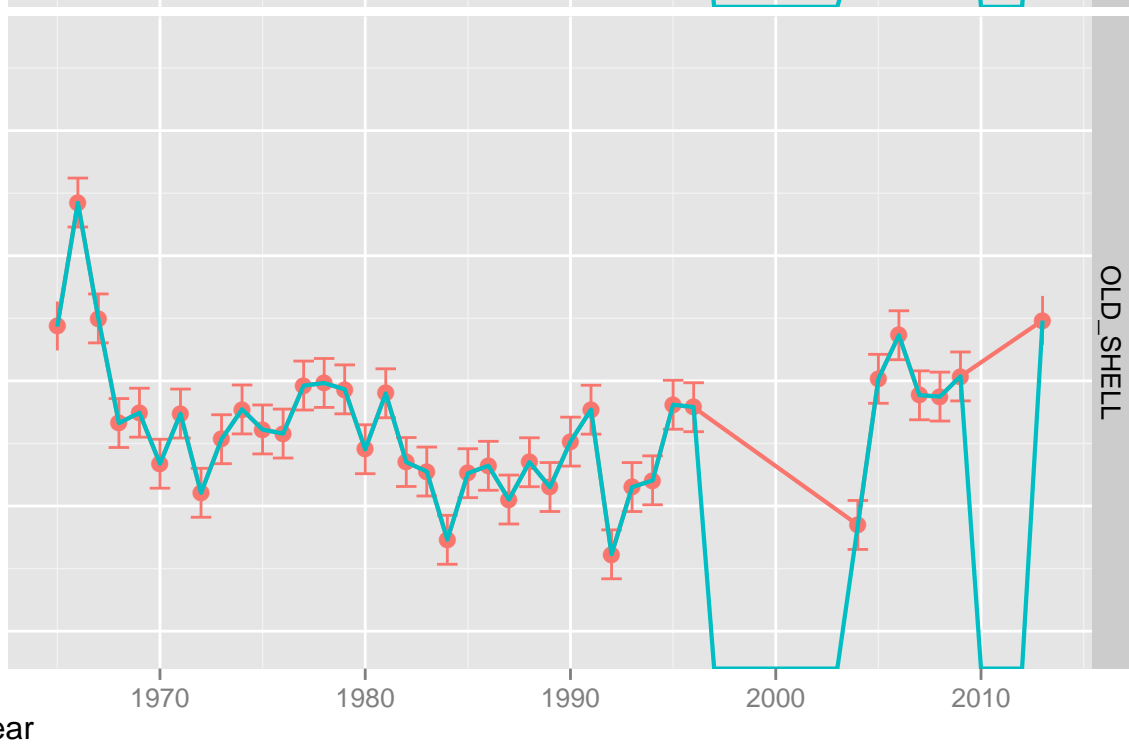
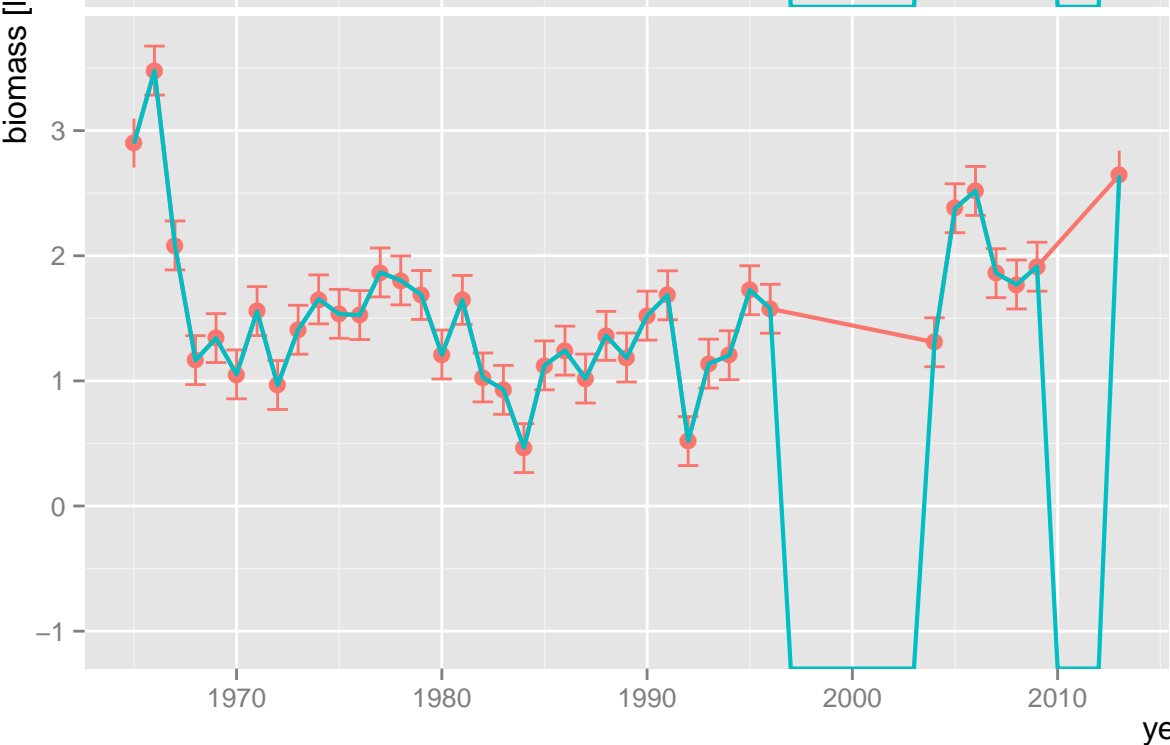
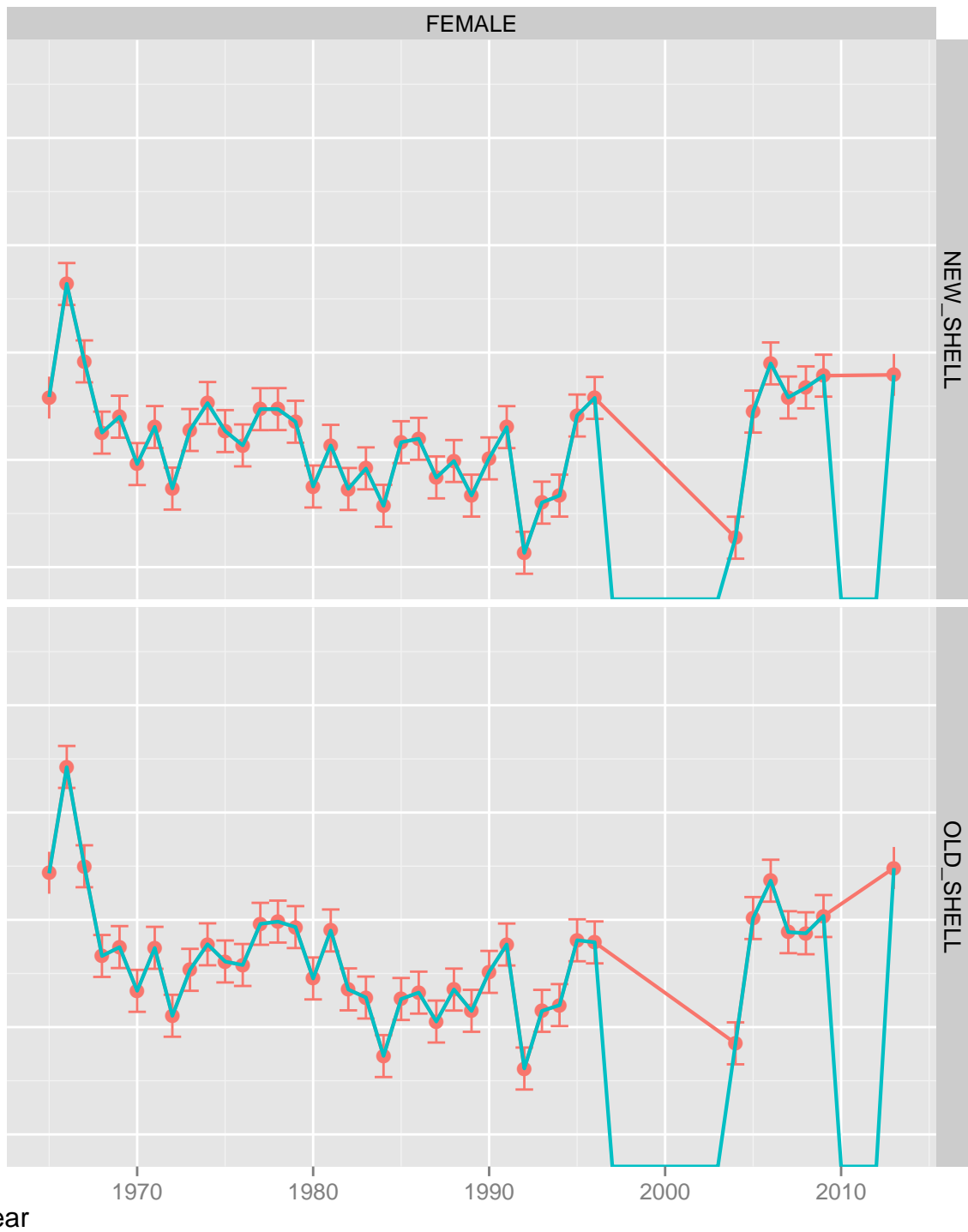
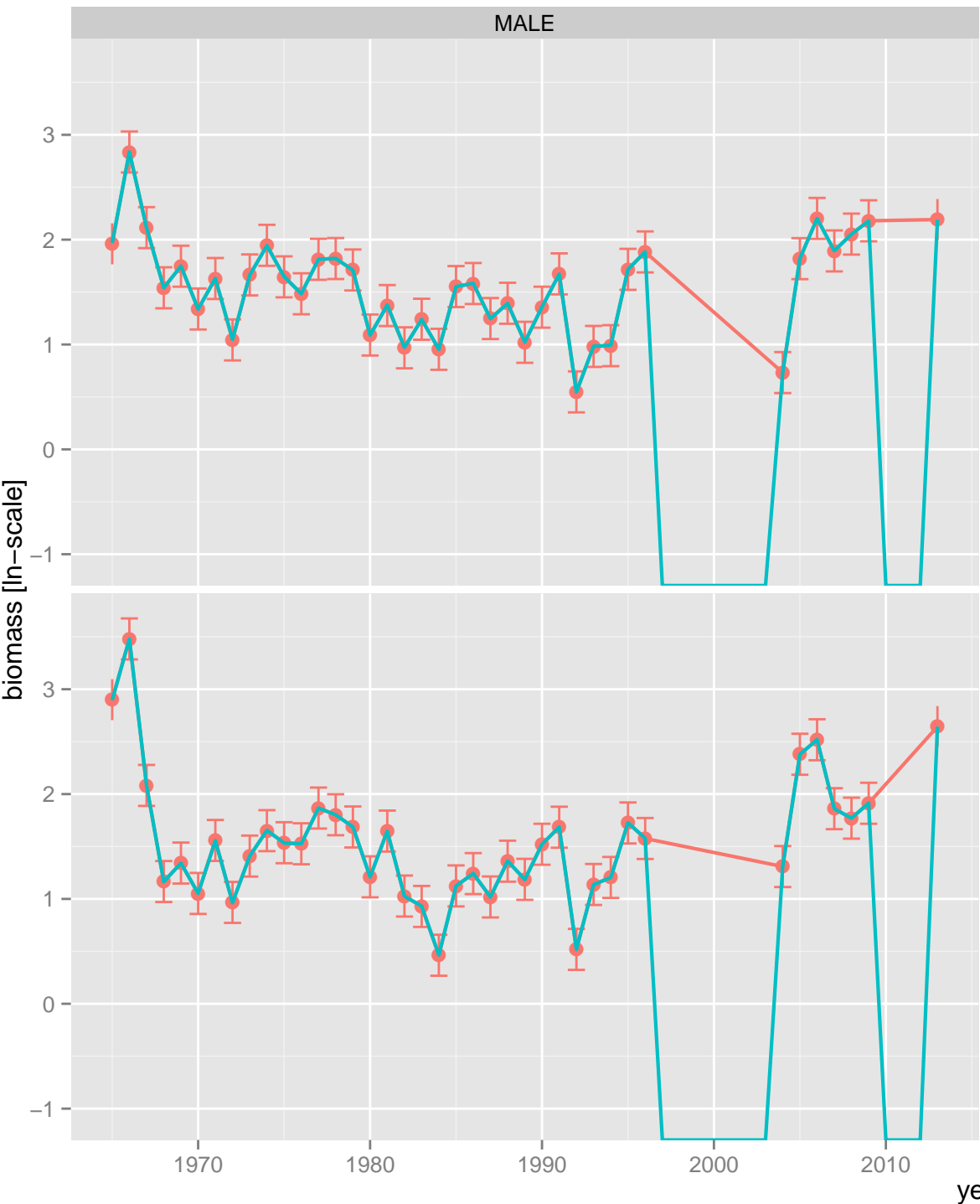
MALE

FEMALE

NEW_SHELL

OLD_SHELL

- maturity**
- ALL_MATURITY
- type**
- observed
 - estimated



TCF: total catch biomass

MALE

FEMALE

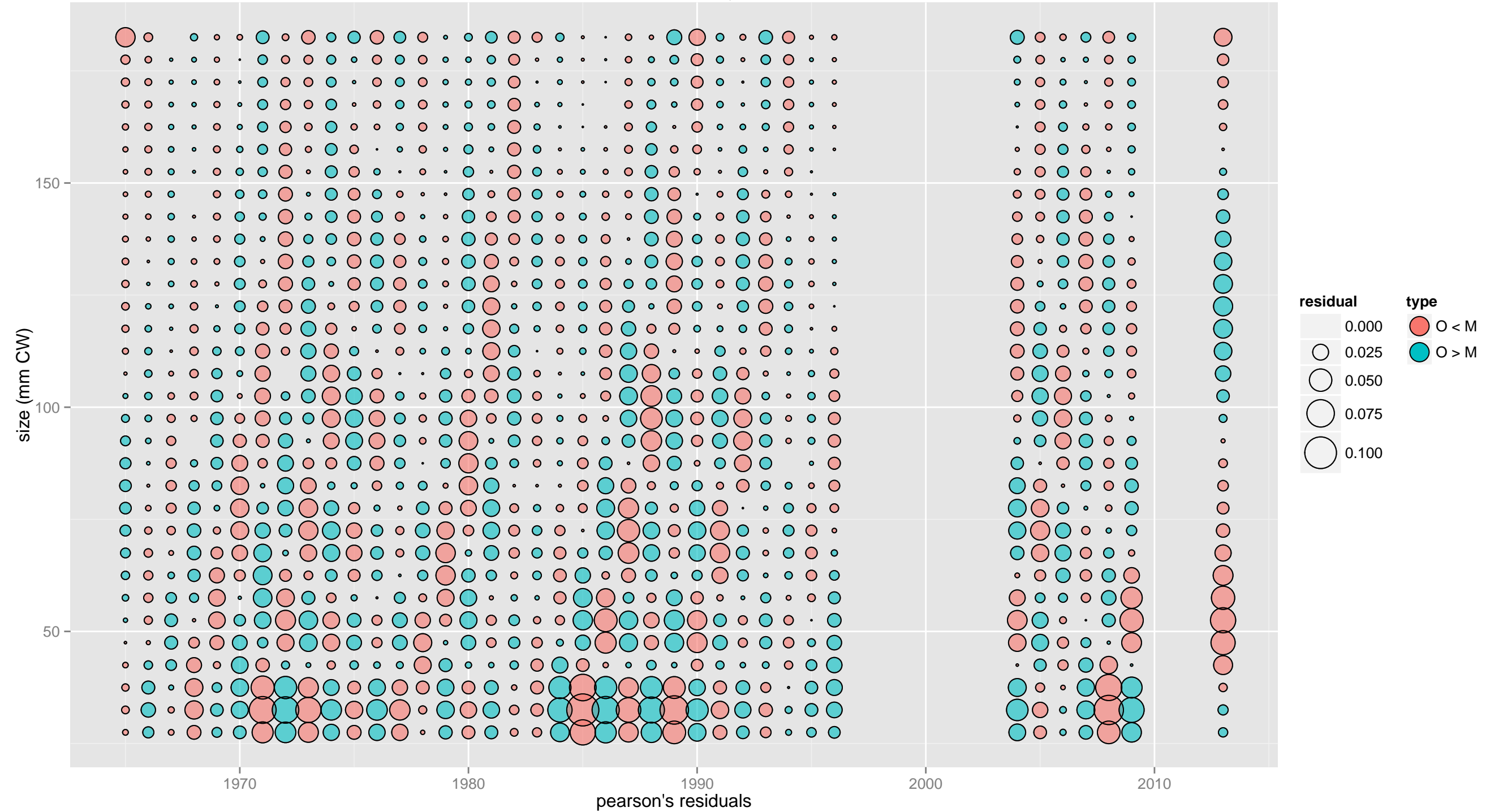
NEW_SHELL

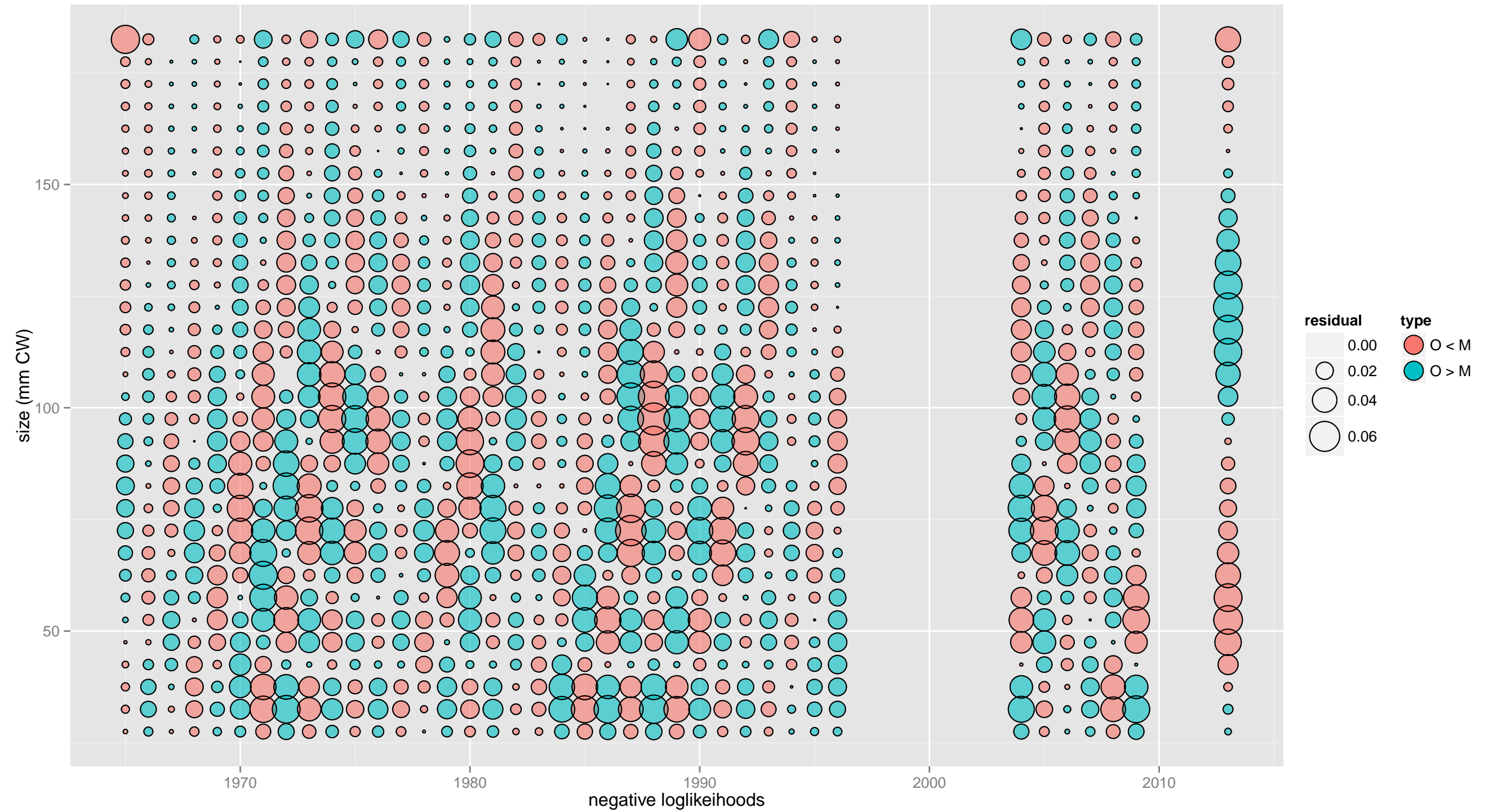
OLD_SHELL

maturity
● ALL_MATURITY

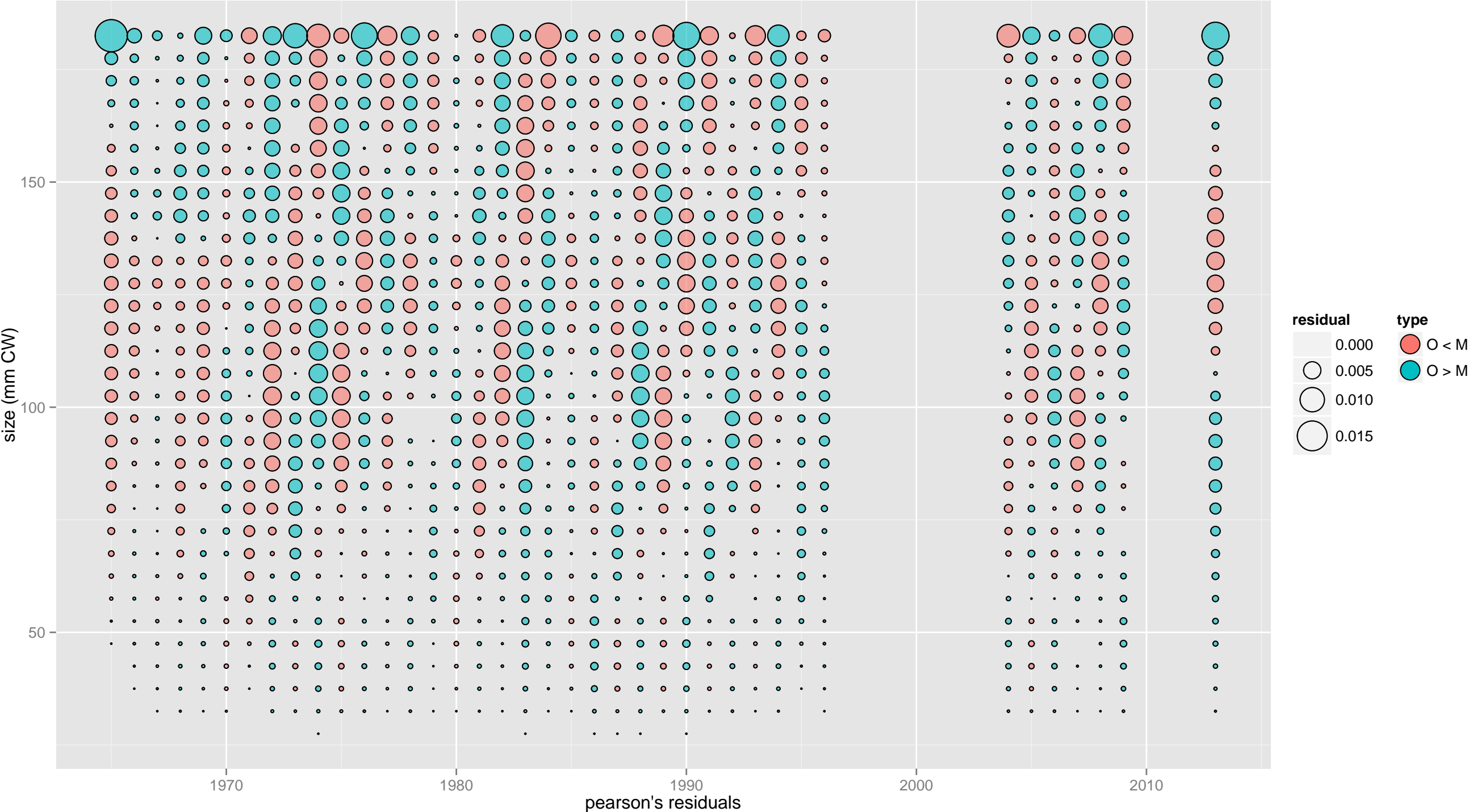


TCF: total catch: male, new shell





TCF: total catch: male, old shell





size (mm CW)

1970

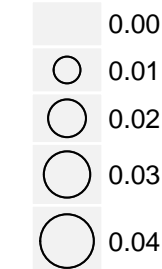
1980

negative loglikelihoods

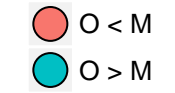
2000

2010

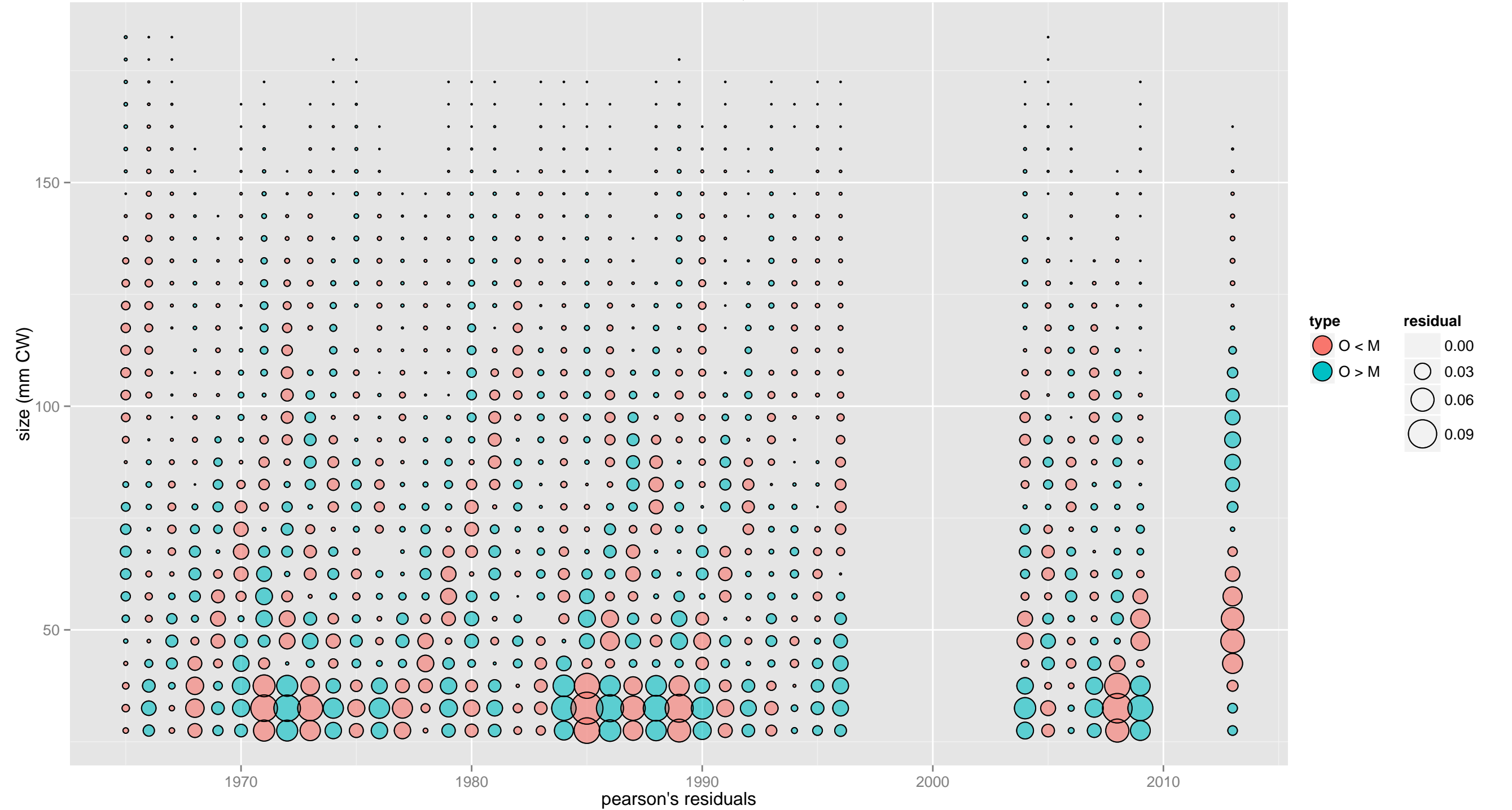
residual



type

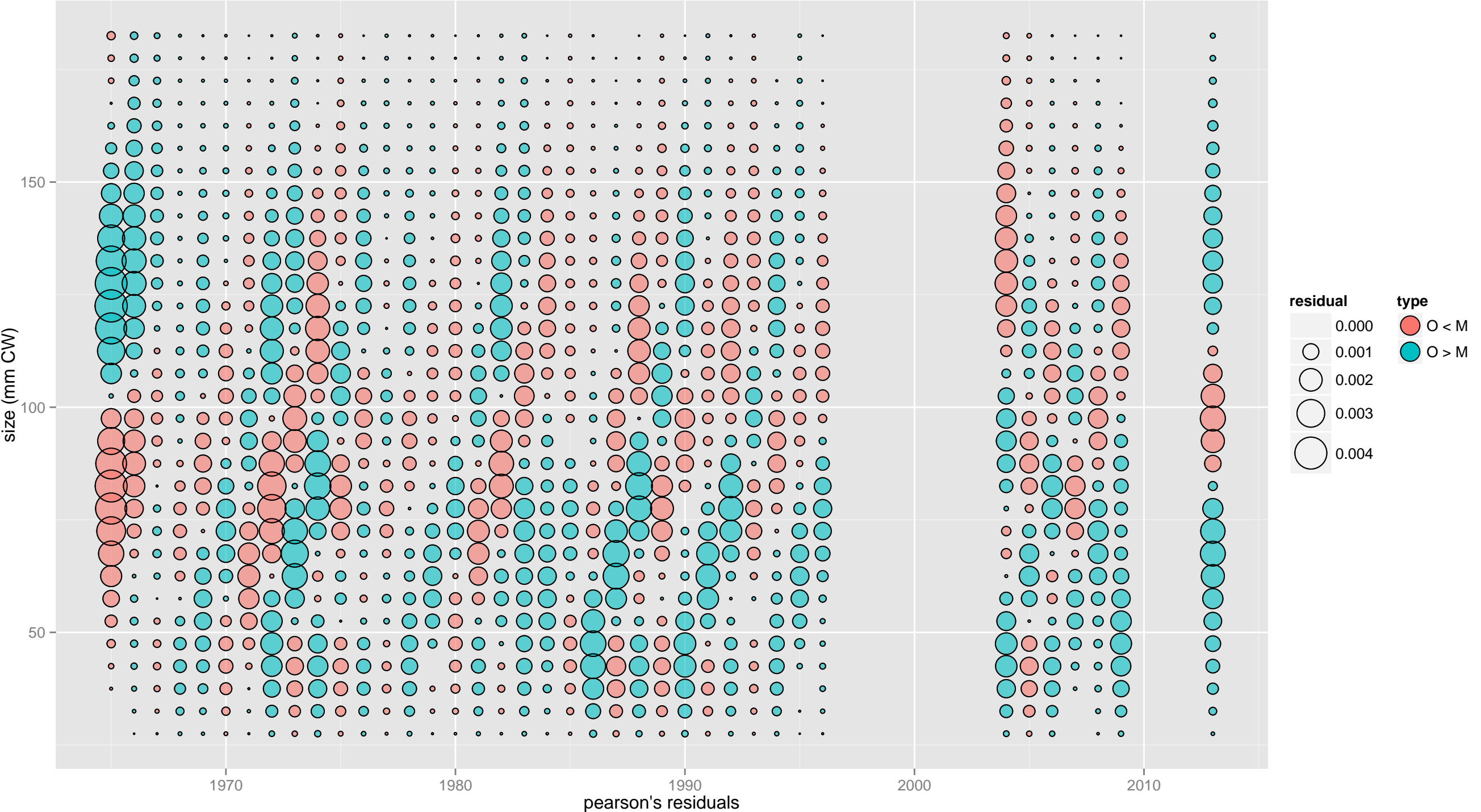


TCF: total catch: female, new shell



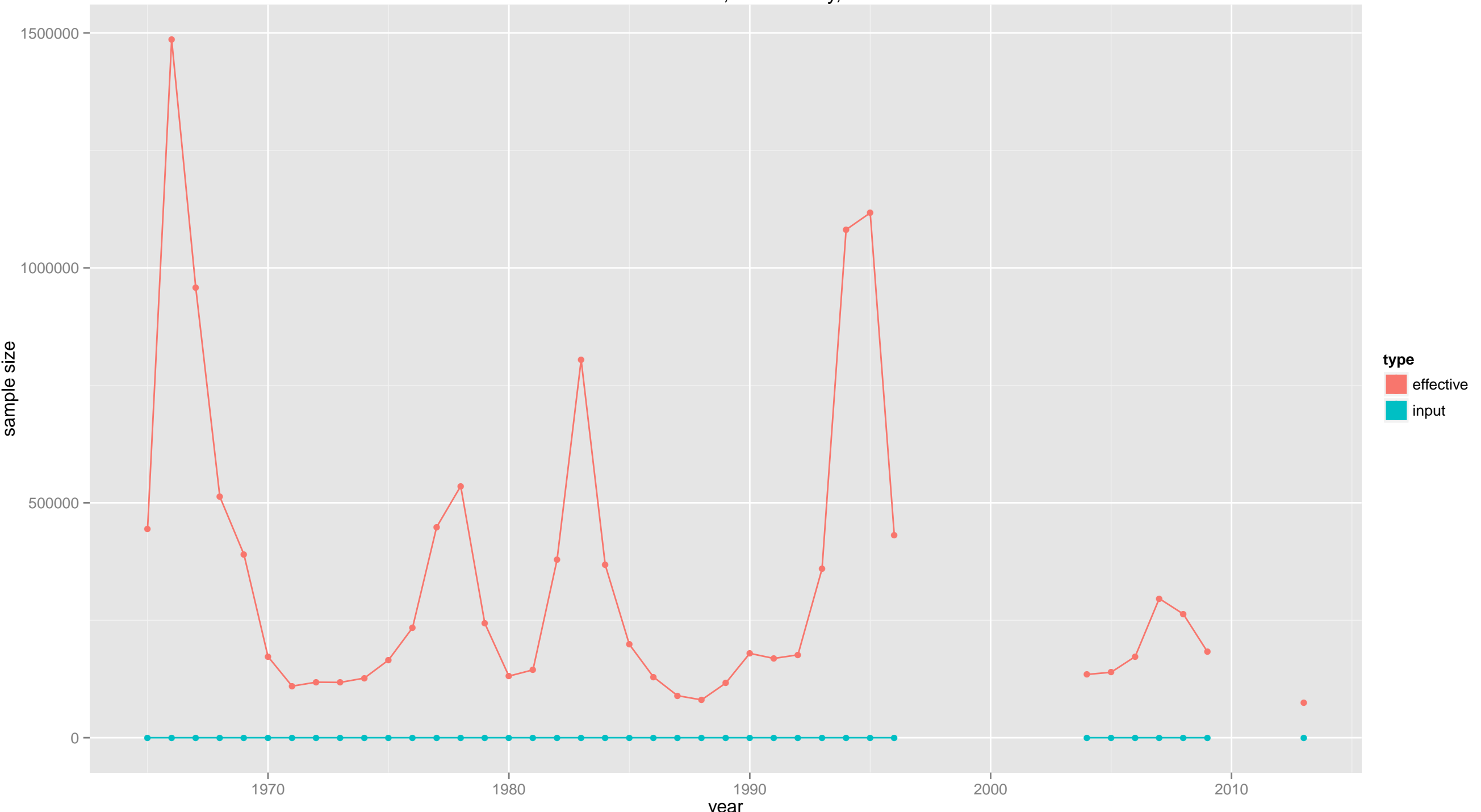


TCF: total catch: female, old shell

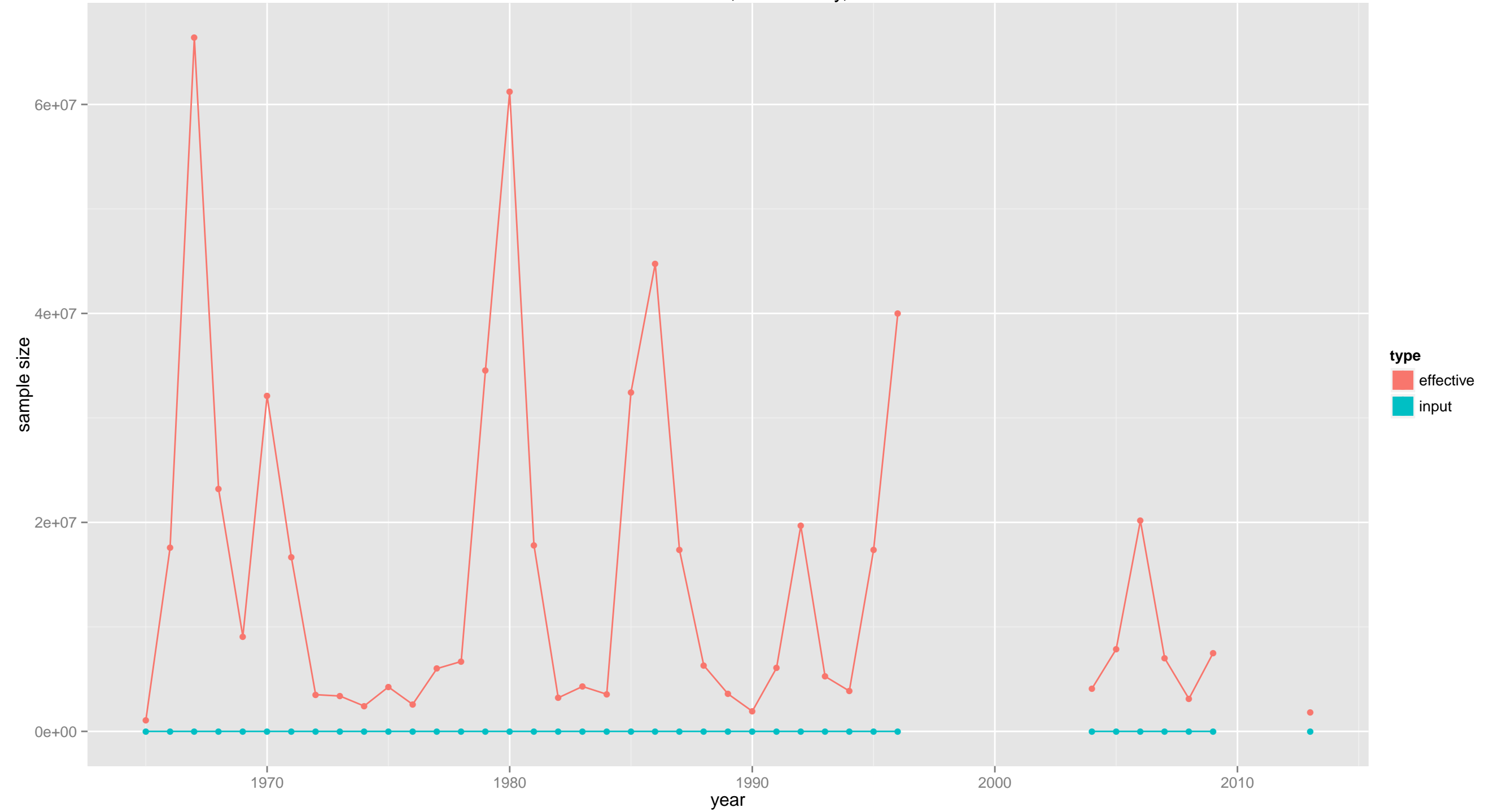




TCF: total catch: male, all maturity, new shell



TCF: total catch: male, all maturity, old shell

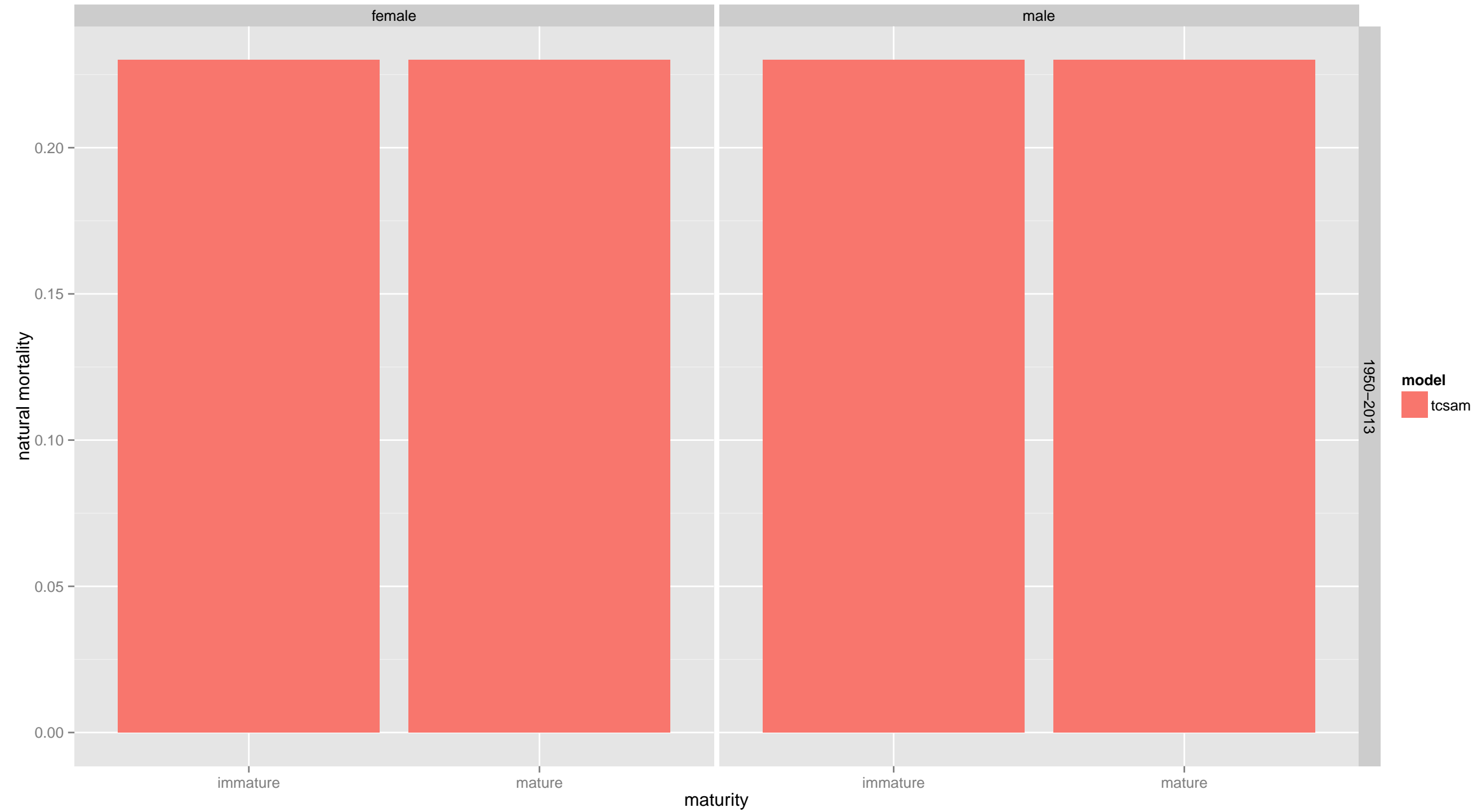


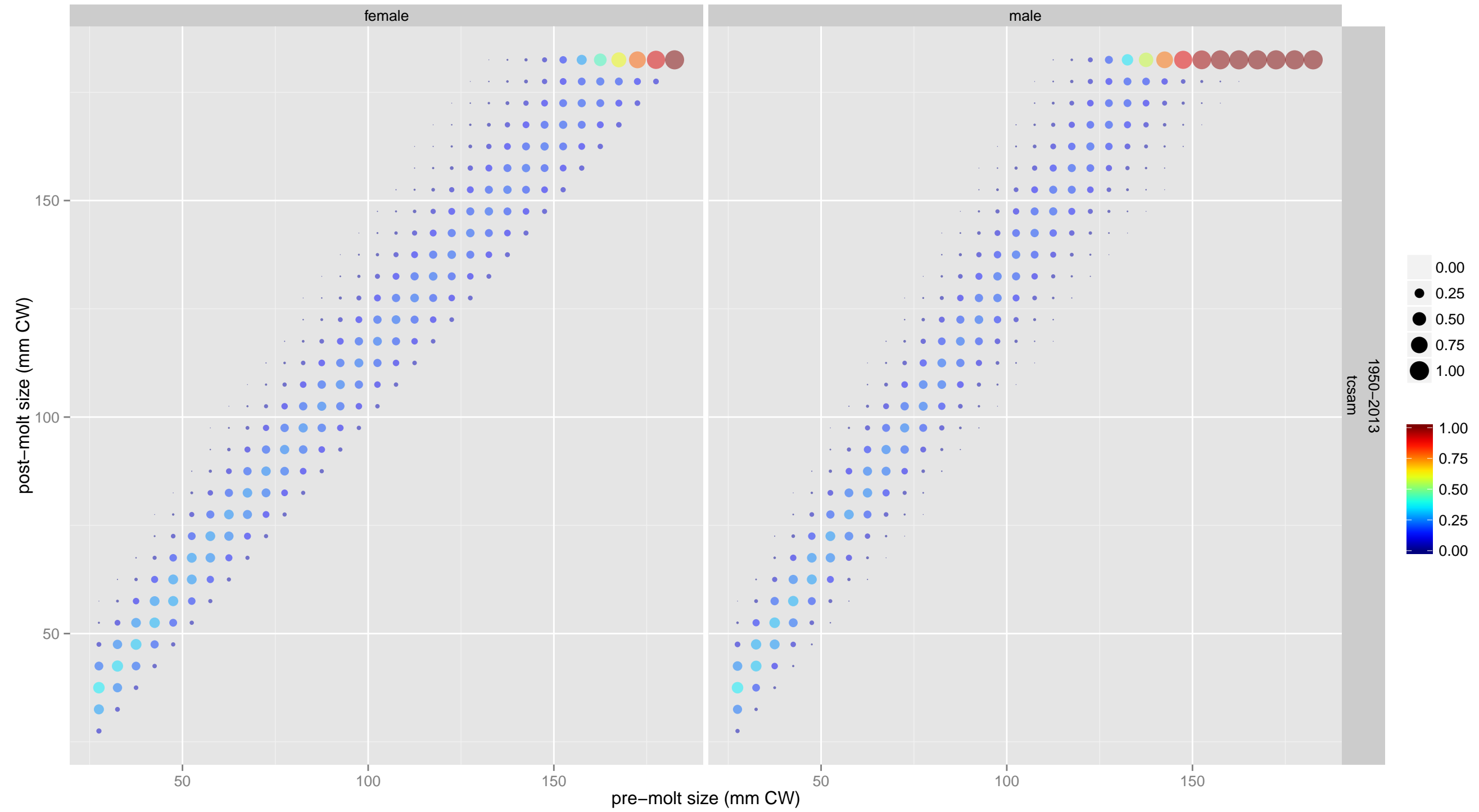
TCF: total catch: female, all maturity, new shell

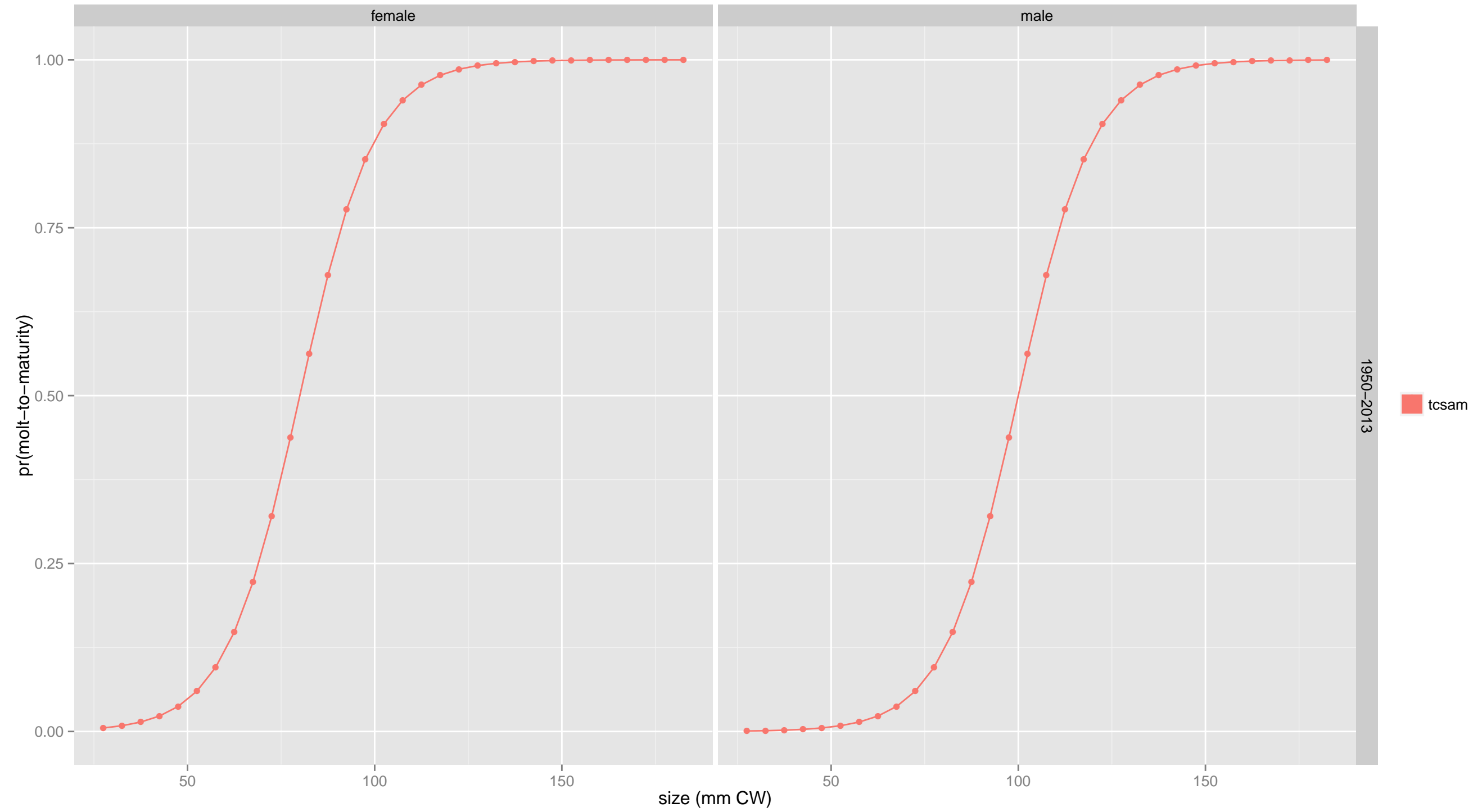


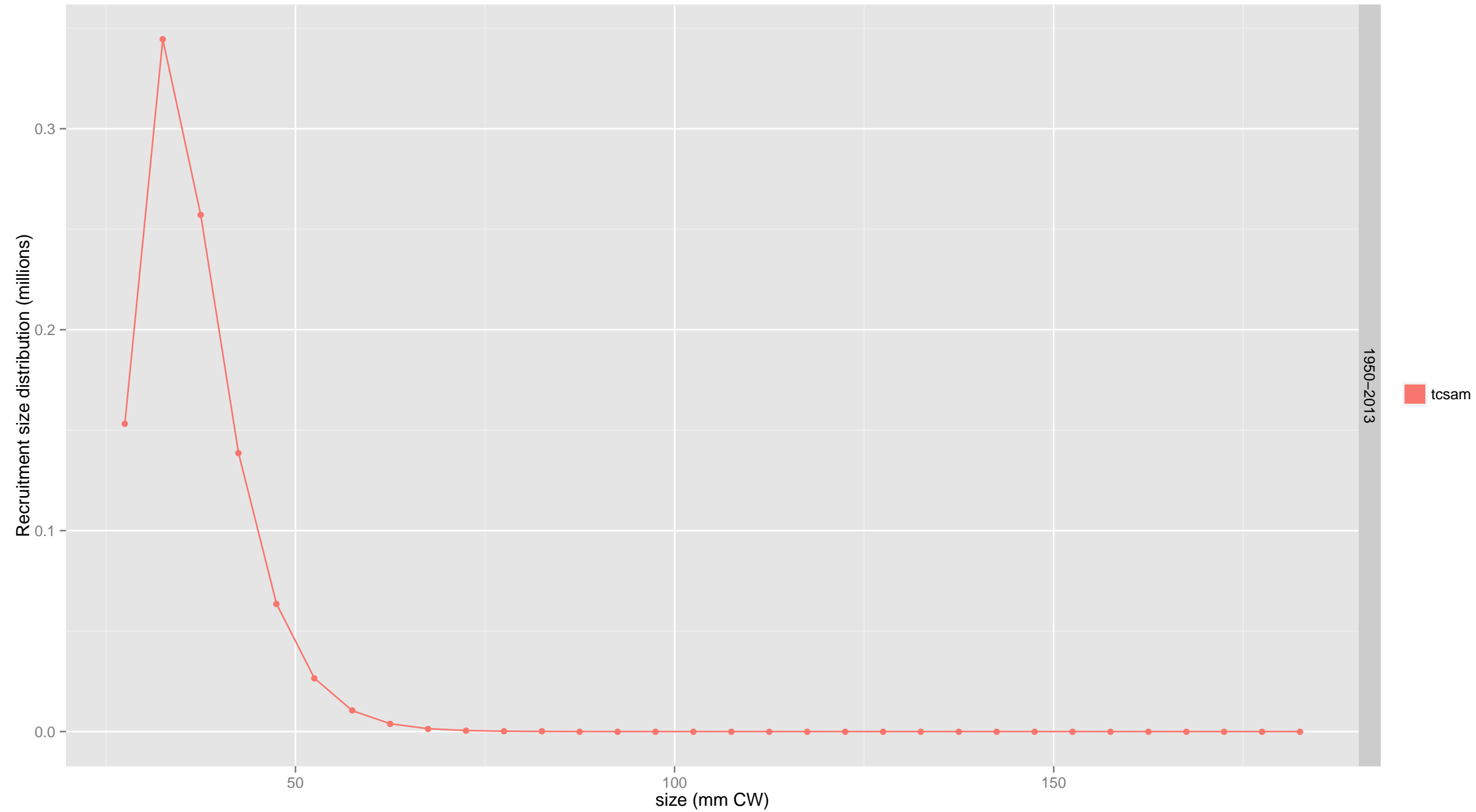
TCF: total catch: female, all maturity, old shell



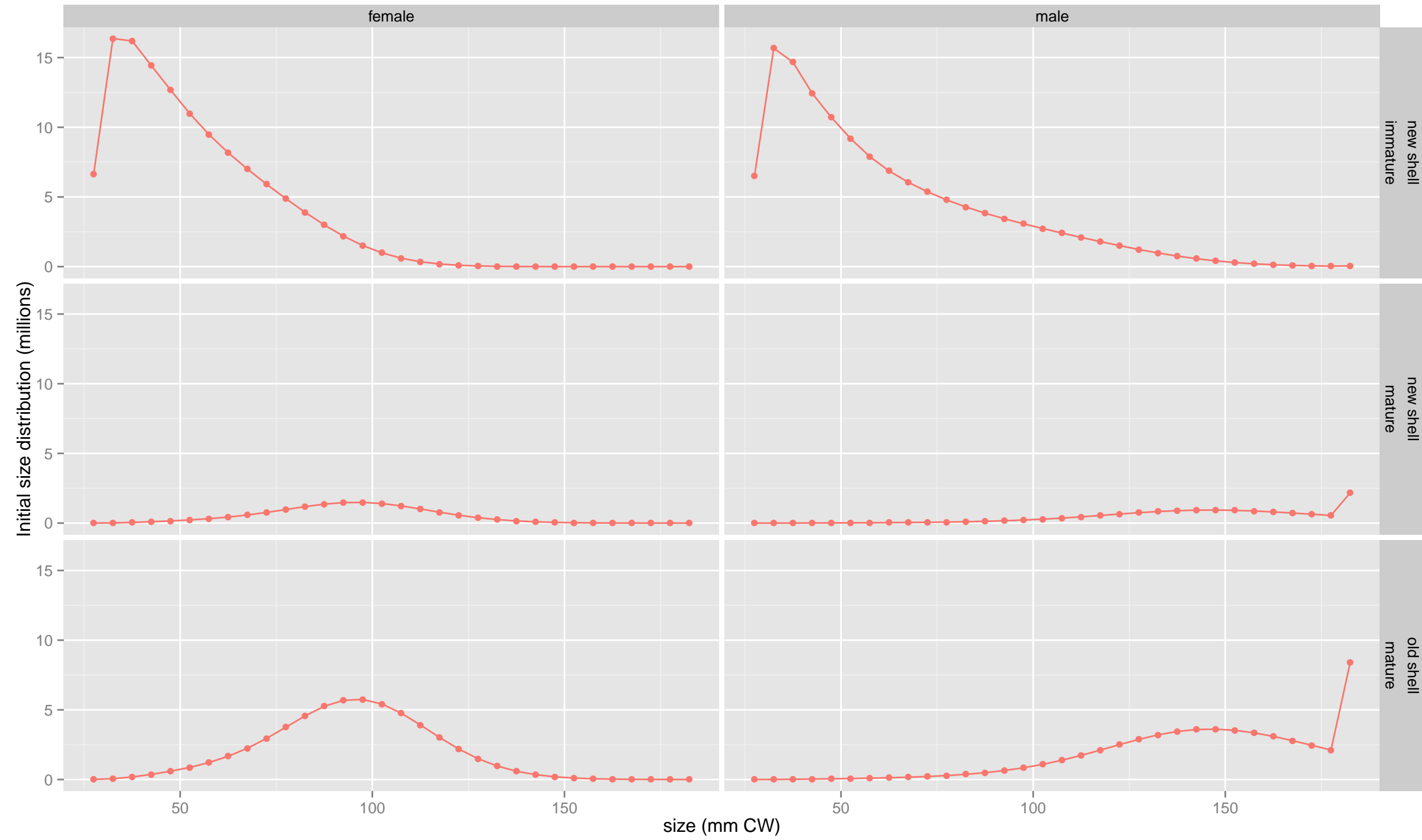




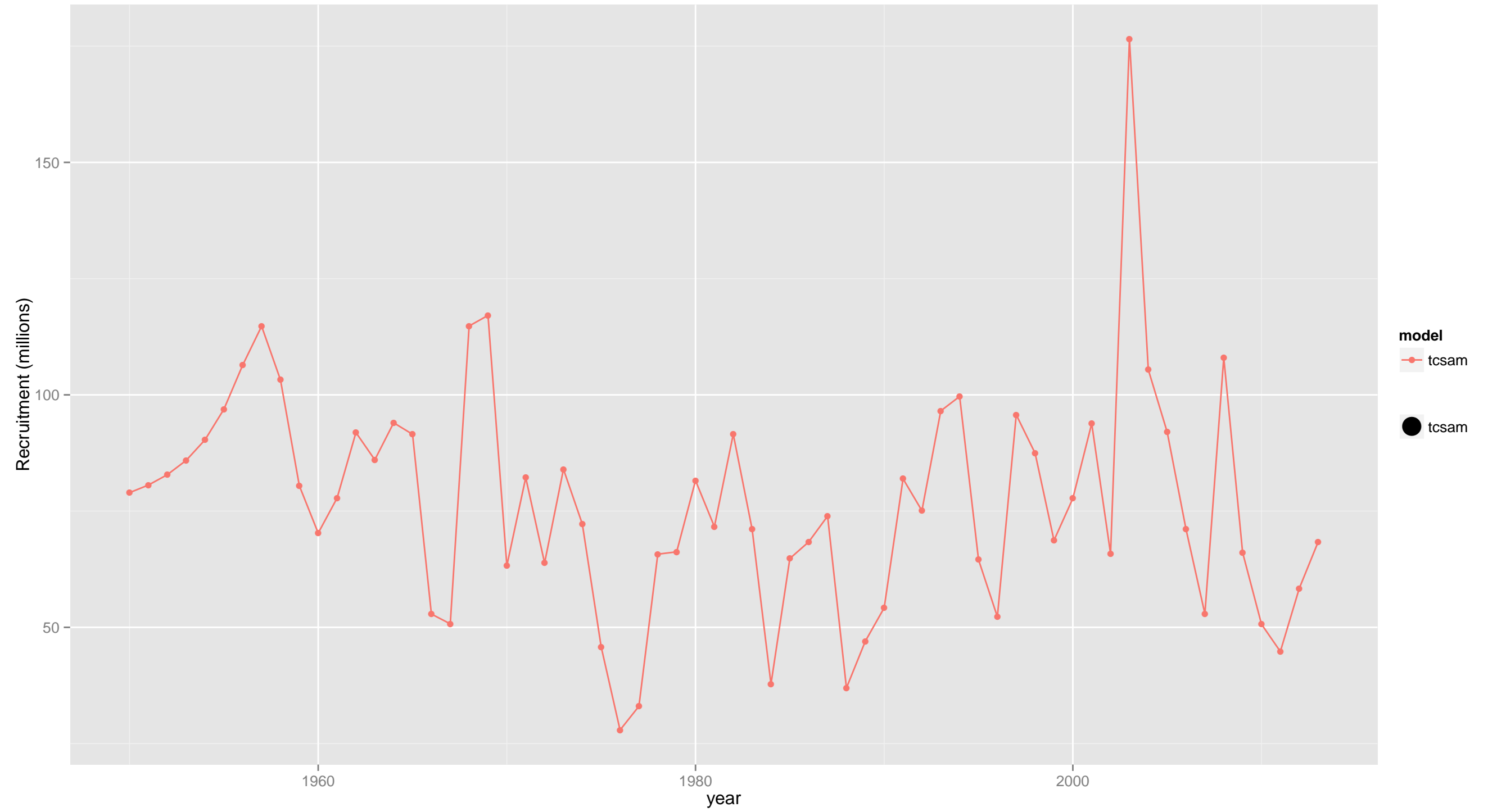


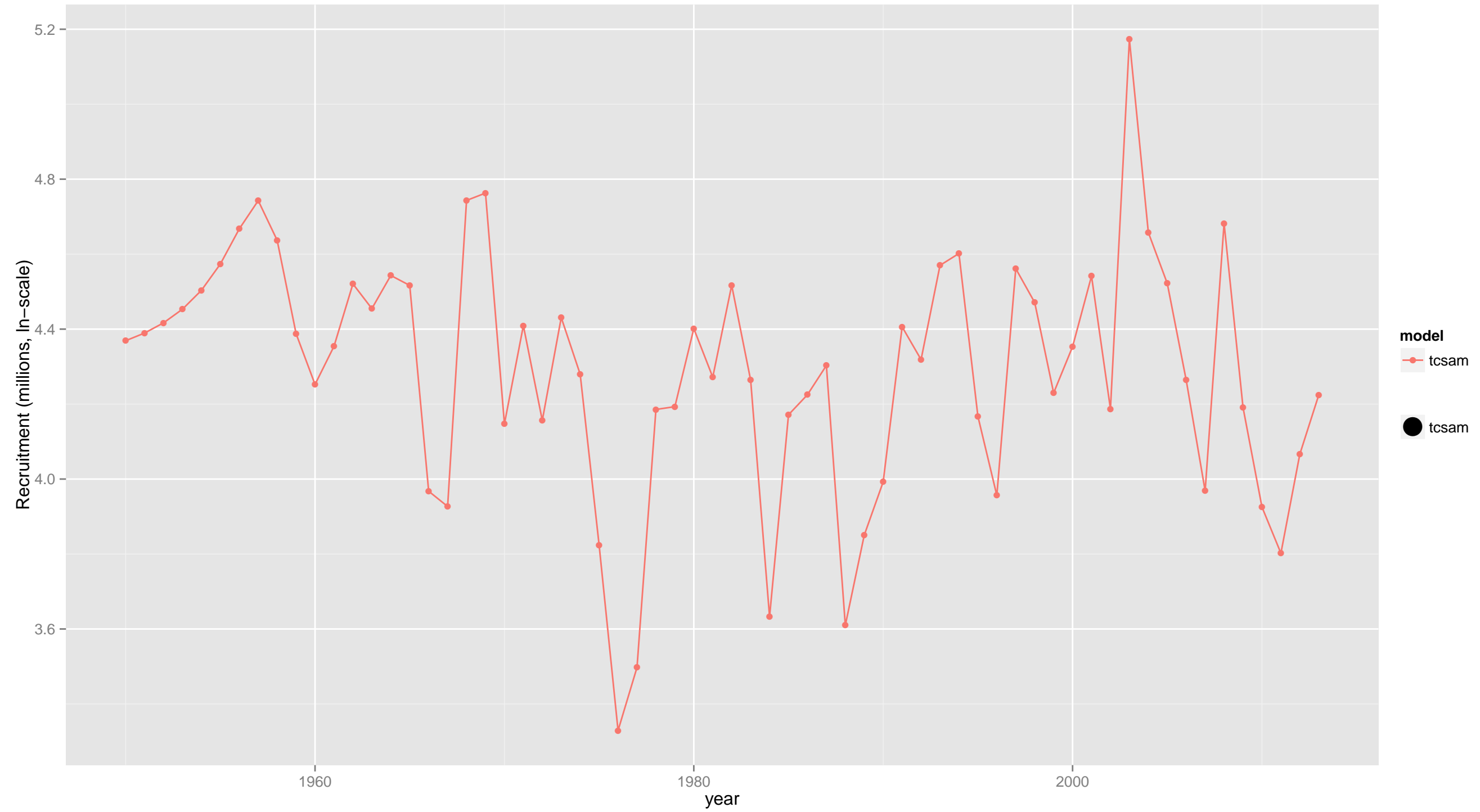


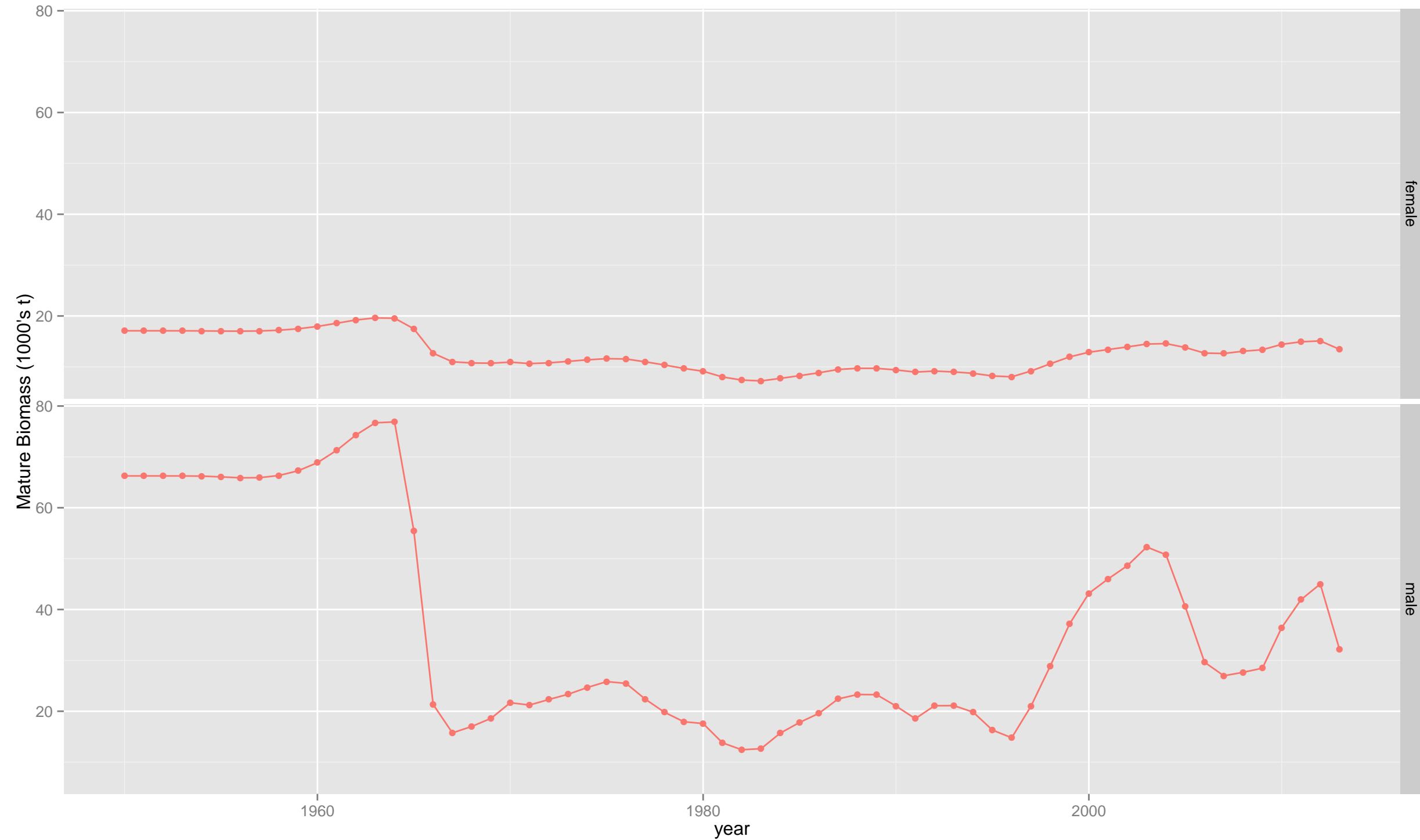


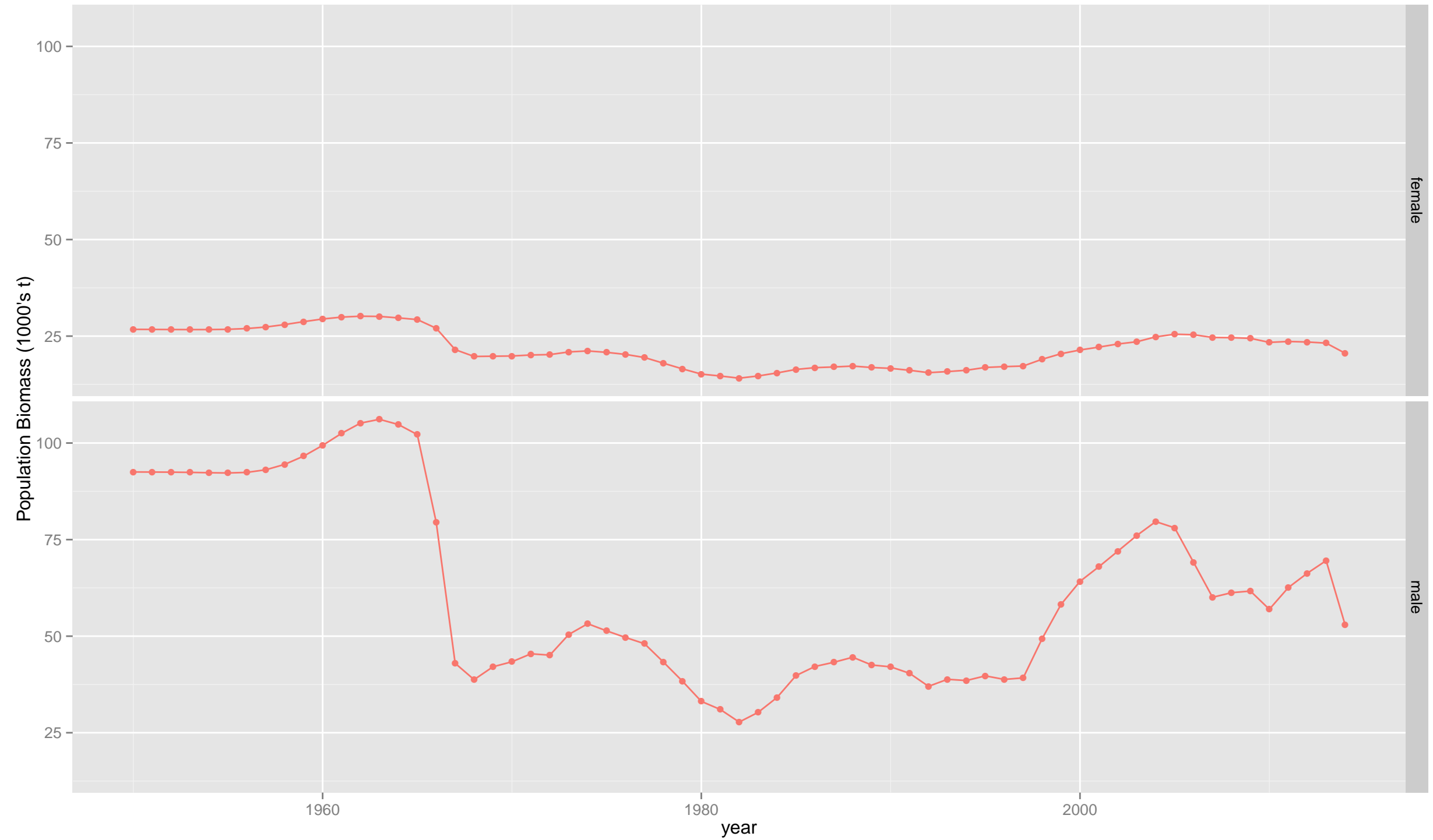


Model Case
■ tcsam

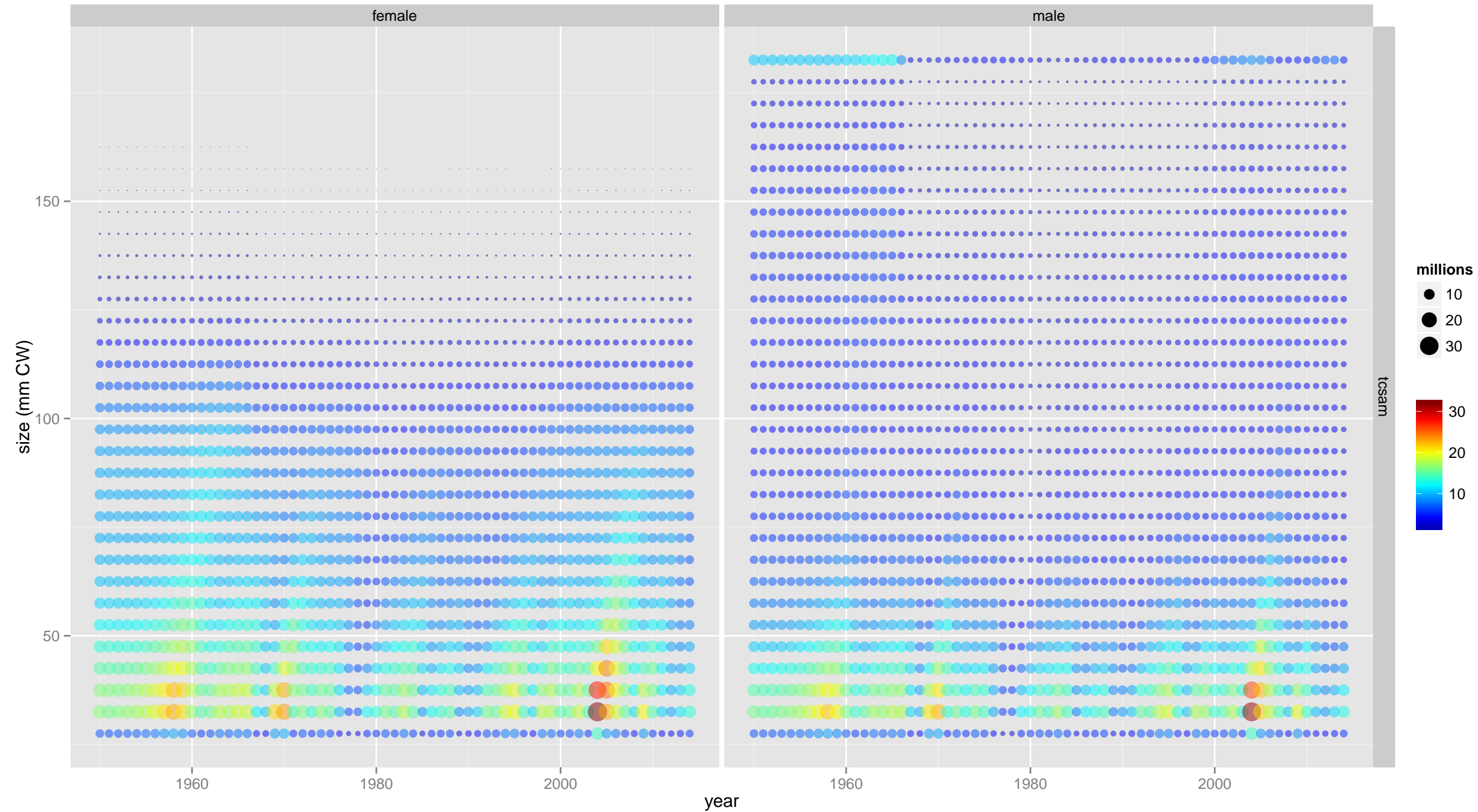




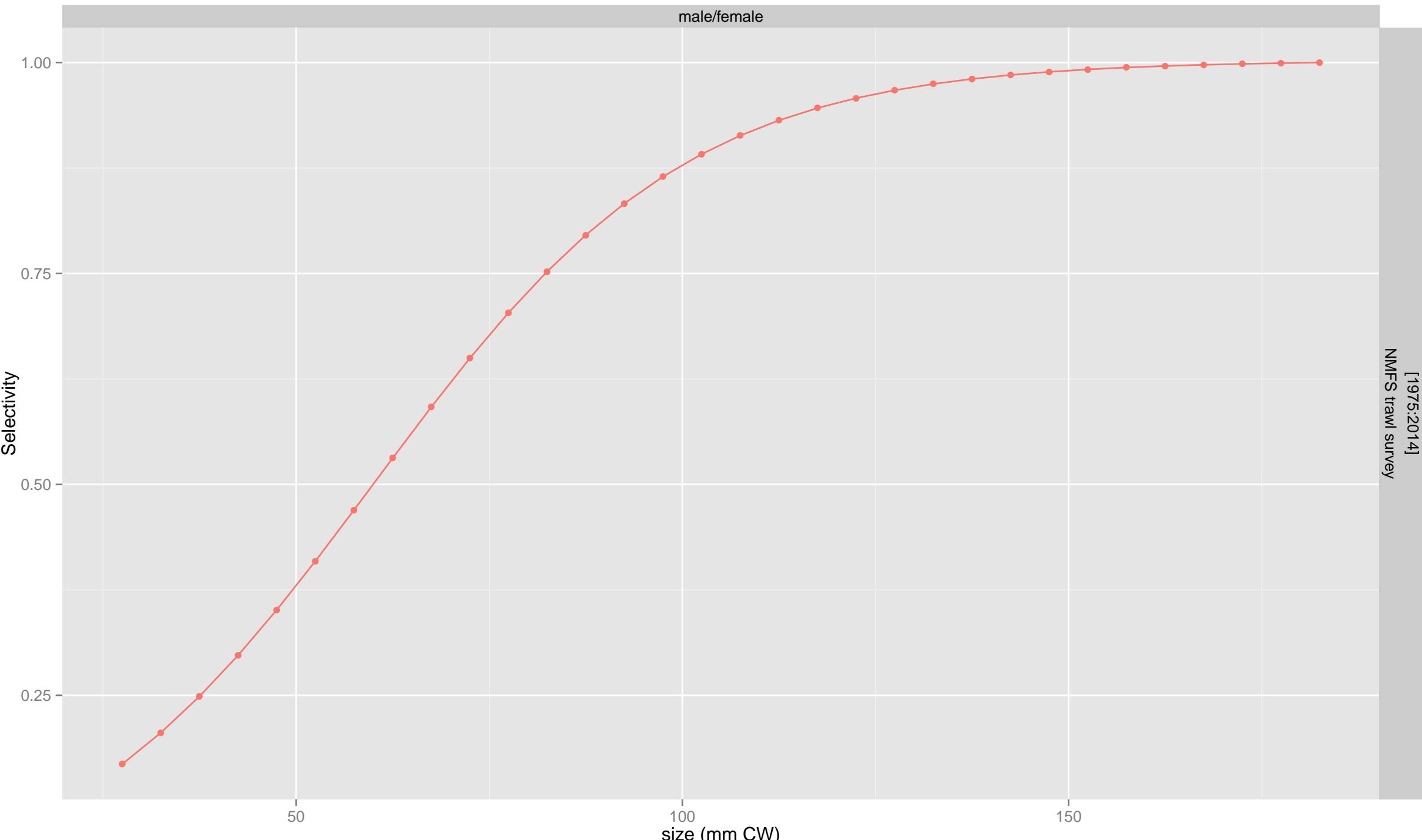








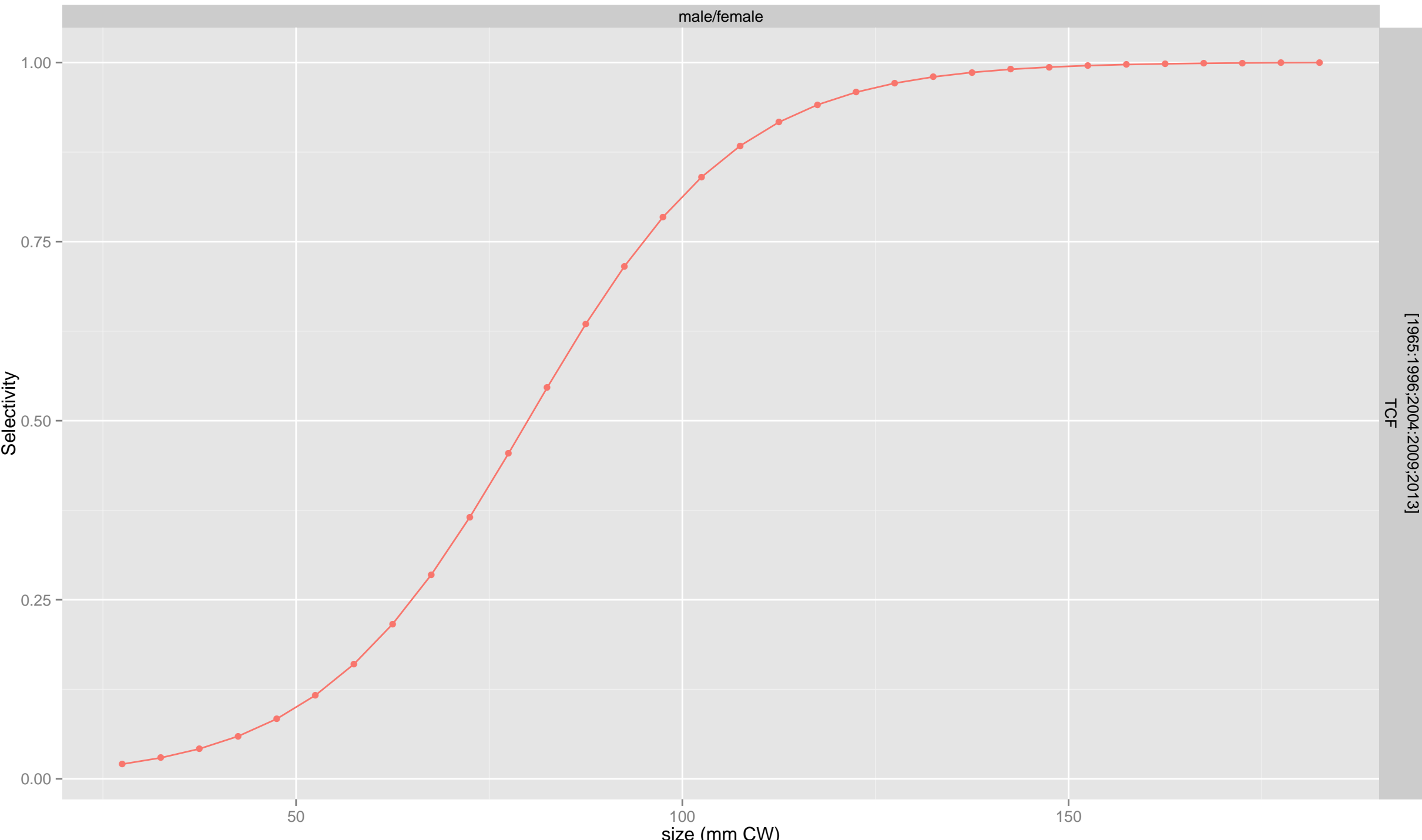
male/female



model
tcsam
tcsam

[1975:2014]
NMFS trawl survey

male/female



model
—●— tcsam
● tcsam

[1965:1996;2004:2009;2013]
TCF

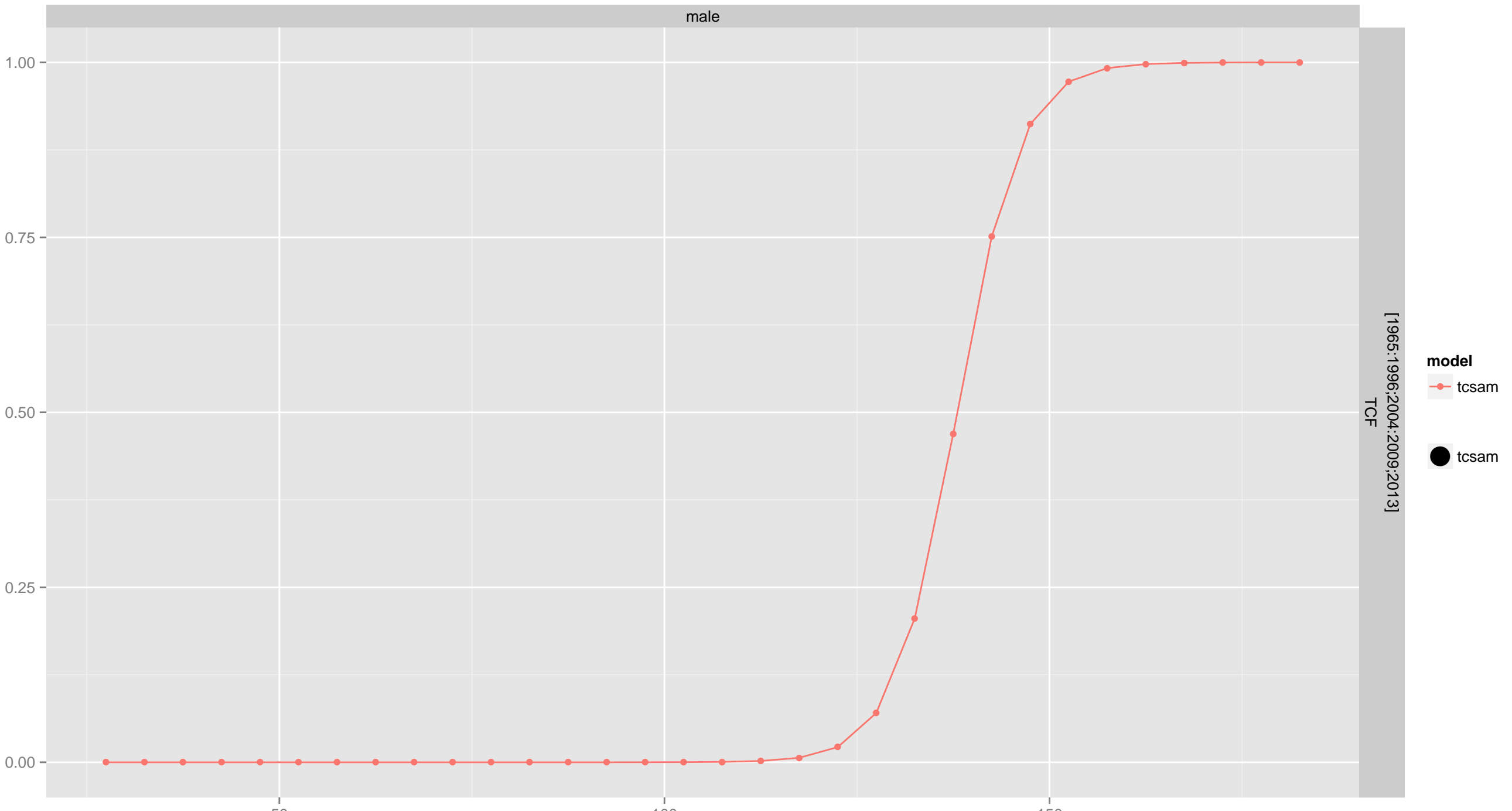
male

Retention

size (mm CW)

[1965:1996;2004:2009;2013]
TCF

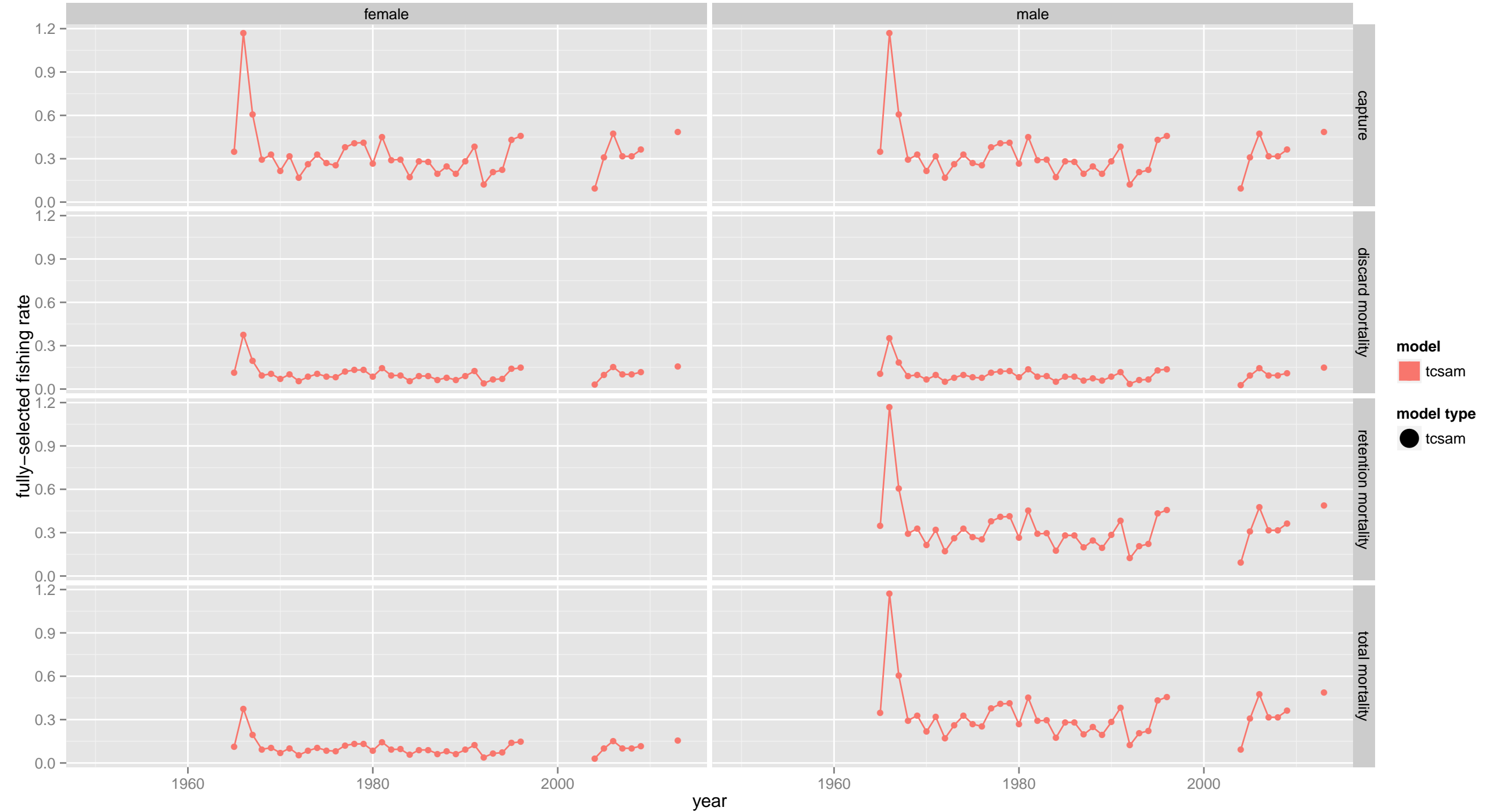
model
—●— tcsam
● tcsam



gmacs-style Handling Mortality Consistency Check



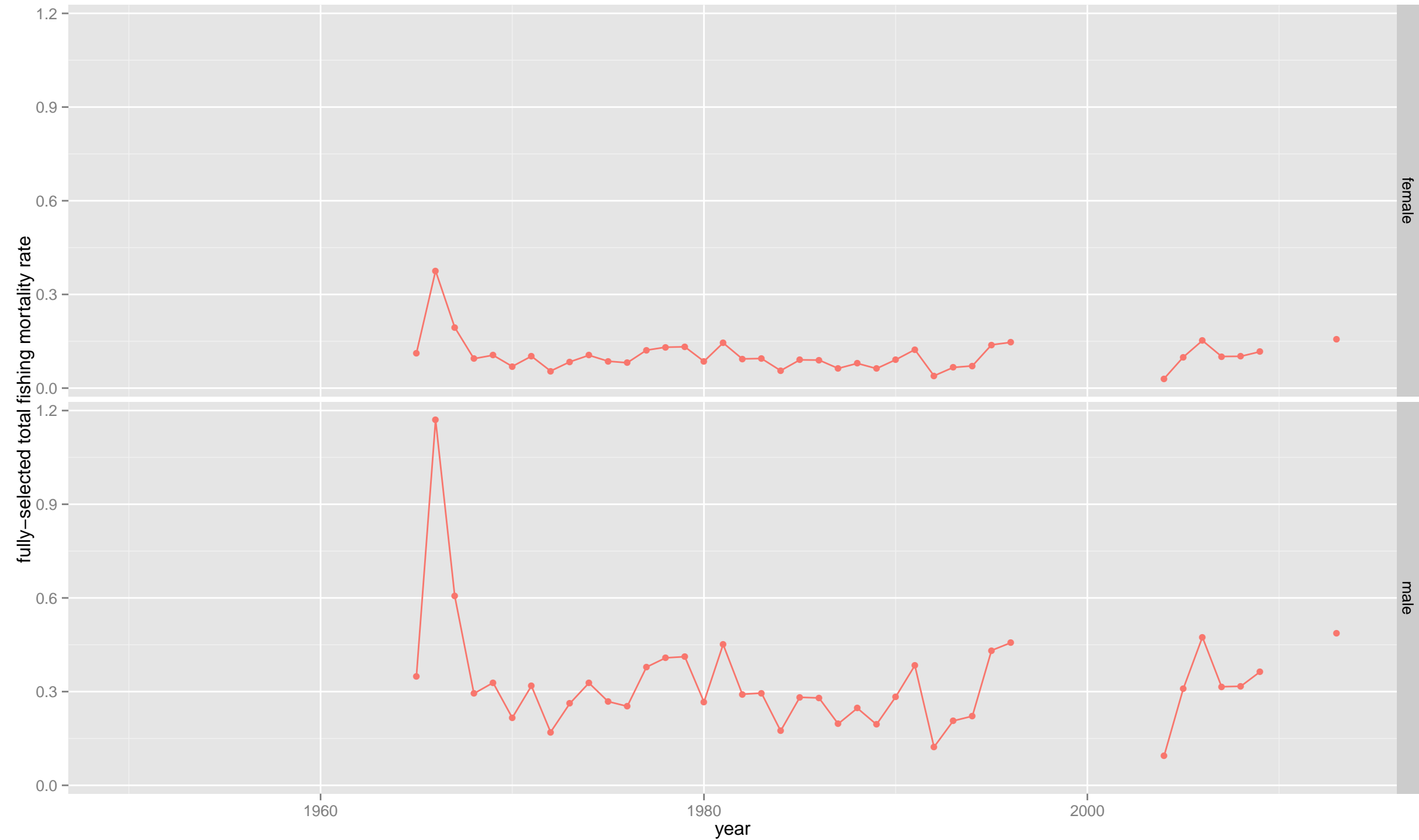
TCF



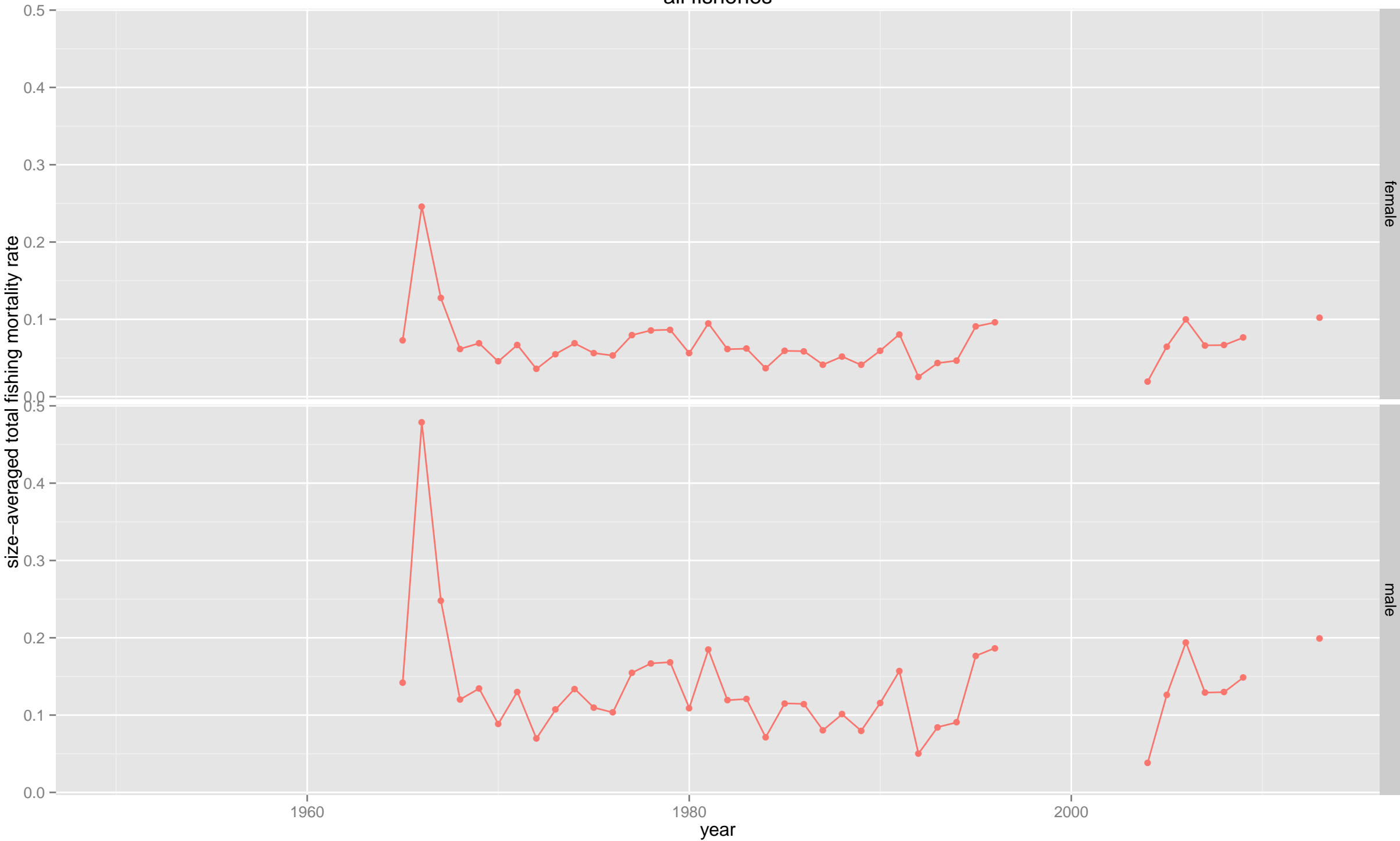
TCF



all fisheries



all fisheries



TCF

female

male

captured

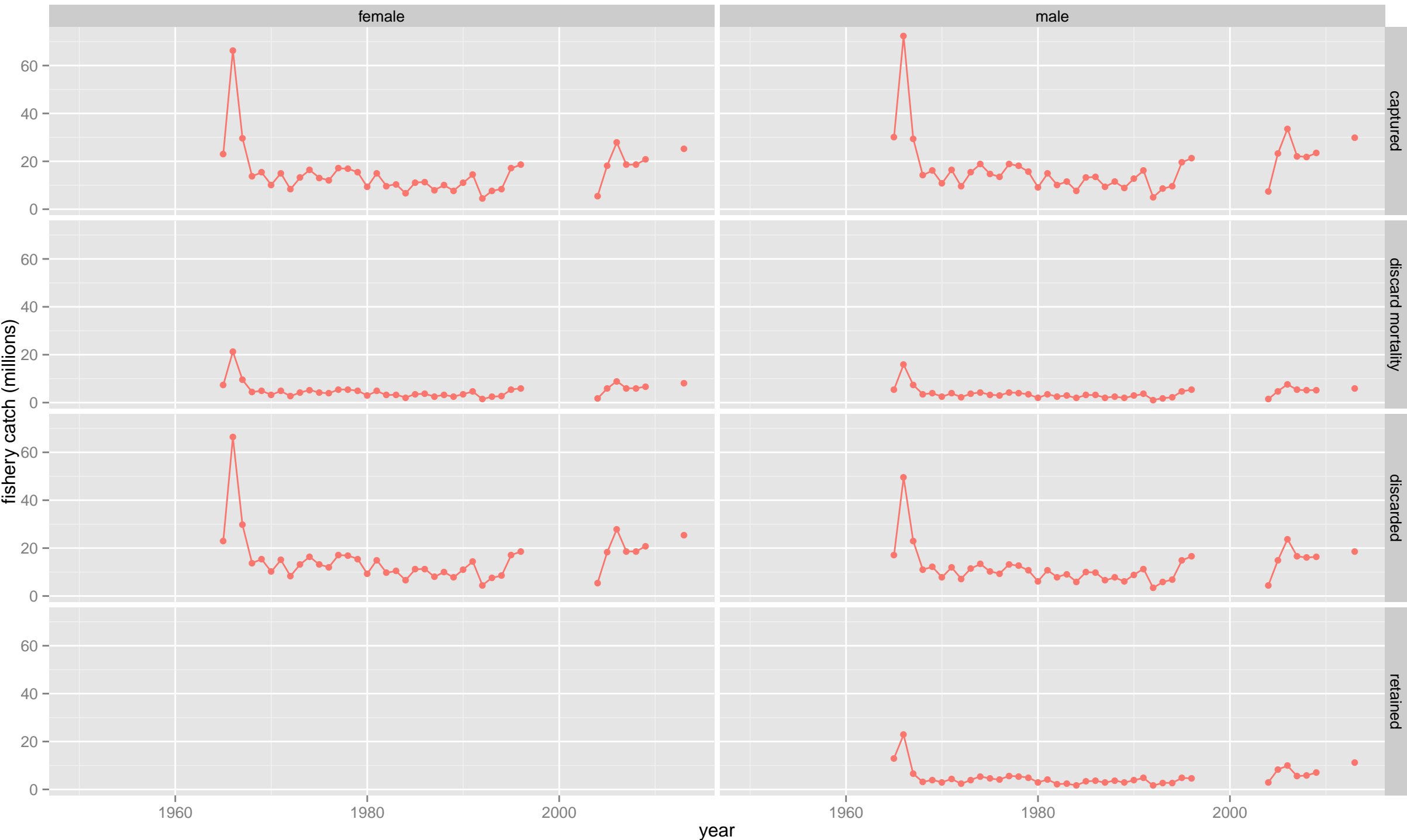
discard mortality

discarded

retained

model
—●— tcsam

model type
■ tcsam



TCF

female

male

captured

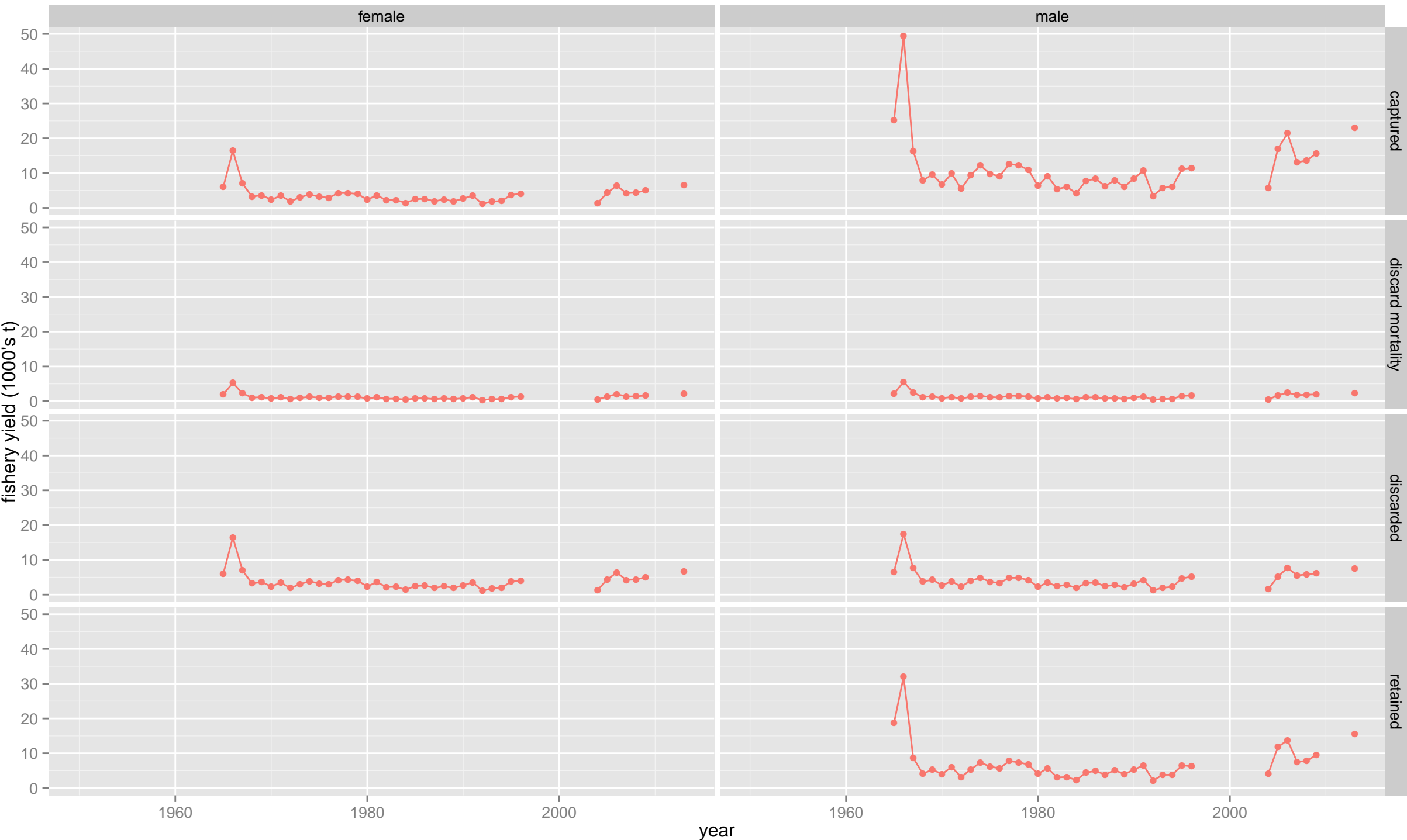
discard mortality

discarded

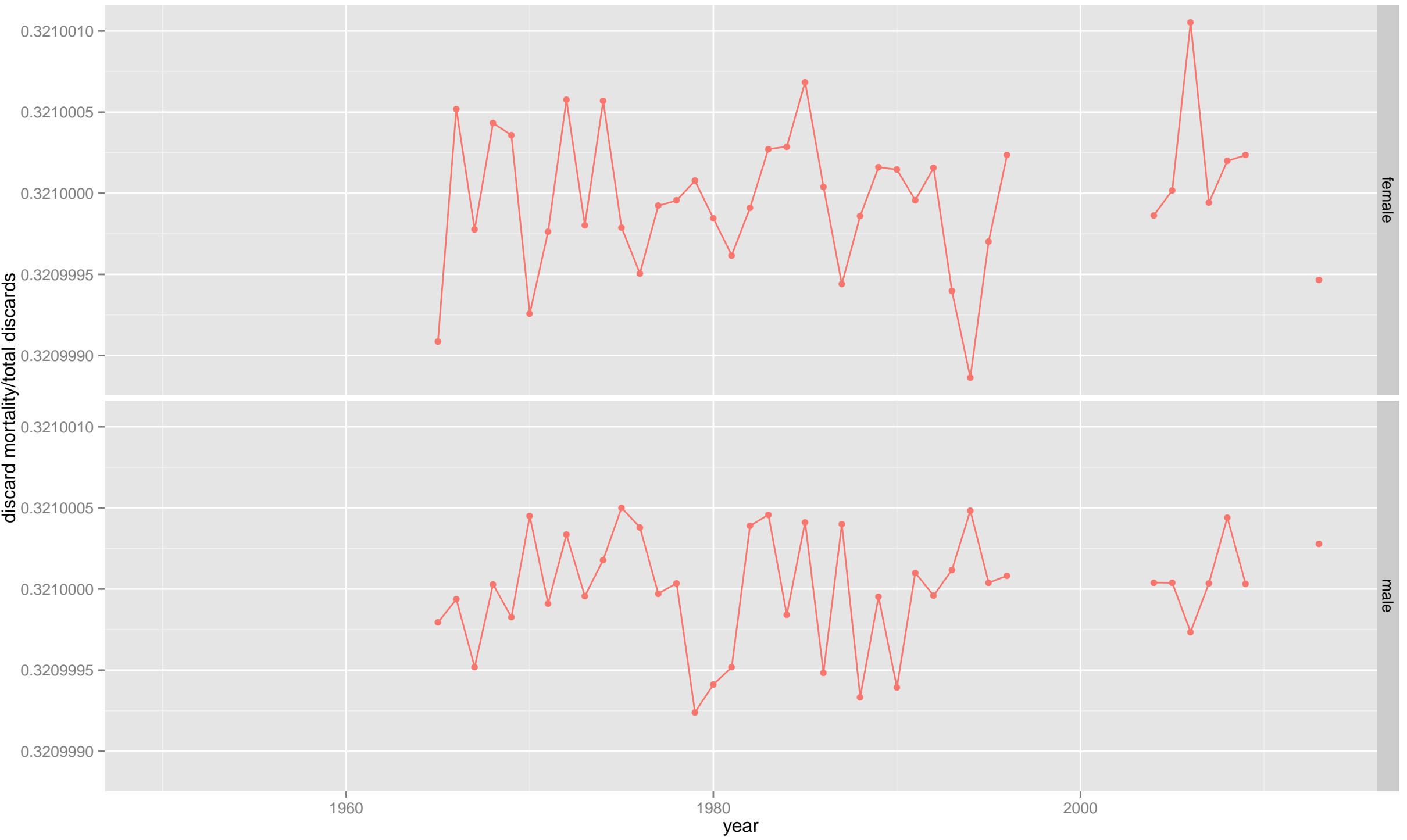
retained

model
—●— tcsam

model type
■ tcsam



TCF

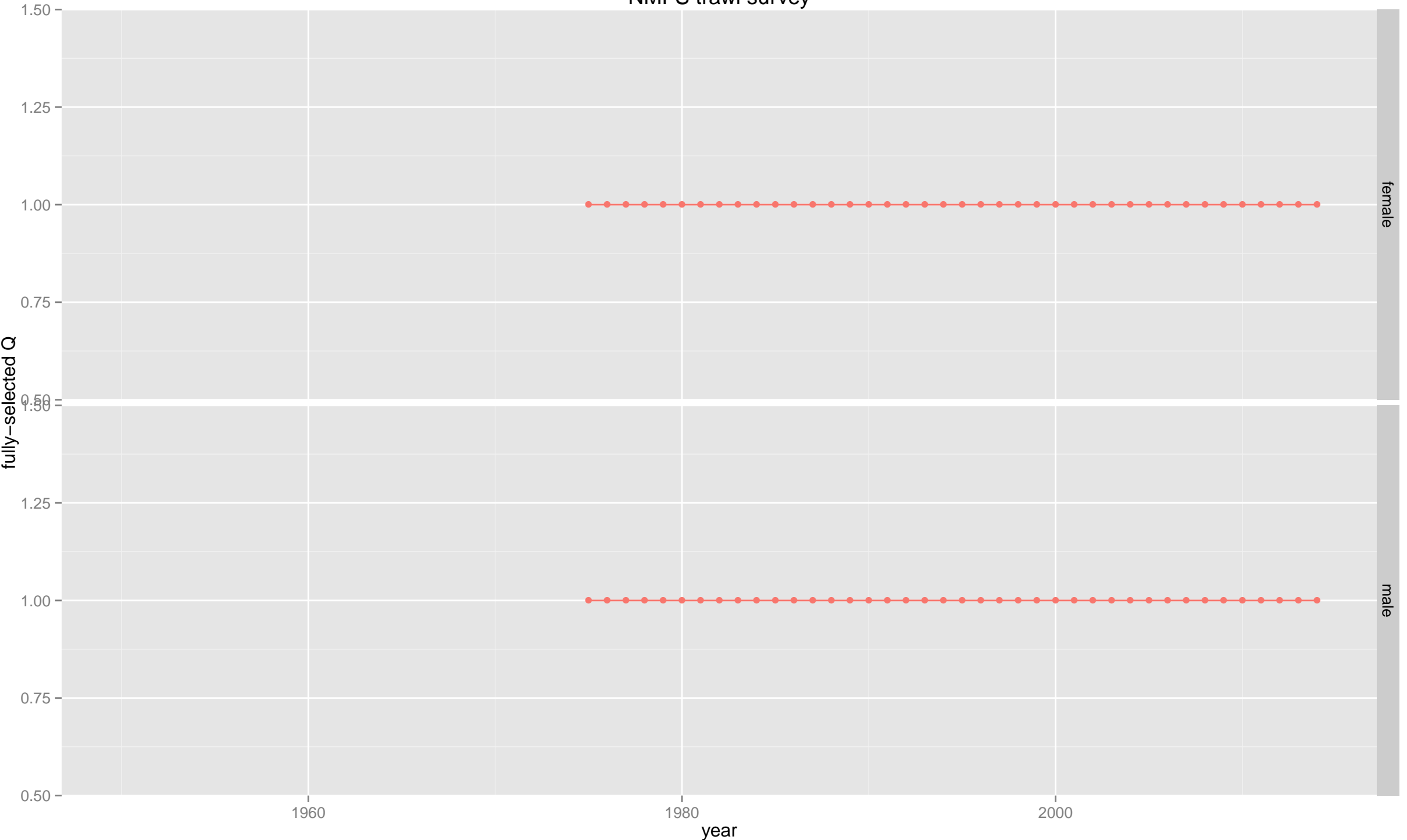


1960

1980

2000

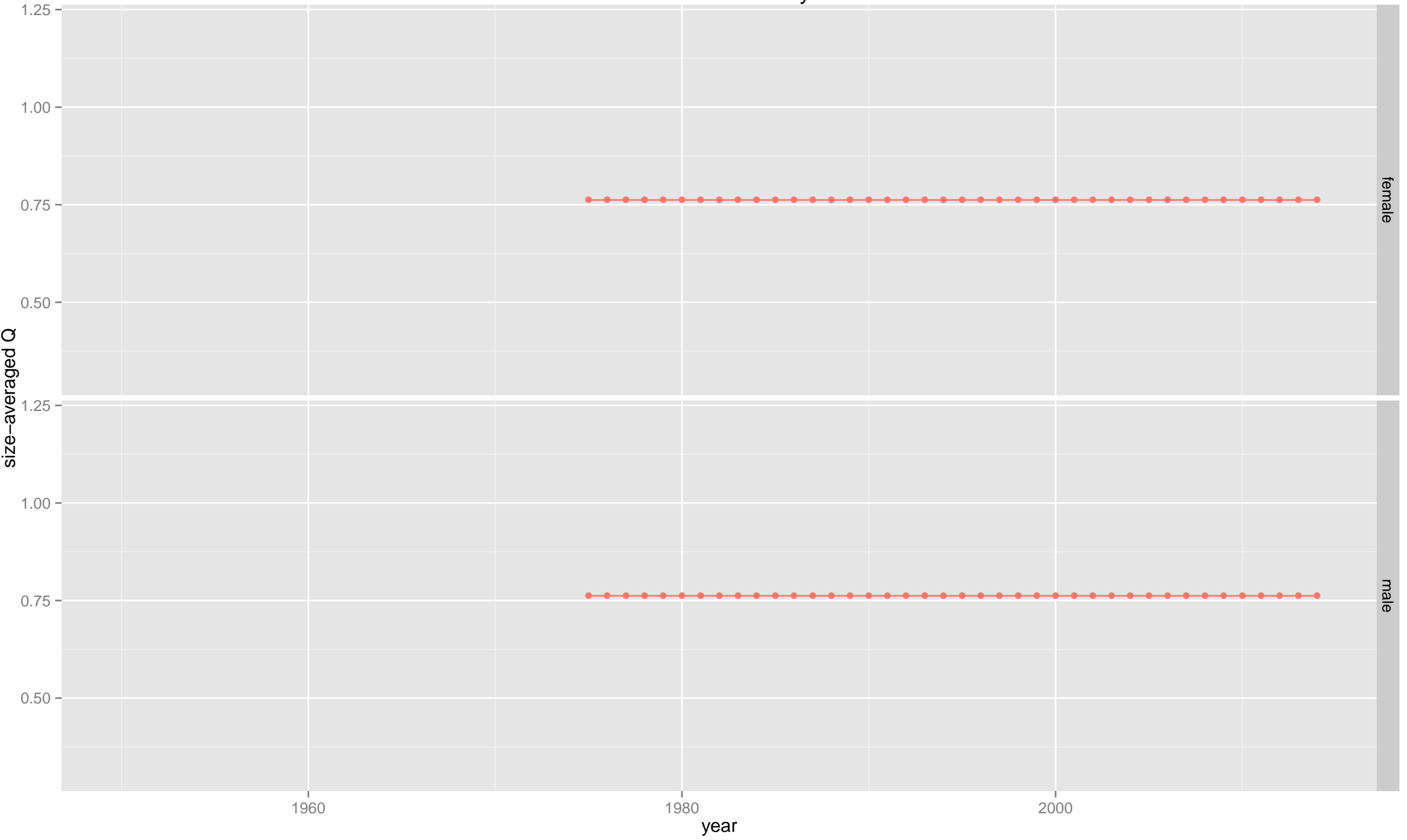
NMFS trawl survey



model
—●— tcsam

model type
● tcsam

NMFS trawl survey



NMFS trawl survey



NMFS trawl survey

