NOAA FISHERIES

Alaska Fisheries Science Center

Ensembling northern rock soles

Northern rock sole models

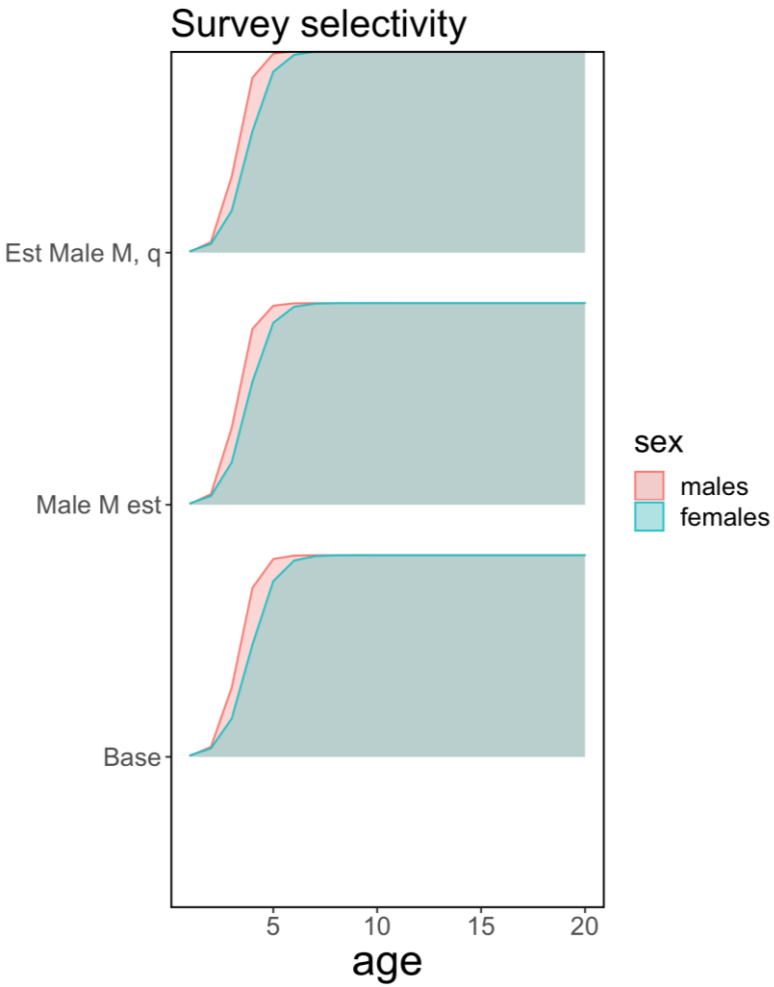
1. Base model
   - Survey catchability with informative prior (mean=1.5, CV=5%)
   - M fixed at 0.15 for both sexes
2. Estimate Male M
   - Female fixed at 0.15
3. Estimate Male M and survey catchability

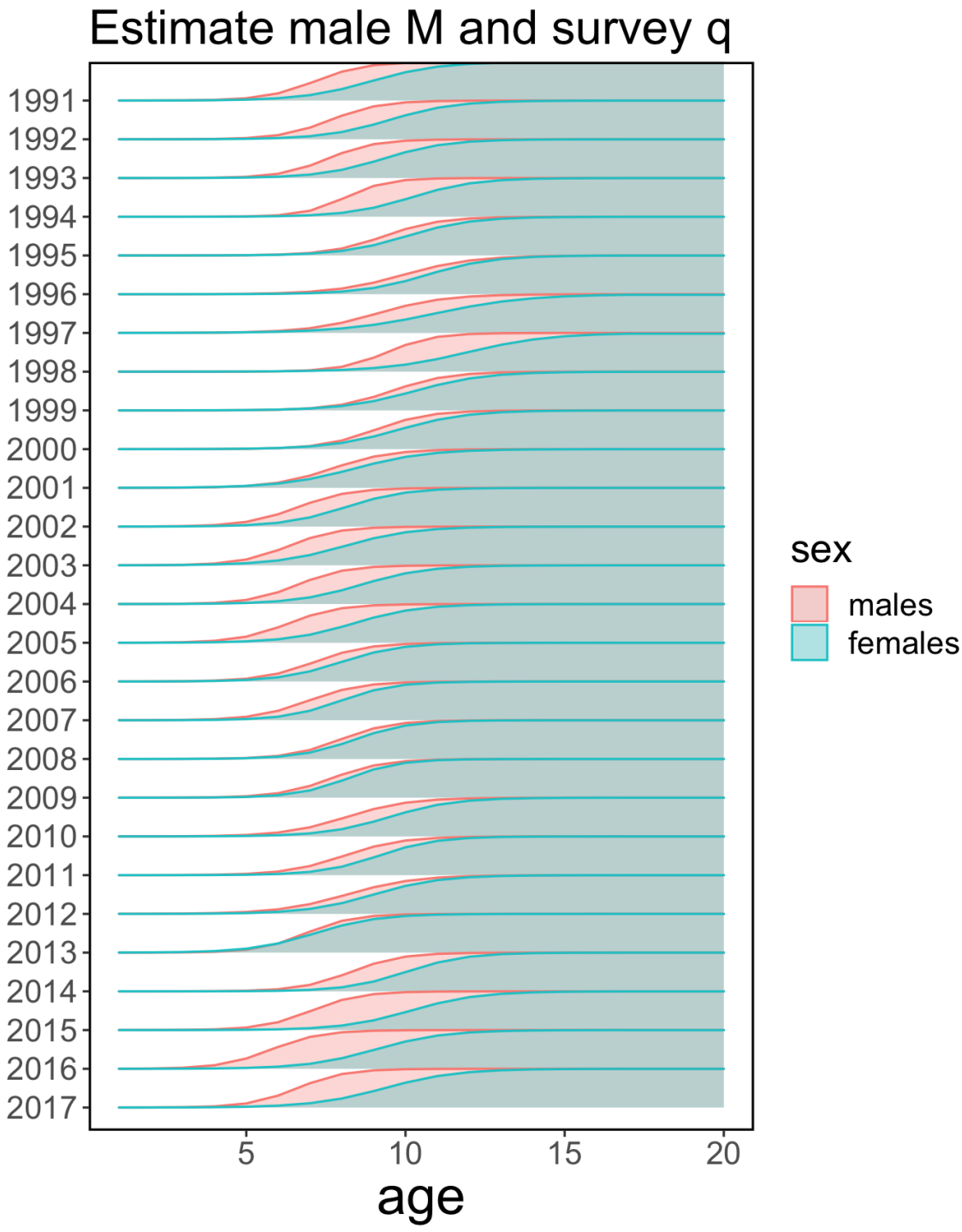
Other models examined but **excluded** from consideration:

- As base but estimate M, same for both sexes
- As base but q estimated
- Estimate both male and female M

Selectivity

- Fishery

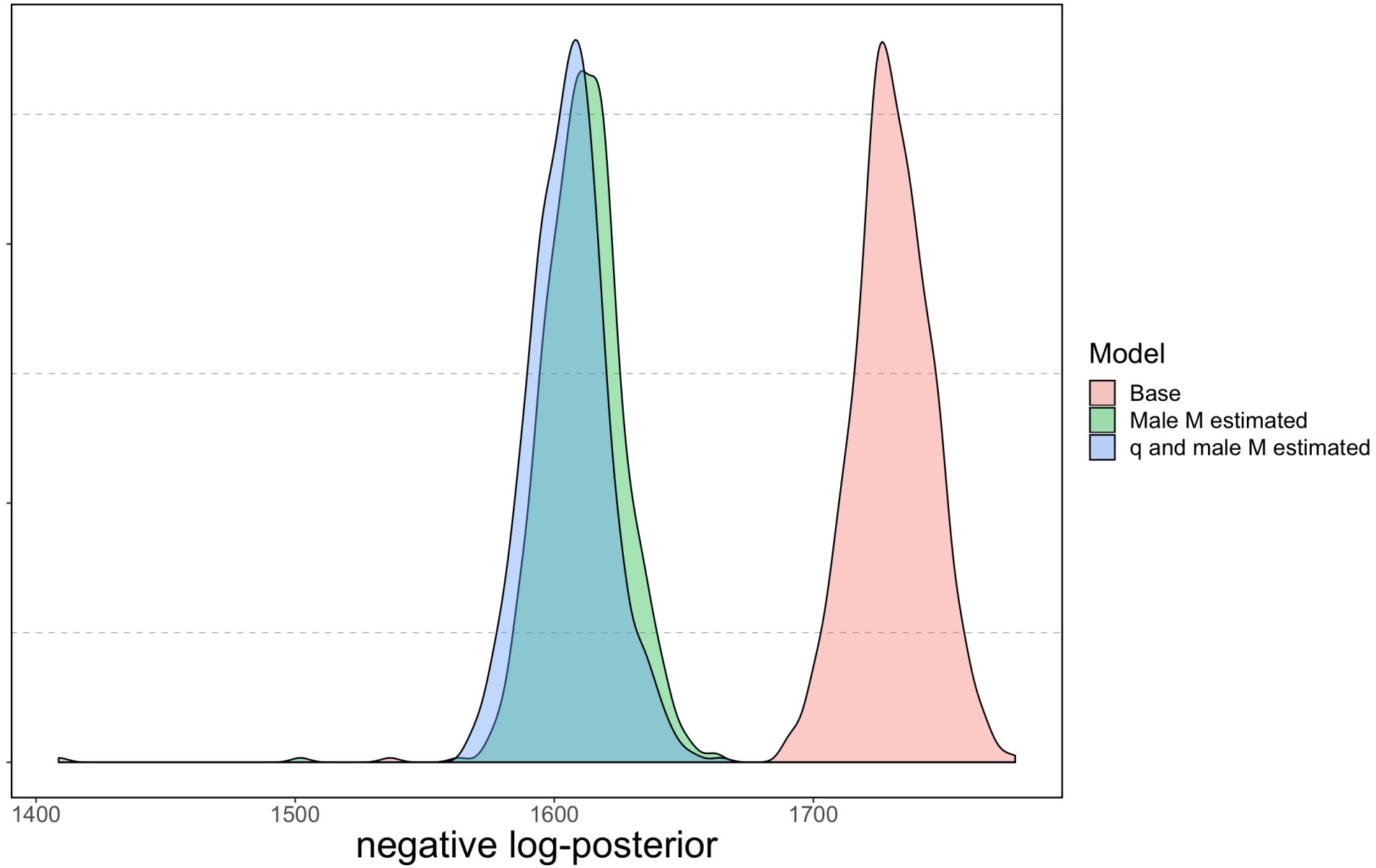




How to find support for ensemble subset

- Examine relative lack of fit…

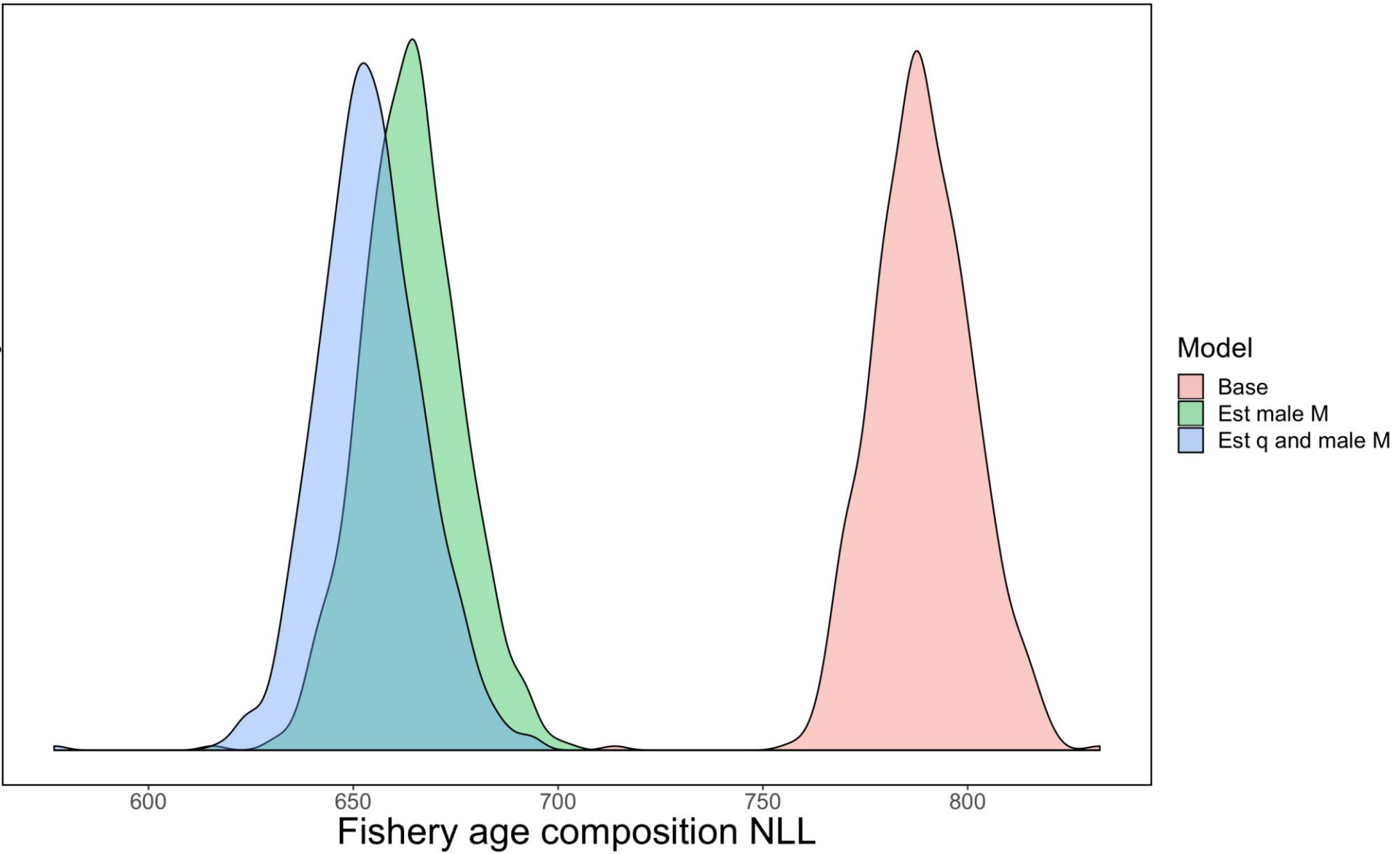
Judging fits (lower is better)



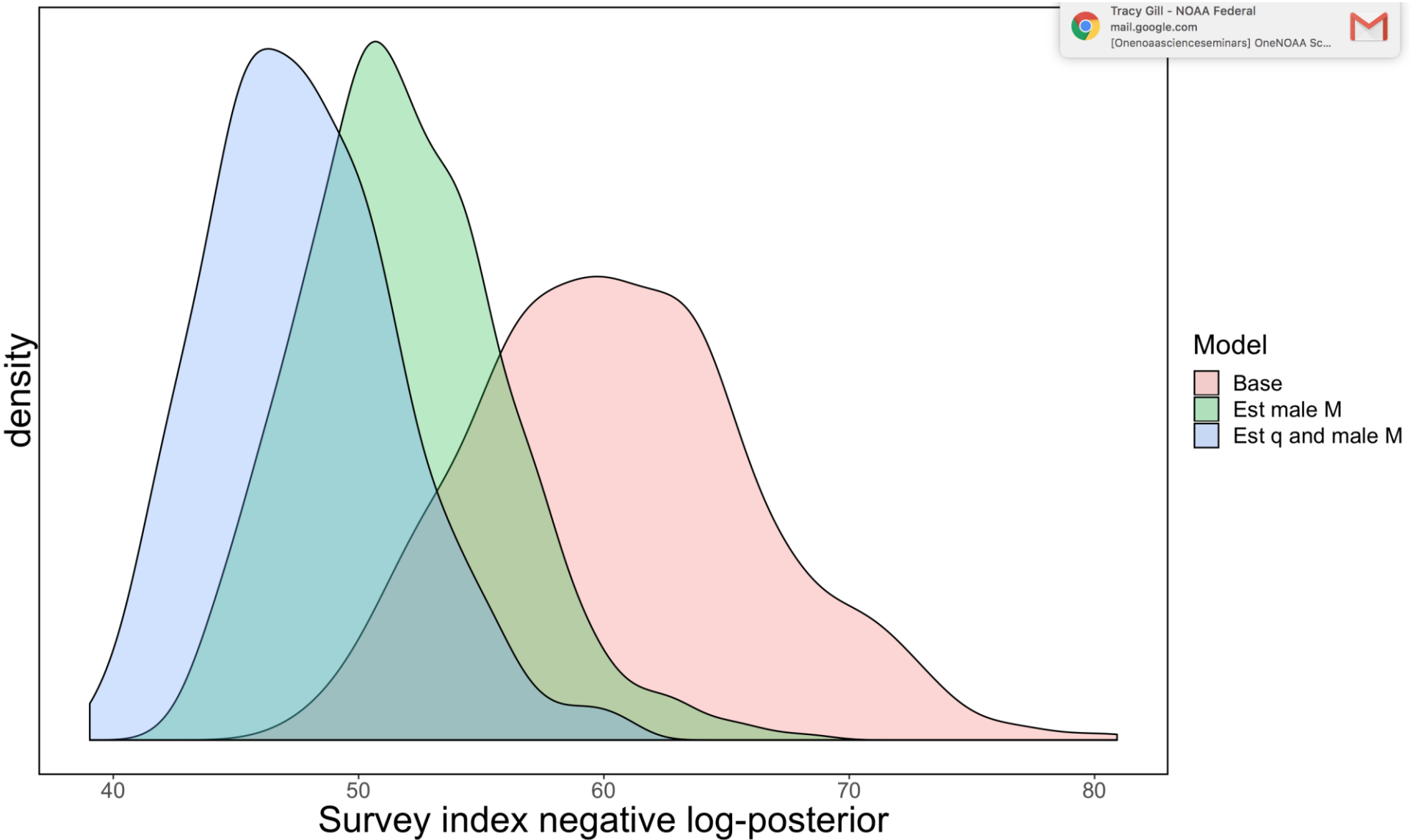
Indications?

- Sex-specific M fit data better…
  - But where/which data?

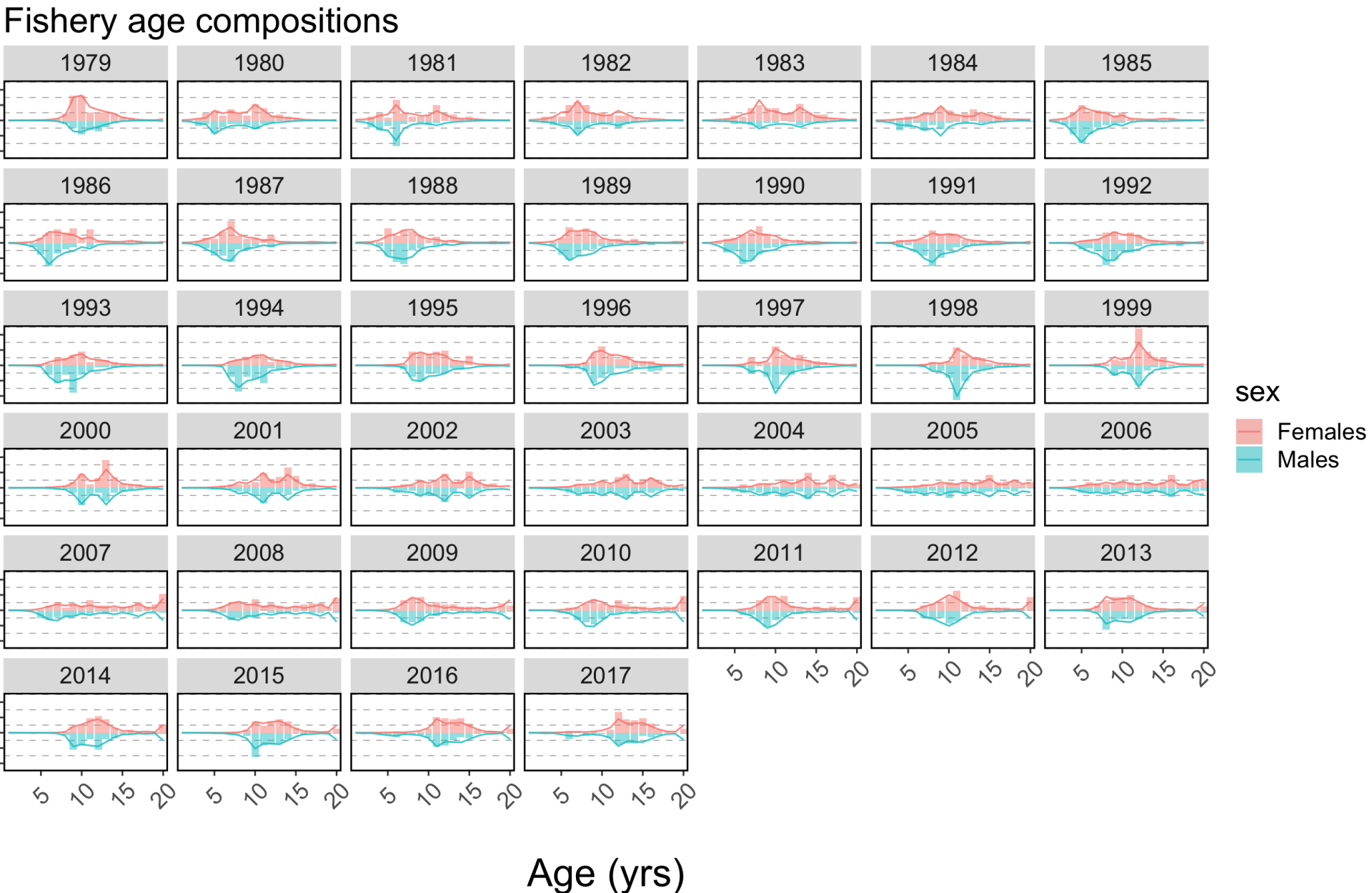
Fishery age composition (lower better)



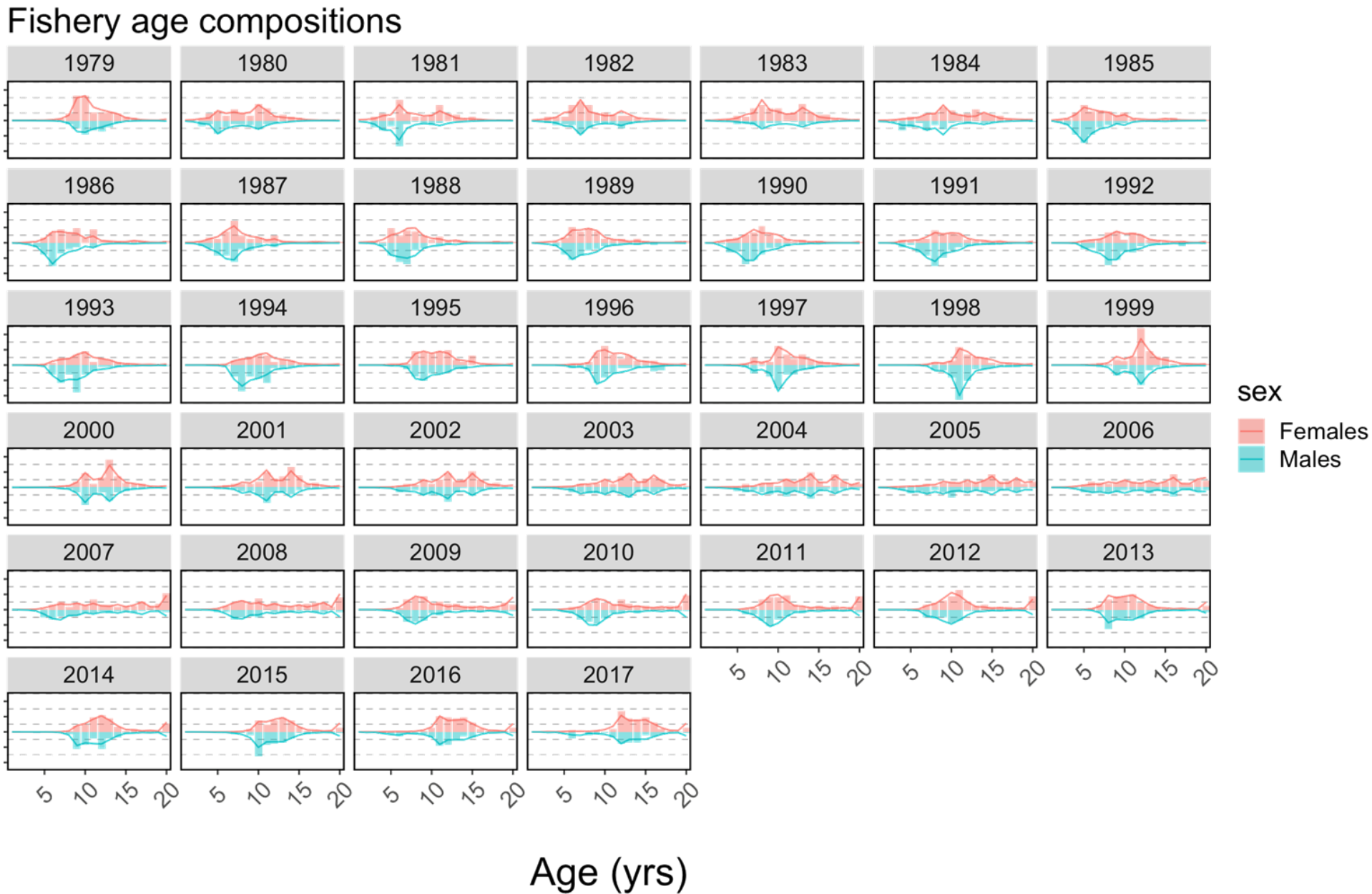
Survey index (lower better)



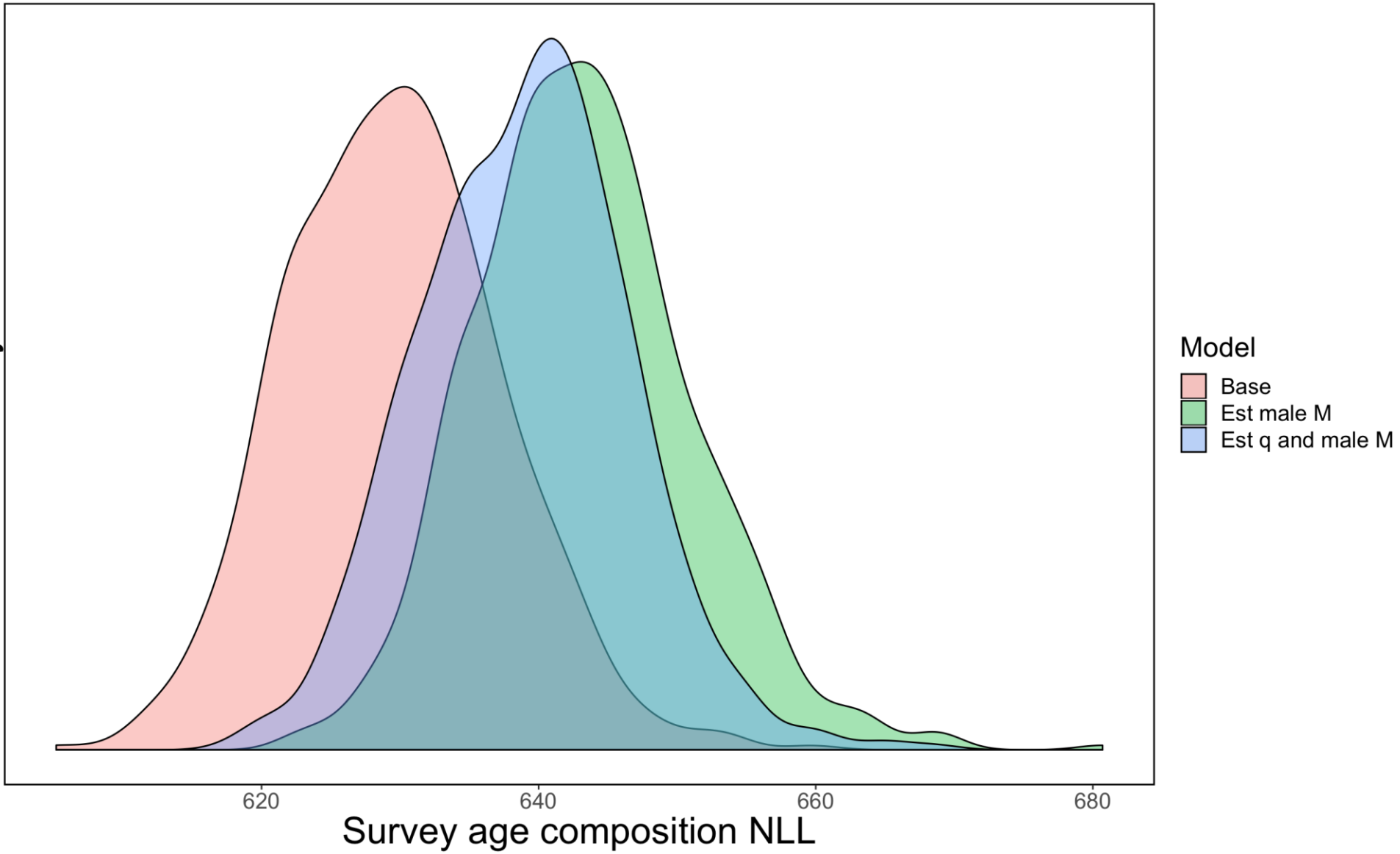
Female = male M = 0.15



Estimated male M

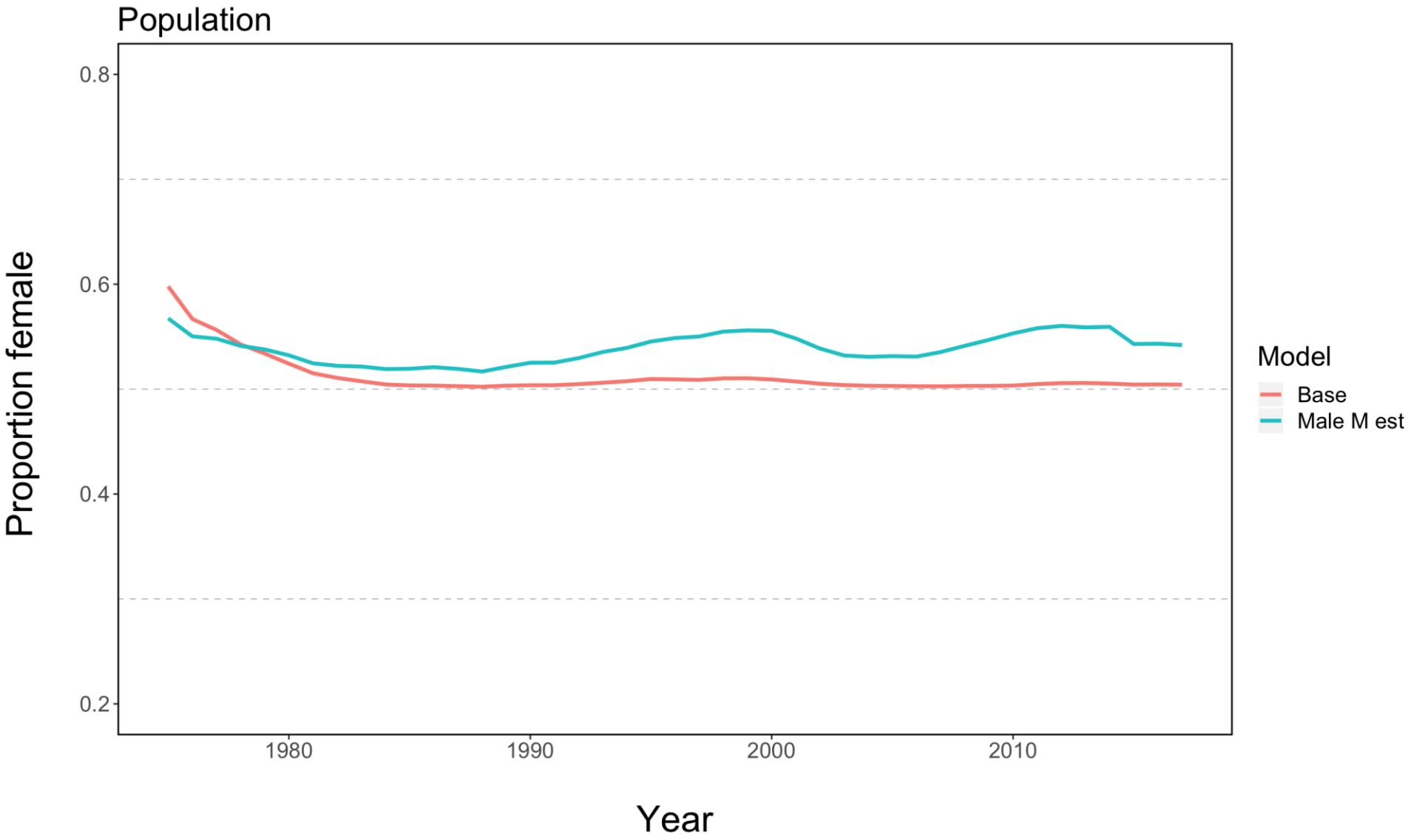


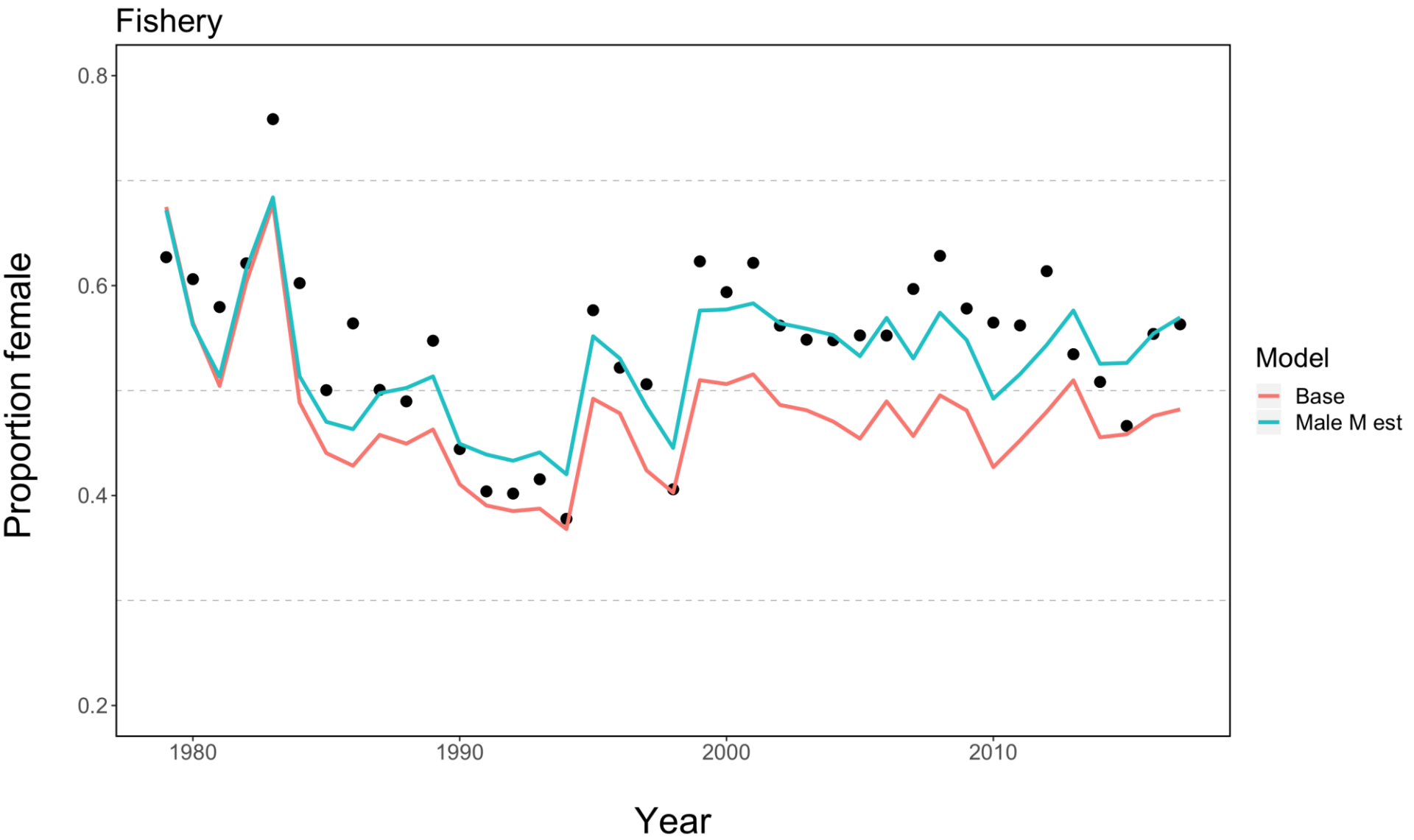
Survey age compositions (base wins!)

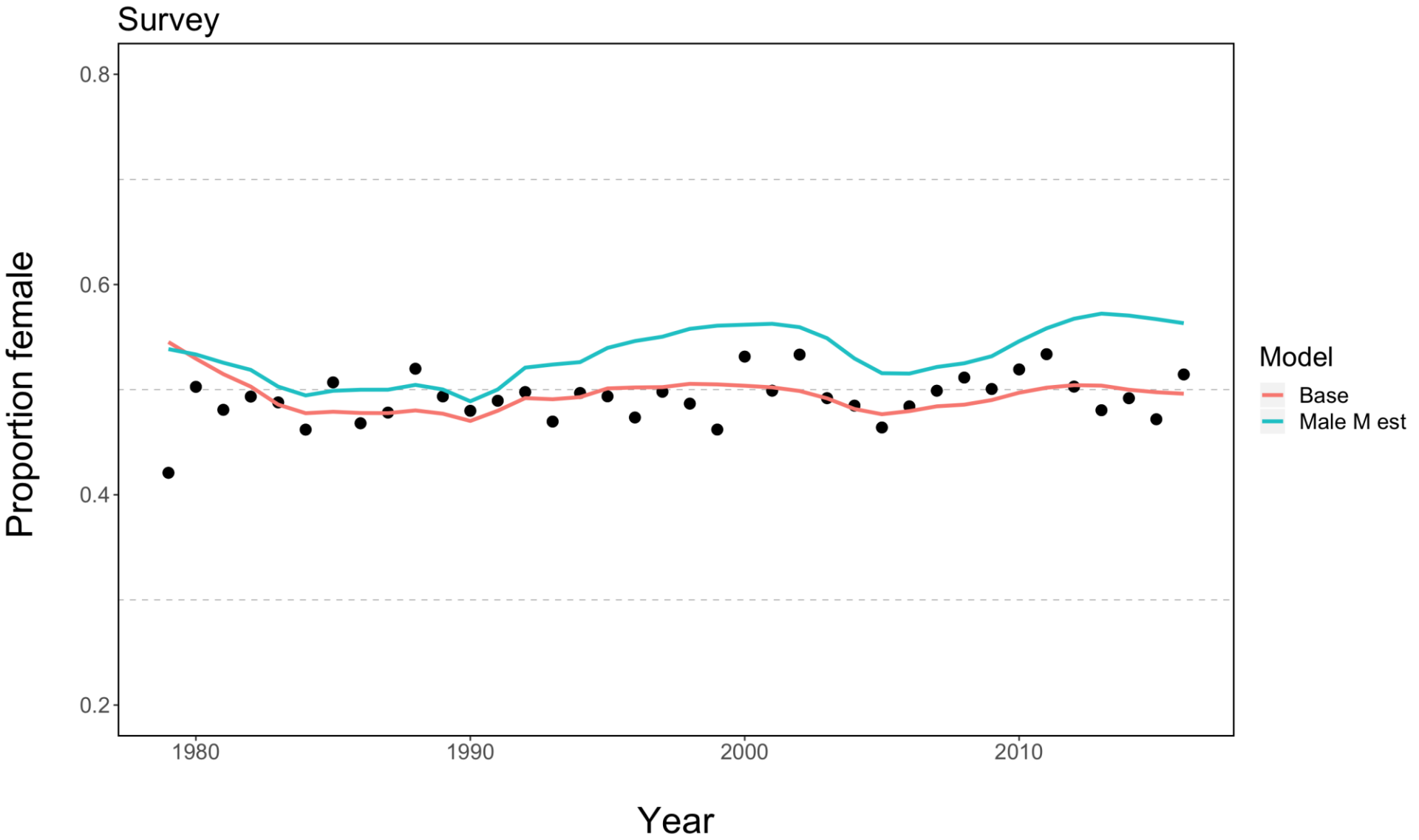


So…why survey sex ratio different?

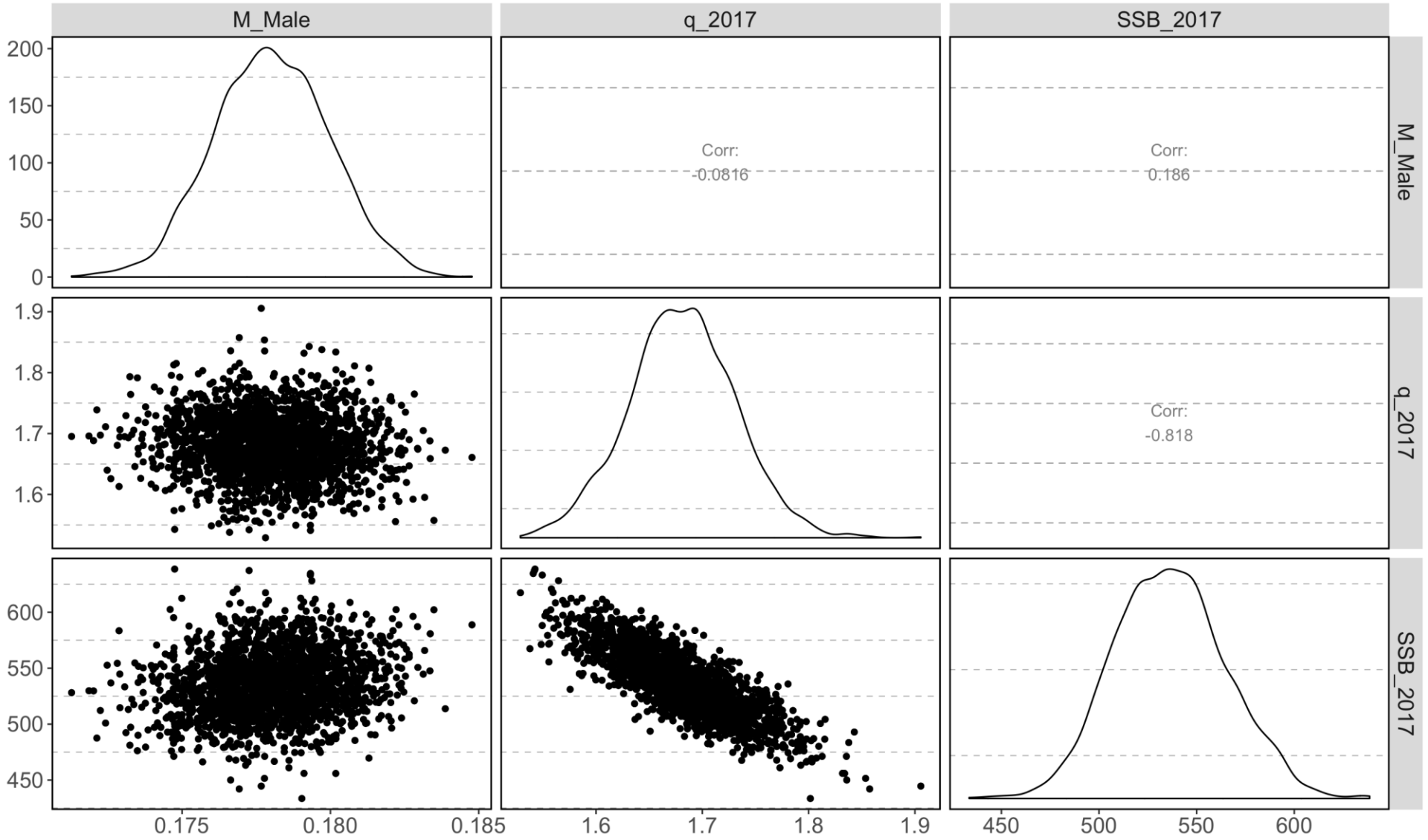
Estimated population sex ratio



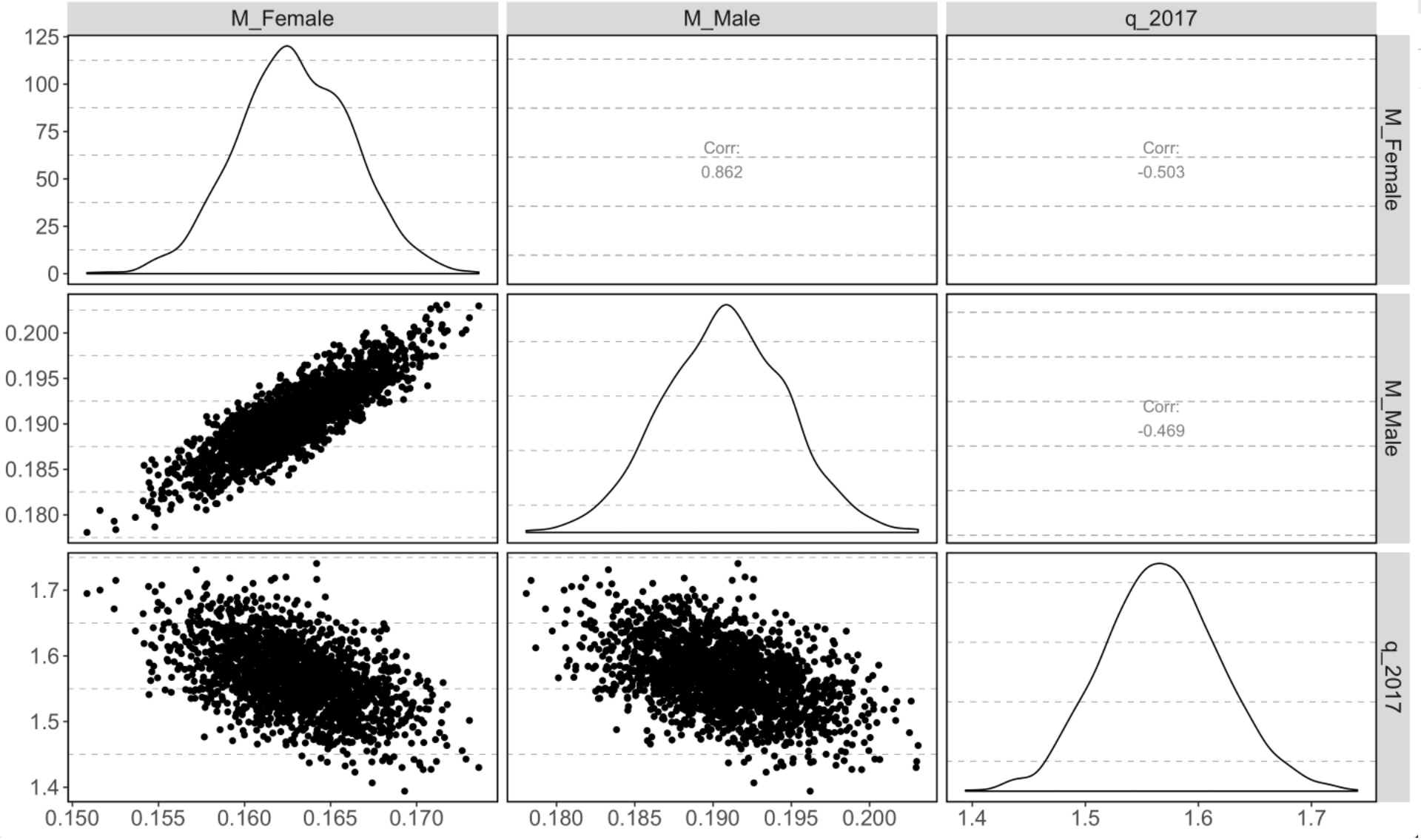

Fishery
Proportion female
0.8
0.6
0.4
0.2
1980
1990
2000
2010
Year
Model
Base
Male M est


Survey
Proportion female
0.8
0.6
0.4
0.2
1980
1990
2000
2010
Year
Model
Base
Male M est

Q vs M? –Male M estimated

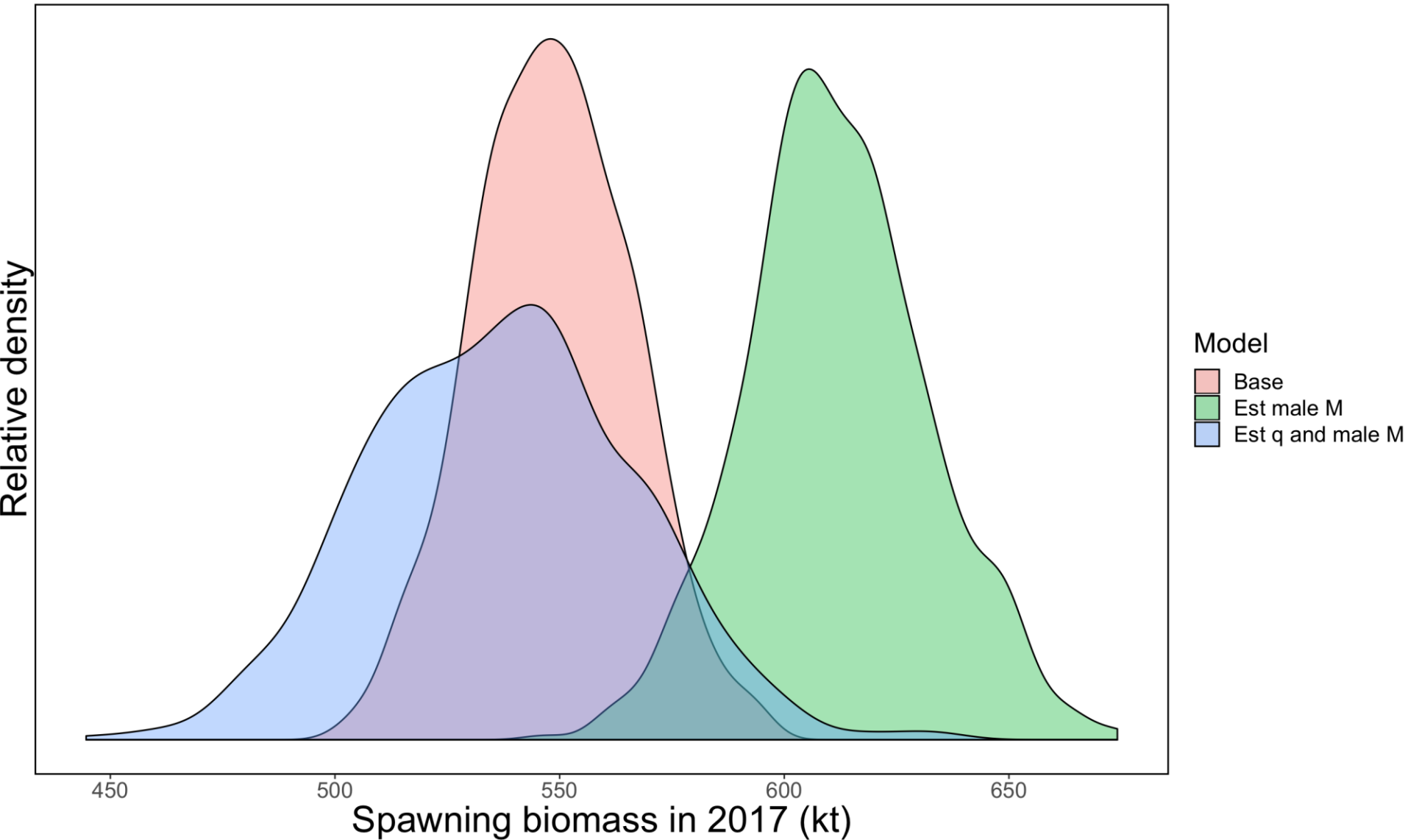


Q vs M? Male and Female M estimated

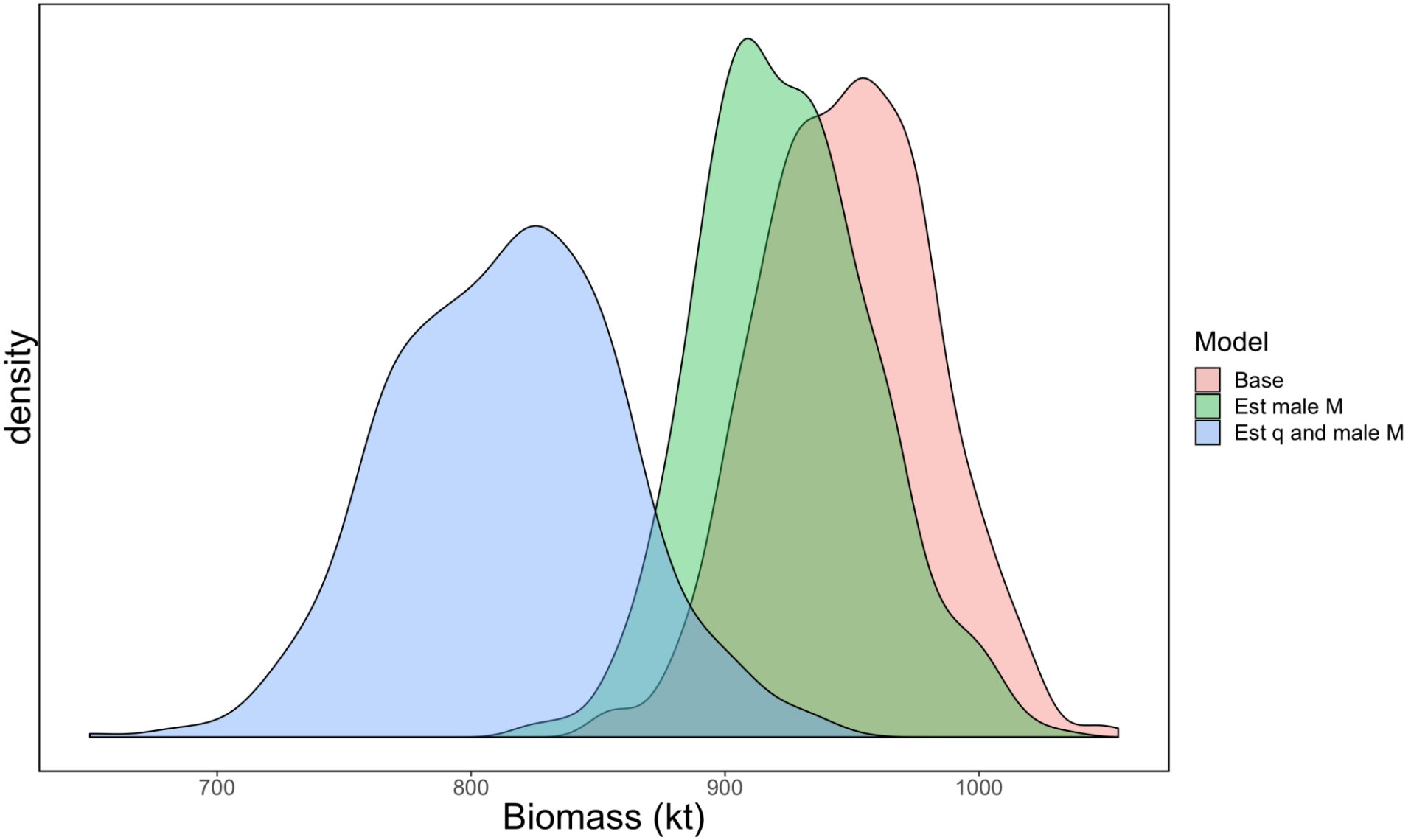


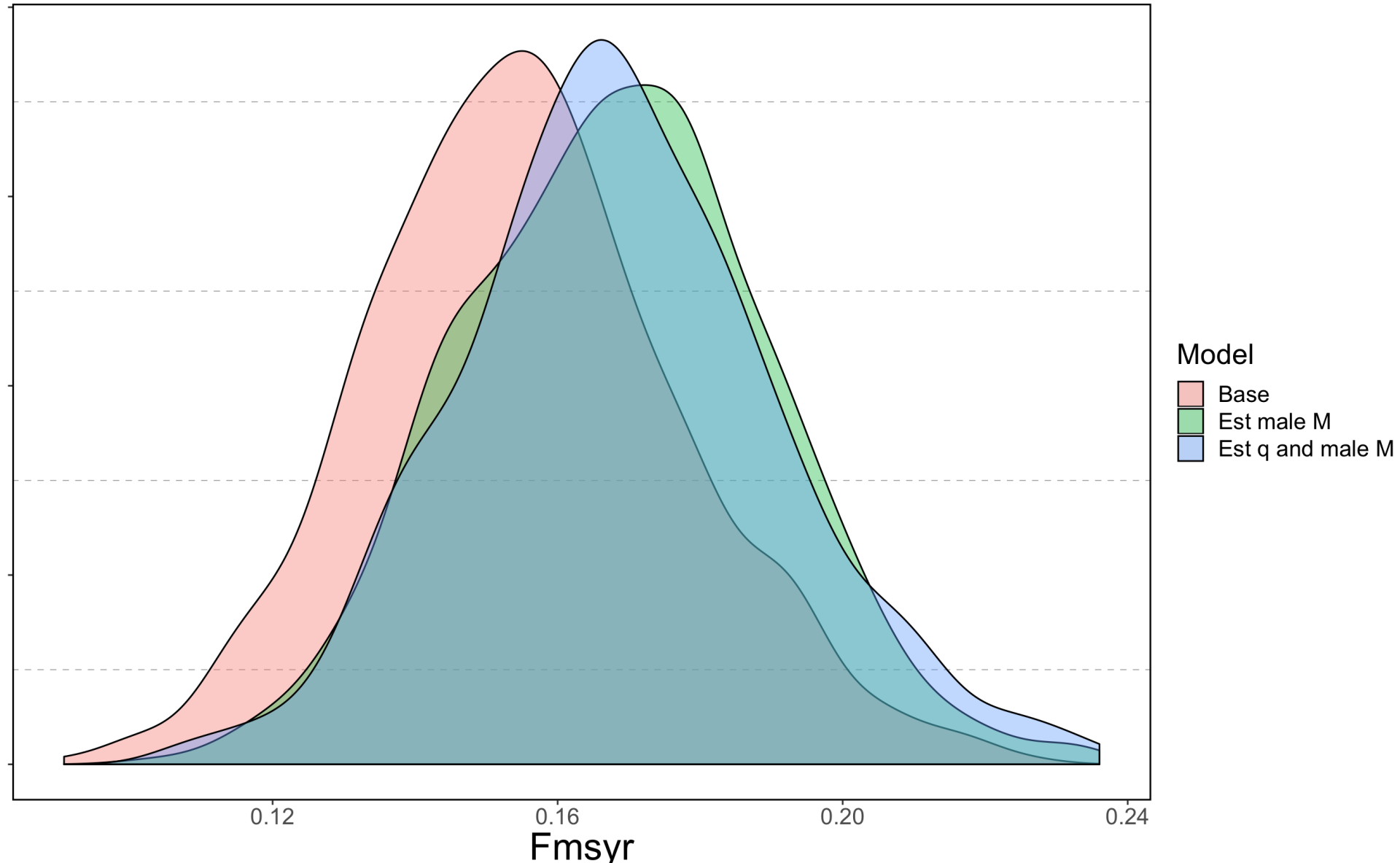
Back to ensembling…

Female spawning biomass (kt)



Biomass of 7+ N. rock sole




0.12
0.16
0.20
0.24
Fmsyr
Model
Base
Est male M
Est q and male M

ABC calculation review

- Present day:
  - Based on analytical formulae and Delta method estimate of variance
- Alternative
  - Use MCMC posterior estimate
  - Can facilitate

Do buffers change?

ABCs from MCMC individual models (and combined)

	FOFL	FABC	Biomass	ABC	OFL	Buffer
Base	0.156	0.152	948	144	147	2.1%
Estimate Male M	0.169	0.166	924	153	156	1.7%
Estimate Male M, q	0.169	0.166	812	135	137	1.9%
“Stacked” ensemble	0.164	0.161	893	143	147	2.3%
Mean point estimates	0.165	0.161	895	144	147	1.8%

Conclusions/questions

- Some of the guidance provided from ensemble meeting was followed
  - Considering models to include
  - Rationale for weights (equal)
  - Evaluating an ensemble versus a single model
  - Easing the calculations
    - MCMCs pretty easy
    - Depart from analytical form used now, but may need more MCMC diagnostics