

An skeleton assessment for Bristol Bay Red King crab in GMACS

Cody Szuwalski & Matthieu Veron

June 2022 - GMACS version 2.01.K

Contents

A. Summary of Major Changes

B. Comments, responses, and assessment summary

C. Introduction

Distribution	
Life history characteristics	
Natural mortality	
Weight at length	
Maturity	
Molting probability	
Reproduction	
Growth	
Management history	
ADFG harvest strategy	
History of BMSY	
Fishery history	

D. Data

Catch data	
Survey biomass and size composition data	
Spatial distribution	

E. Analytic approach

History of modeling approaches	
Model description	
Model selection and evaluation	
Results	
Fits to data	
Estimated population processes and derived quantities	

F. Calculation of the OFL

Methodology of the OFL	
Calculated OFLs and interpretation	
Projections under harvest strategies	

G. Calculation of the ABC

Uncertainty in the ABC	
Author recommendations	

H. Data gaps and research priorities

Methodology	
Data sources	
Scientific uncertainty	

I. Ecosystem considerations

Appendix A: Population dynamics

1. Stock: Bristol Bay red king crab.
2. Catches: trends and current levels
3. Stock Biomass:
4. Recruitment

5. Management
6. Basis for the OFL
7. Probability Density Function of the OFL
8. Basis for ABC

A. Summary of Major Changes

1. Management: None
2. Input data:
3. Assessment methodology:
4. Assessment results

Notes:

B. Comments, responses, and assessment summary

C. Introduction

Distribution

Life history characteristics

Natural mortality

Weight at length

Maturity

Molting probability

Reproduction

Growth

Management history

ADFG harvest strategy

History of BMSY

Fishery history

D. Data

Catch data

Survey biomass and size composition data

Spatial distribution

E. Analytic approach

History of modeling approaches

Model description

Model selection and evaluation

Results

Fits to data

Estimated population processes and derived quantities

F. Calculation of the OFL

Methodology of the OFL

Calculated OFLs and interpretation

Projections under harvest strategies

G. Calculation of the ABC

Uncertainty in the ABC

Author recommendations

H. Data gaps and research priorities

Methodology

Data sources

Scientific uncertainty

I. Ecosystem considerations

Appendix A: Population dynamics

Table 1: Changes in management quantities for each scenario considered. Reported management quantities are derived from maximum likelihood estimates.

Model	MMB	B35	F35	FOFL	OFL
Version 2.01.E	14025.96	2991.975	0.880	0.880	8342.826
Version 2.01.F	14025.96	2991.975	0.880	0.880	8342.826
Version 2.01.G	14025.96	2991.975	0.880	0.880	8342.826
Version 2.01.H	14025.96	2991.975	0.880	0.880	8342.826
Version 2.01.I	14025.96	22512.179	0.299	0.186	2425.493
Version 2.01.K	14025.96	22512.179	0.299	0.186	2425.493

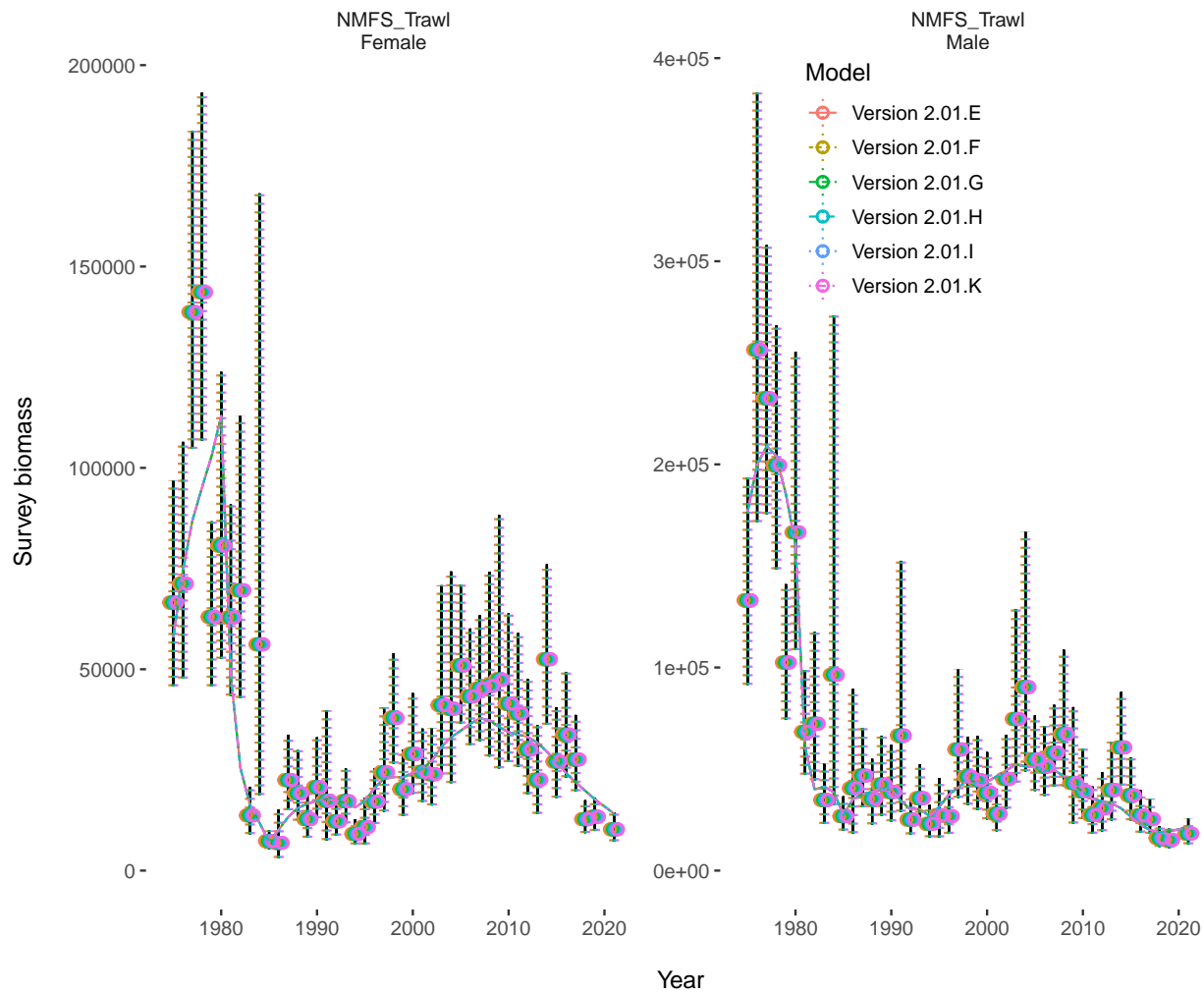


Figure 1: Model fits to the NMFS trawl survey.

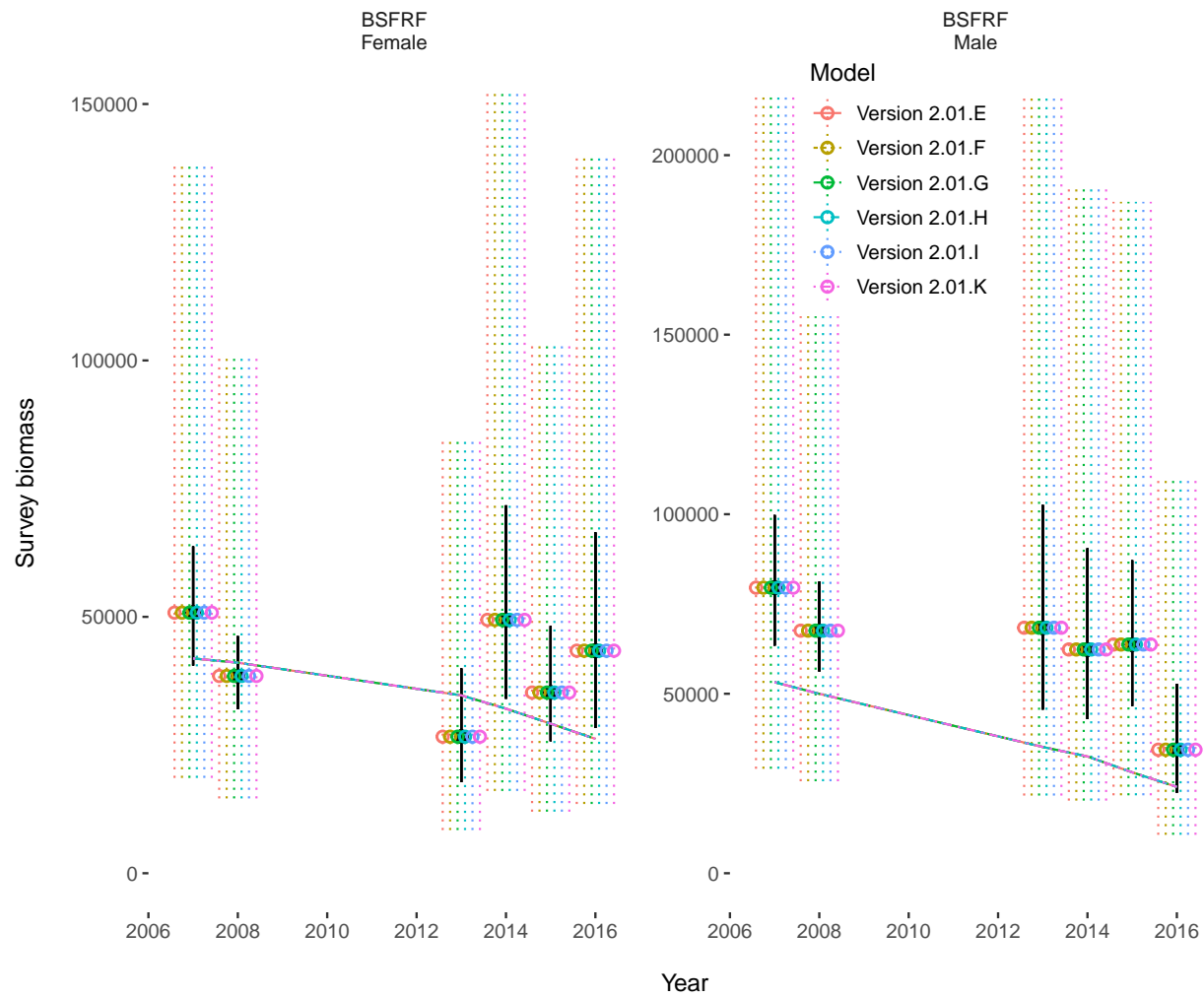


Figure 2: Model fits to the BSFRF survey.

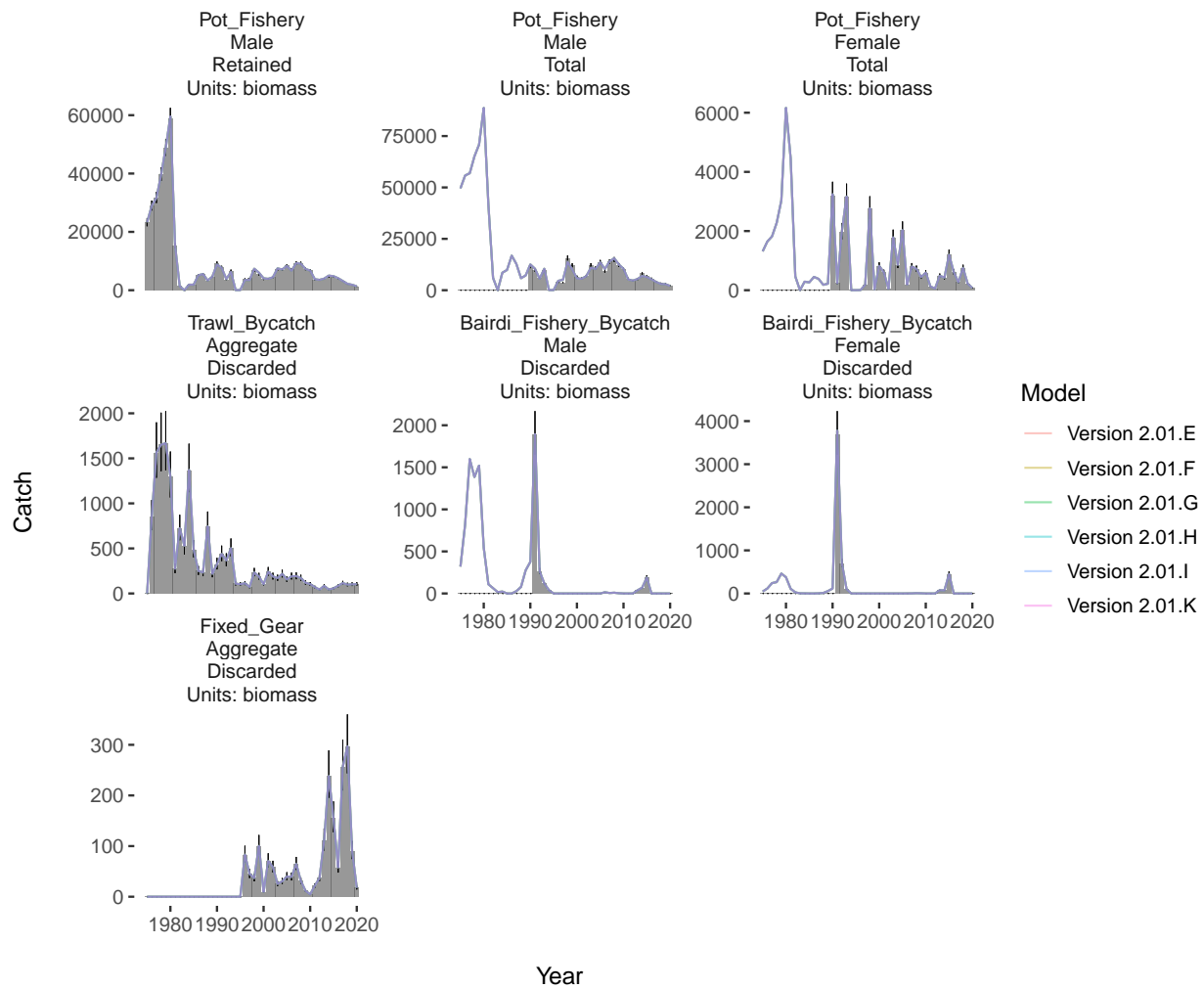


Figure 3: Model fits to the catch data.

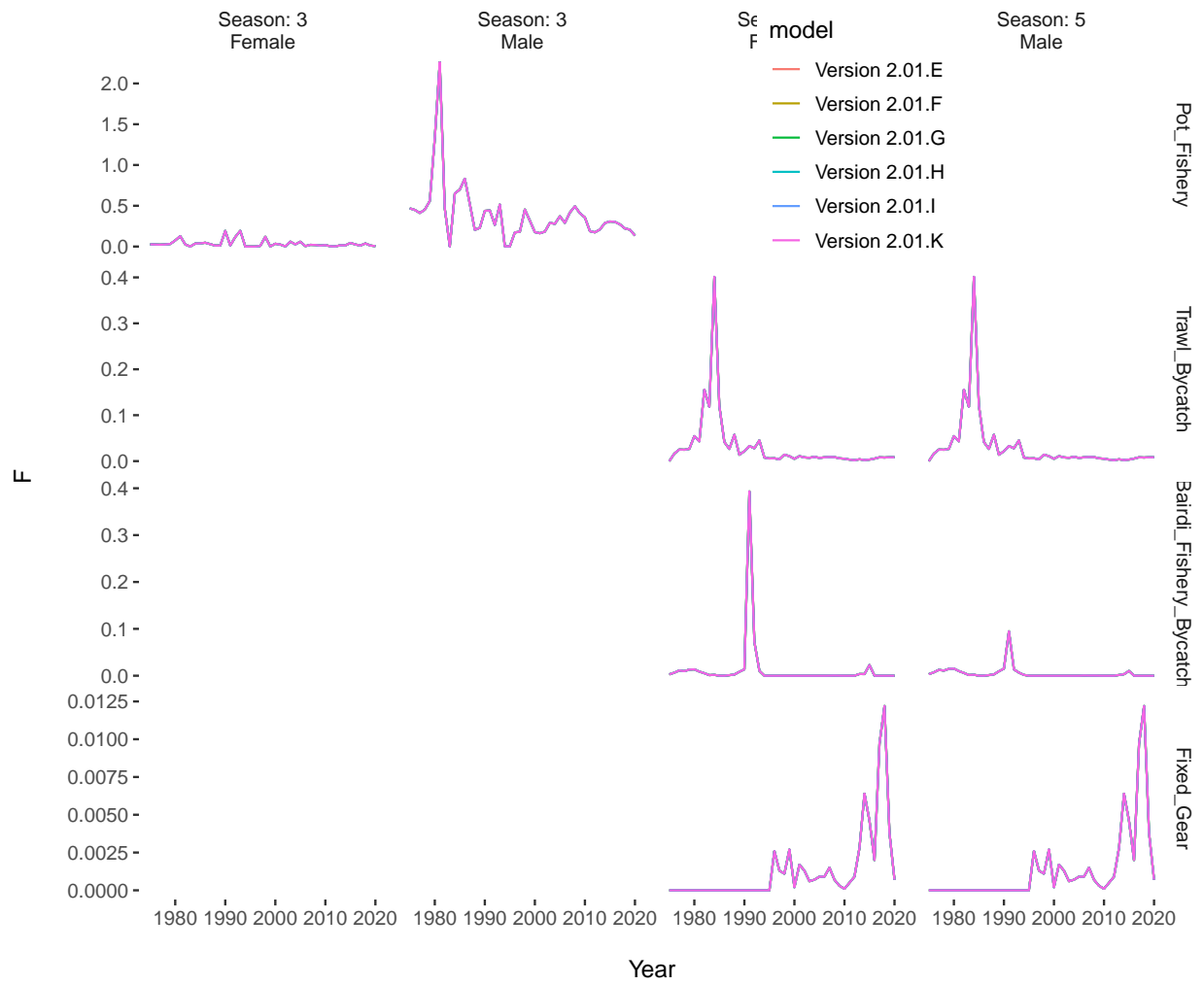


Figure 4: Estimated fishing mortality by fleet.

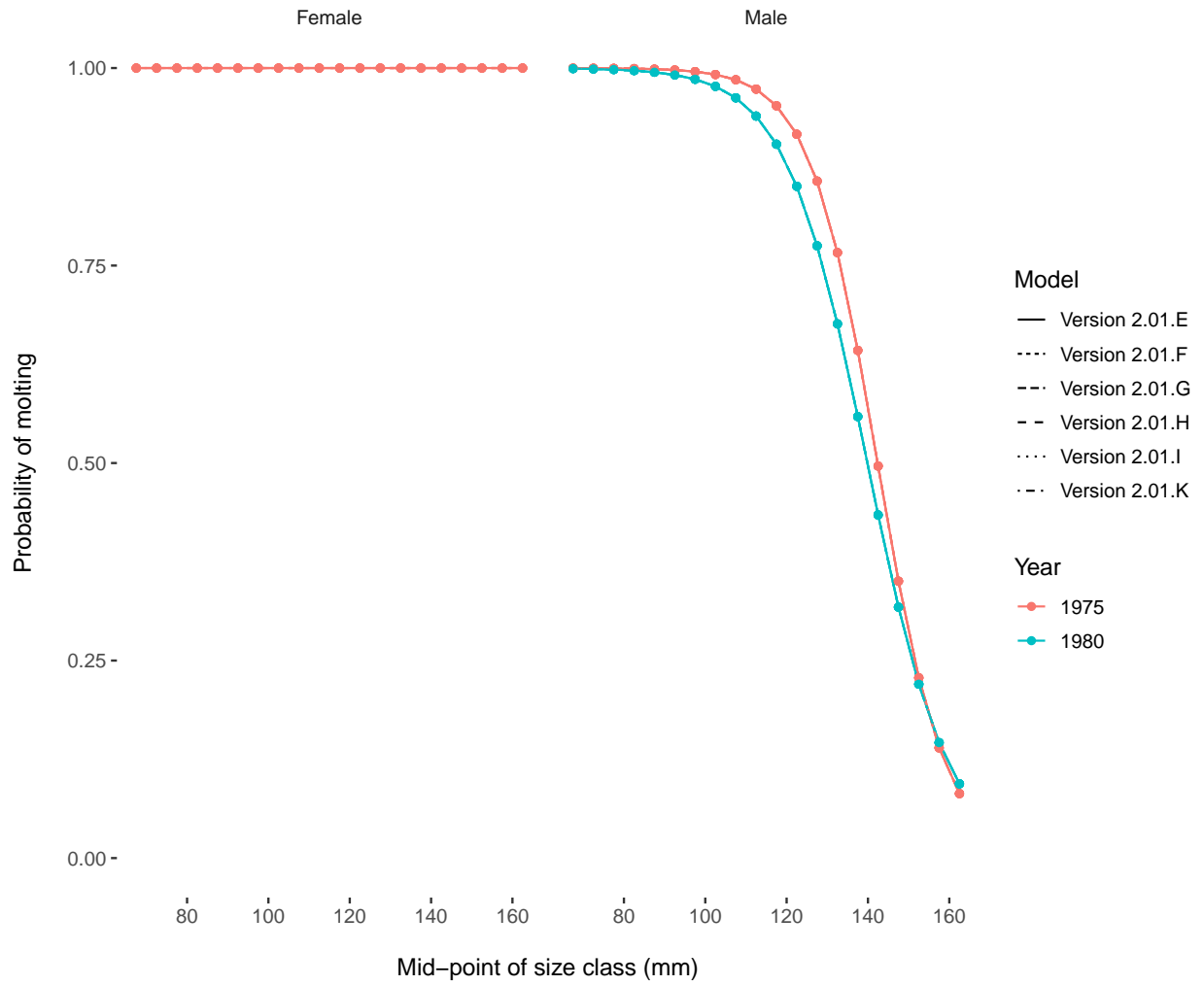


Figure 5: Estimated probability of molting.

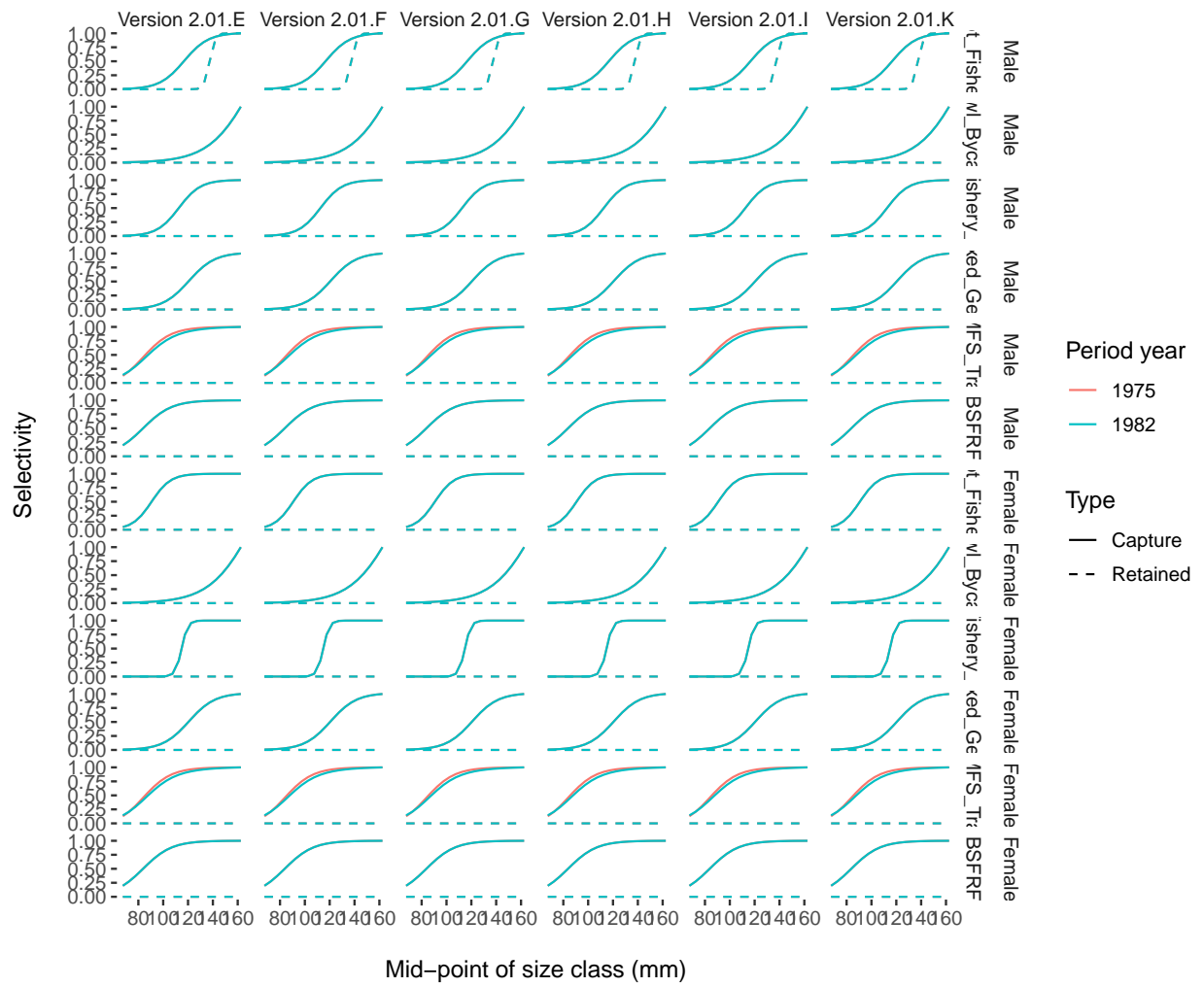


Figure 6: Estimated selectivity.

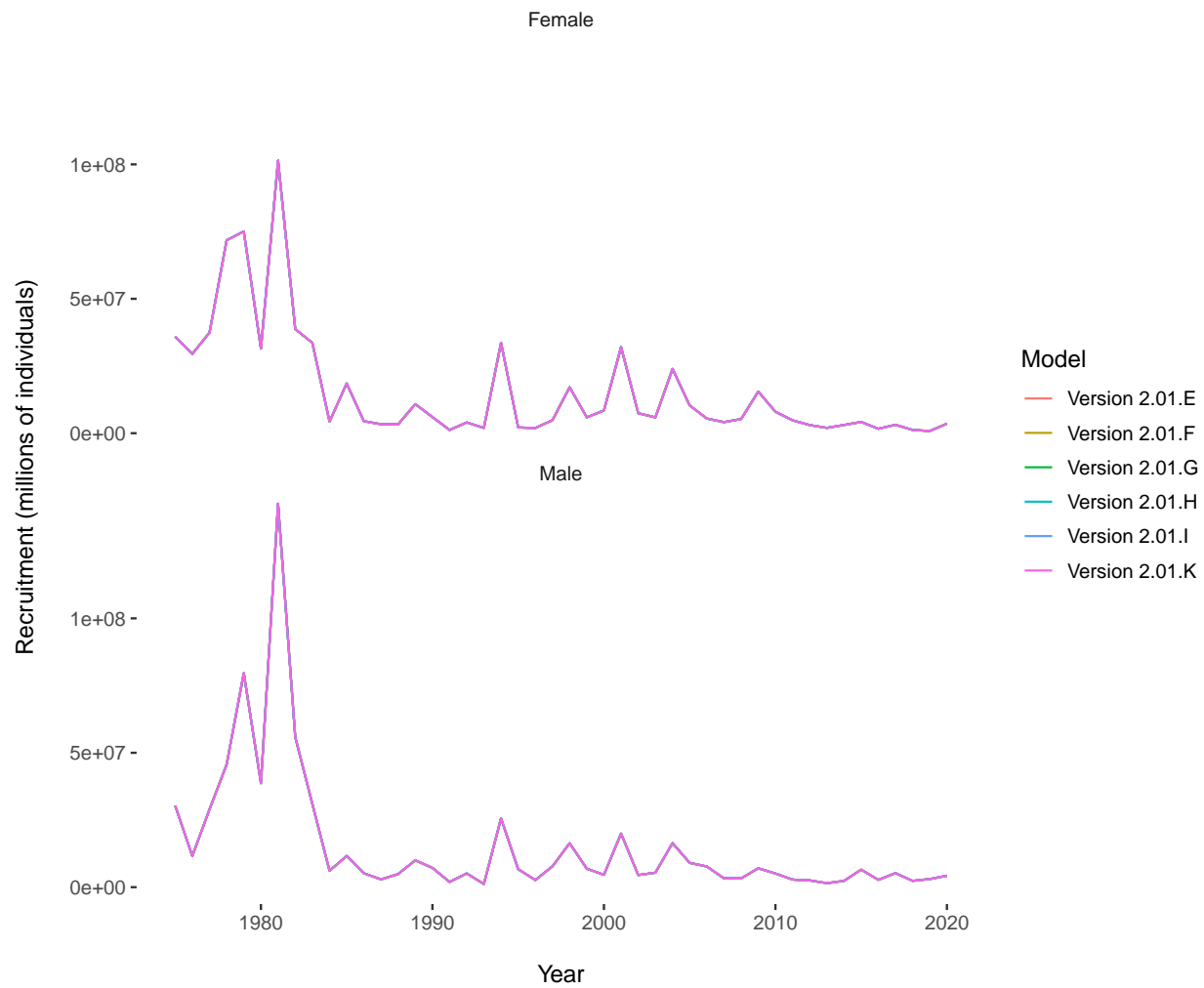


Figure 7: Estimated recruitment.

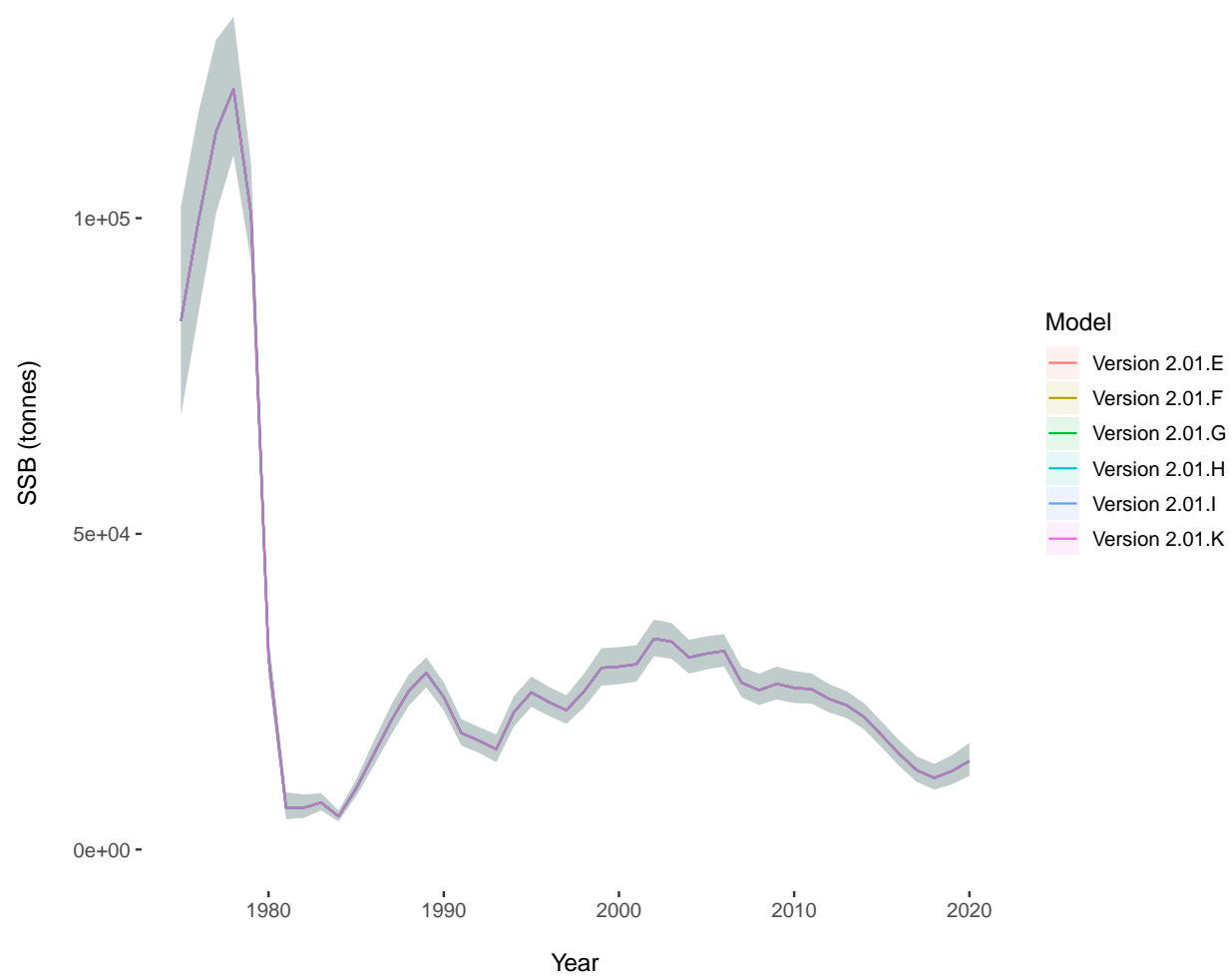


Figure 8: Estimated mature biomass

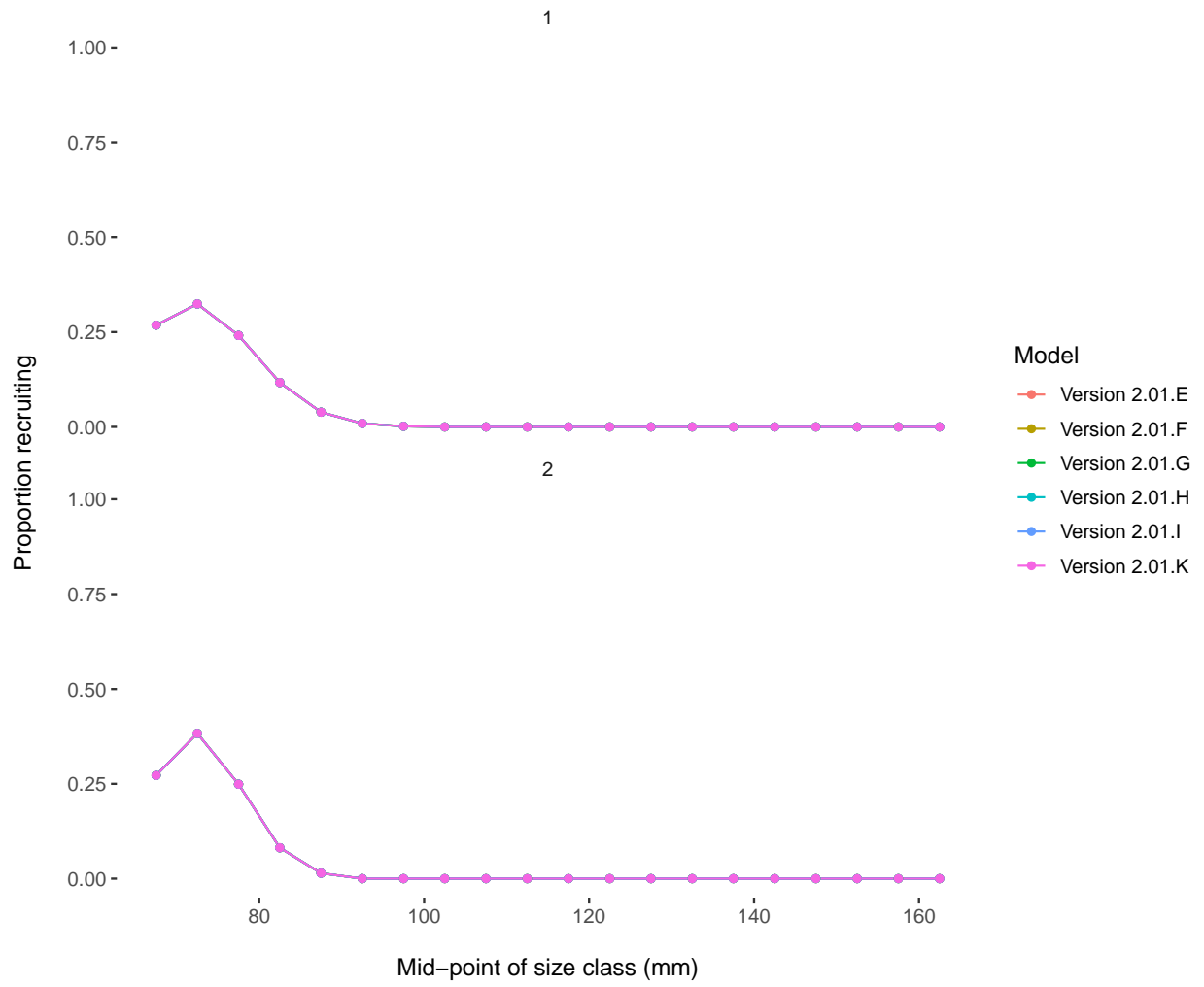


Figure 9: Estimated size at recruitment

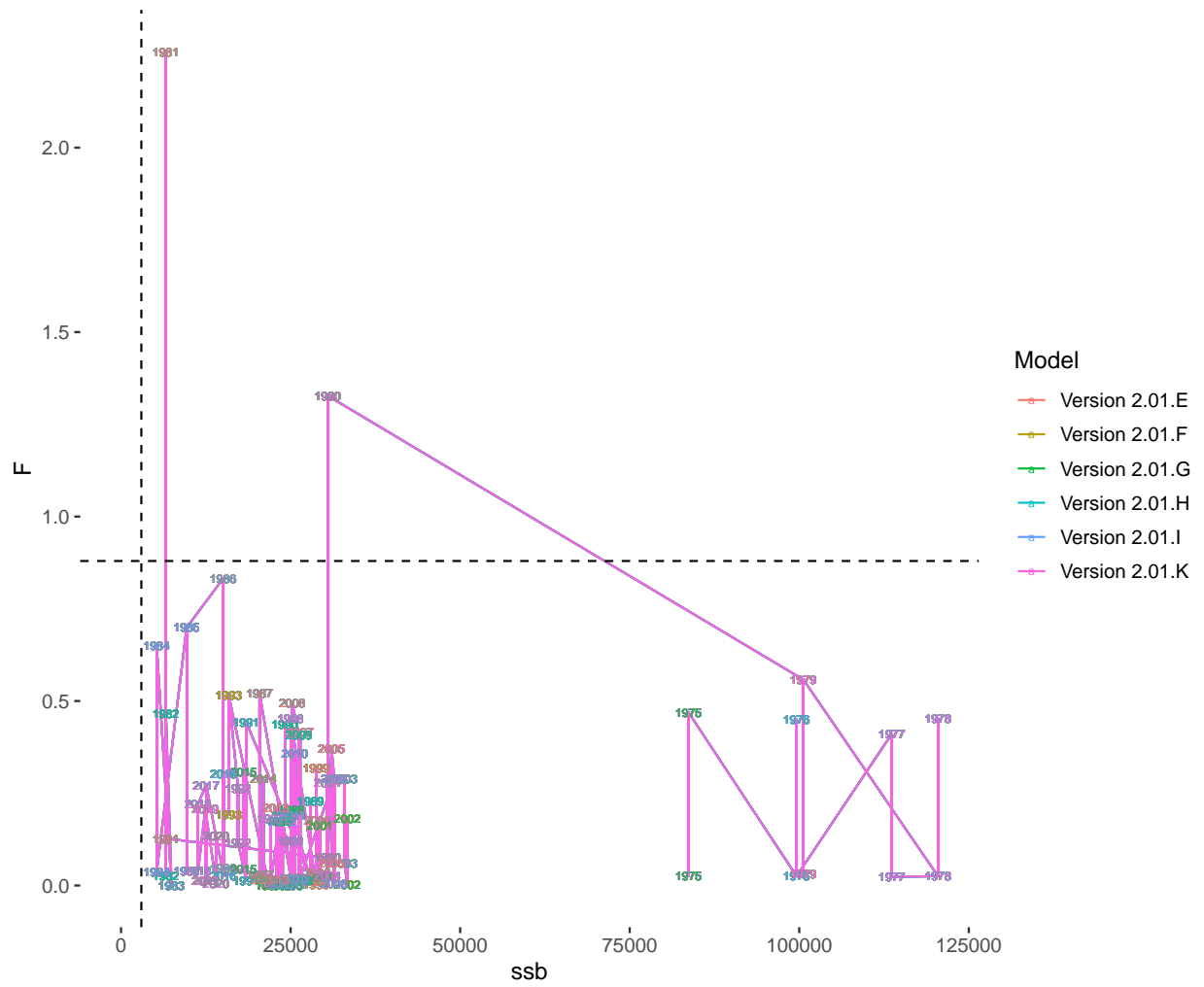


Figure 10: Kobe plot for the Pot Fishery fleet.