

# Comp1: Comparison with 2014 assessments

ABT-MSE Operating model fitting report

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*July 13, 2017*

**Operating model scenario is:**

Base operating model

**Area definitions for operating model:**

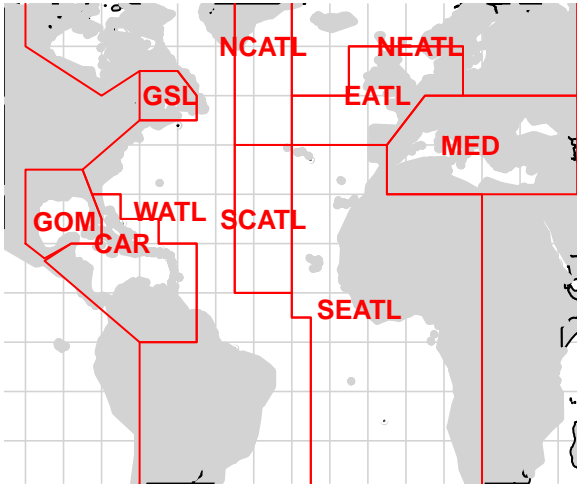


Figure 1. Area definitions for operating model

# Fits to CPUE indices of relative abundance

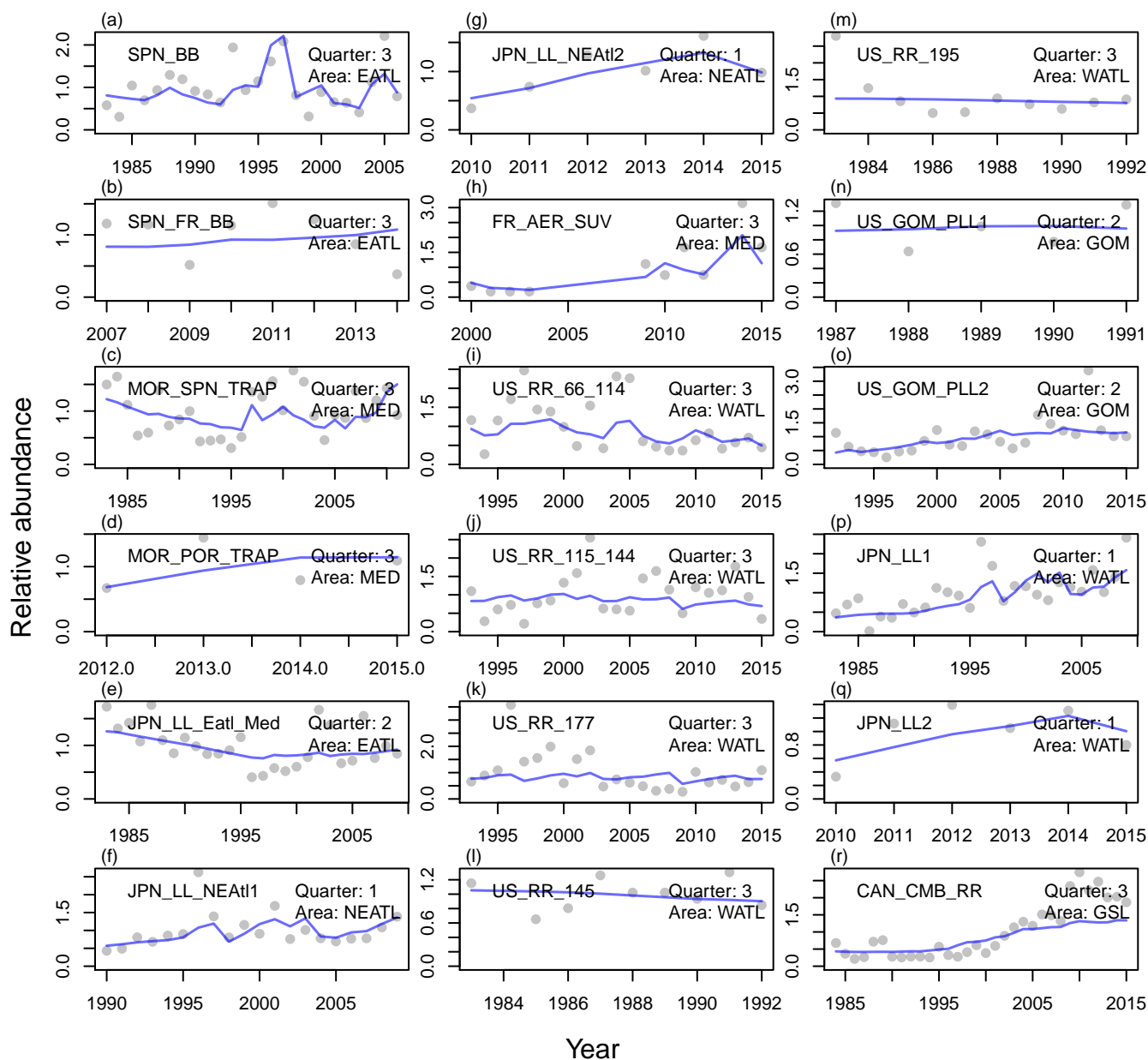


Figure 2. Assessment CPUE index fits (blue line = predicted, grey dots = index)

Tracking of ‘master’ abundance indices (for generating standardized effort, partial Fs)

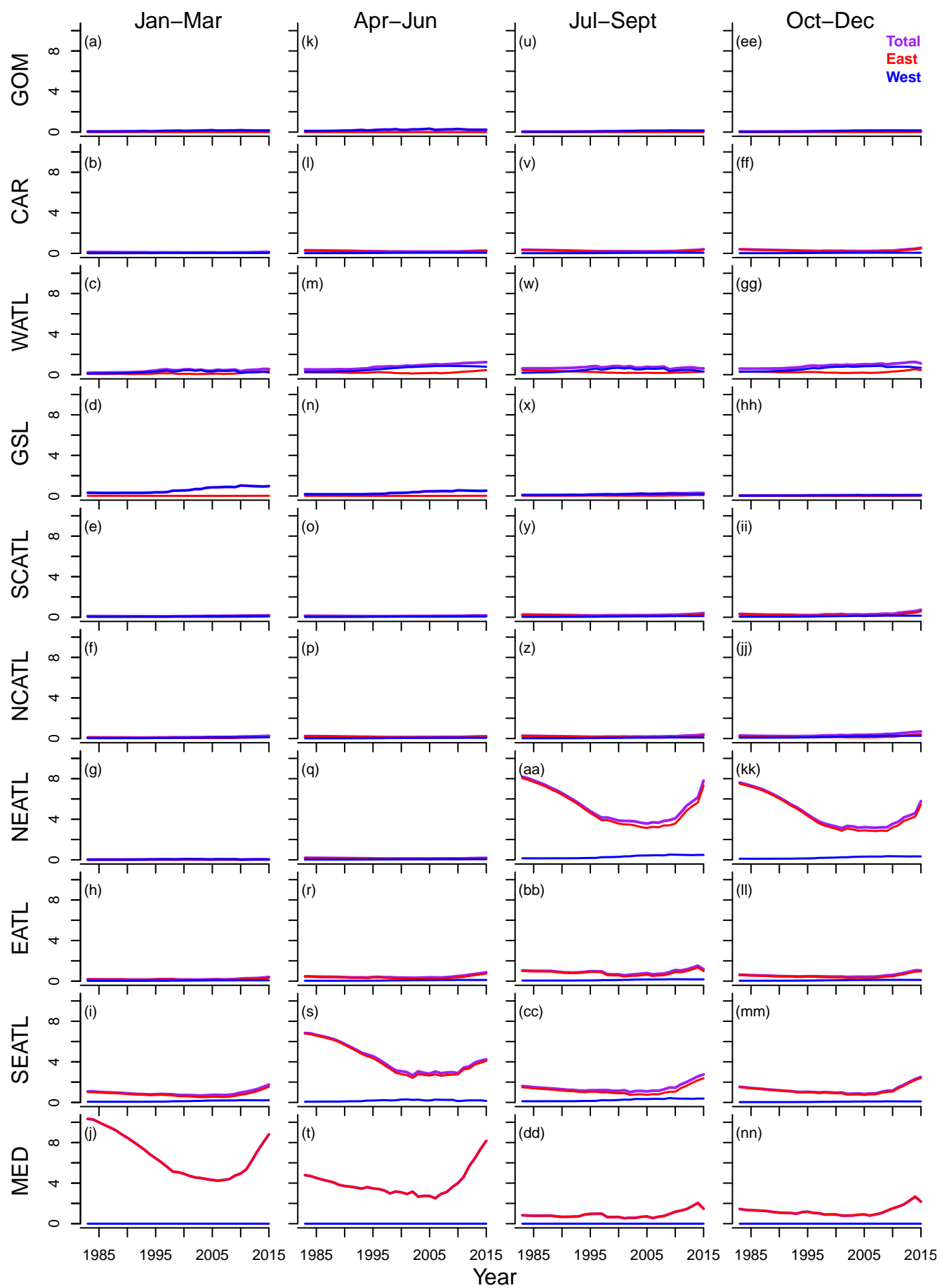


Figure 3. Predicted seasonal and spatial biomass of Atlantic bluefin tuna.

# SSB, recruitment and F comparison with 2014 assessment (by East/West area, not East/West stock)

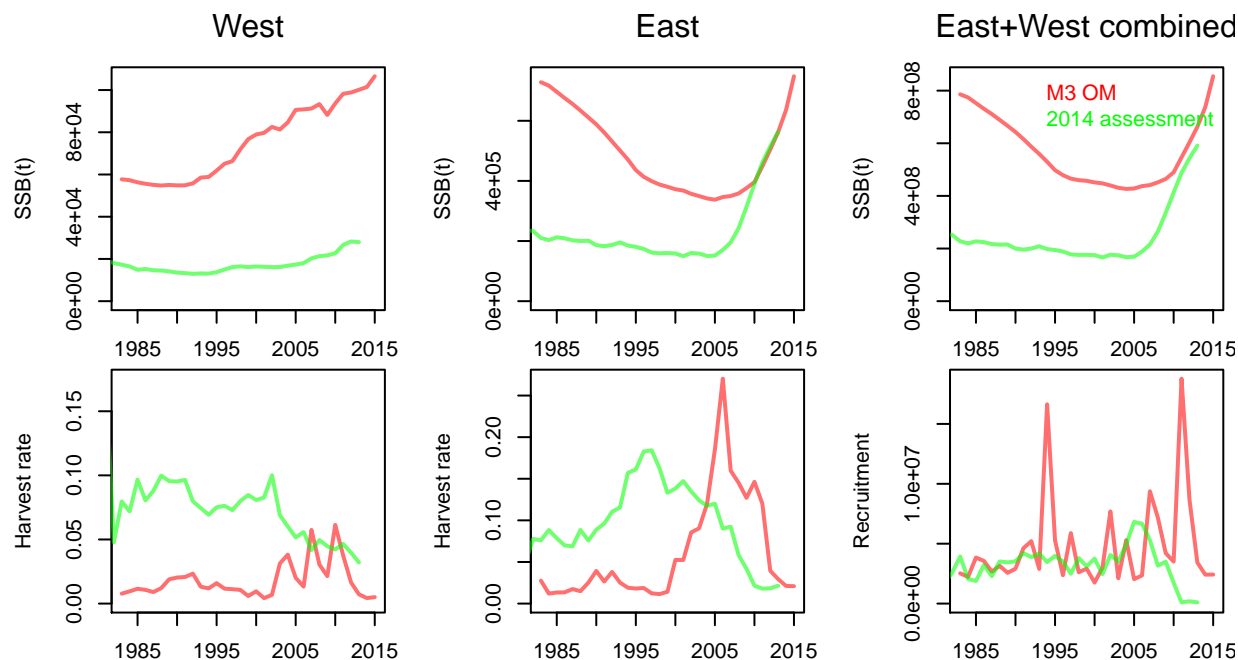


Figure 3. Regional comparisons (45deg W) with 2014 stock assessment. Note that annual estimates from the operating model are calculated from average of the seasonal predictions. Harvest rates from the operating model are based on total stock biomass not vulnerable biomass which is fleet specific (and hence may not be comparable with assessments).

## Stock-recruitment relationships (by East/West stock)

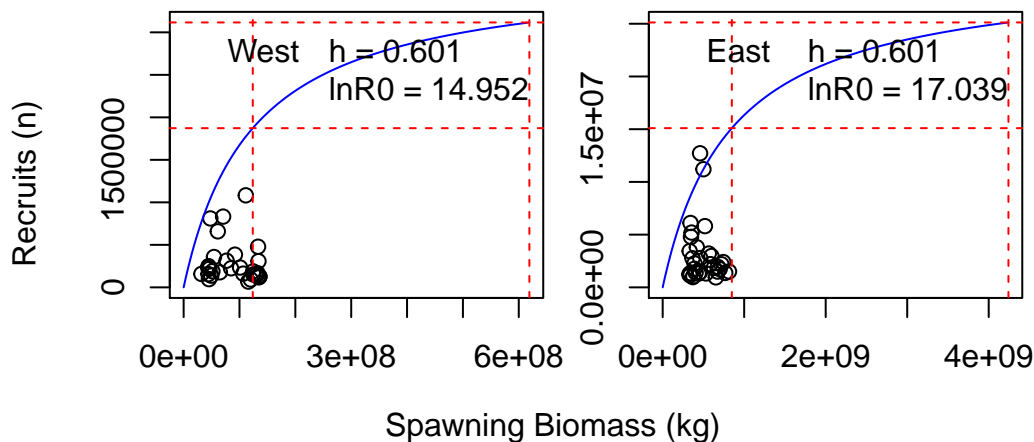


Figure 4. Model predicted pairs of SSB and recruitment (with a fitted Bev Holt for illustration)

## MSY reference points (by East/West stock)

Table 1. Reference points by stock.

	MSY	FMSY <sub>ap</sub>	UMSY	BMSY	SSBMSY	BMSY_B0	SSBMSY_SSB0	RMSY_R0	F_FMSY	SSB_SSBMS
East	173934	0.238	0.060	2900992	2544104	0.375	0.350	0.765	0.031	0.2
West	36342	0.315	0.077	473750	439871	0.422	0.408	0.806	0.031	0.2

2014 Assessment MSY reference points (by East/West area)

Table 2. Where available, reference points from most recent assessments

	MSY	FMSY <sub>ap</sub>	UMSY	BMSY	SSBMSY	BMSY_B0	SSBMSY_SSB0	RMSY_R0	F_FMSY	SSB_SSBMSY
East	-	-	-	-	-	-	-	-	0.75	0.45
West	3056	0.23	-	-	13268	-	-	-	0.47-0.85	0.35-2.1

Current annual mean F-at-age profile, all fleets, seasons, areas

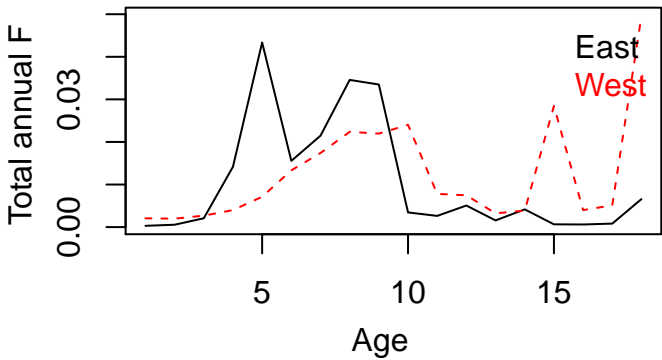


Figure 5. The current profile of F at age summed over all fleets.

Estimated size selectivity by fleet

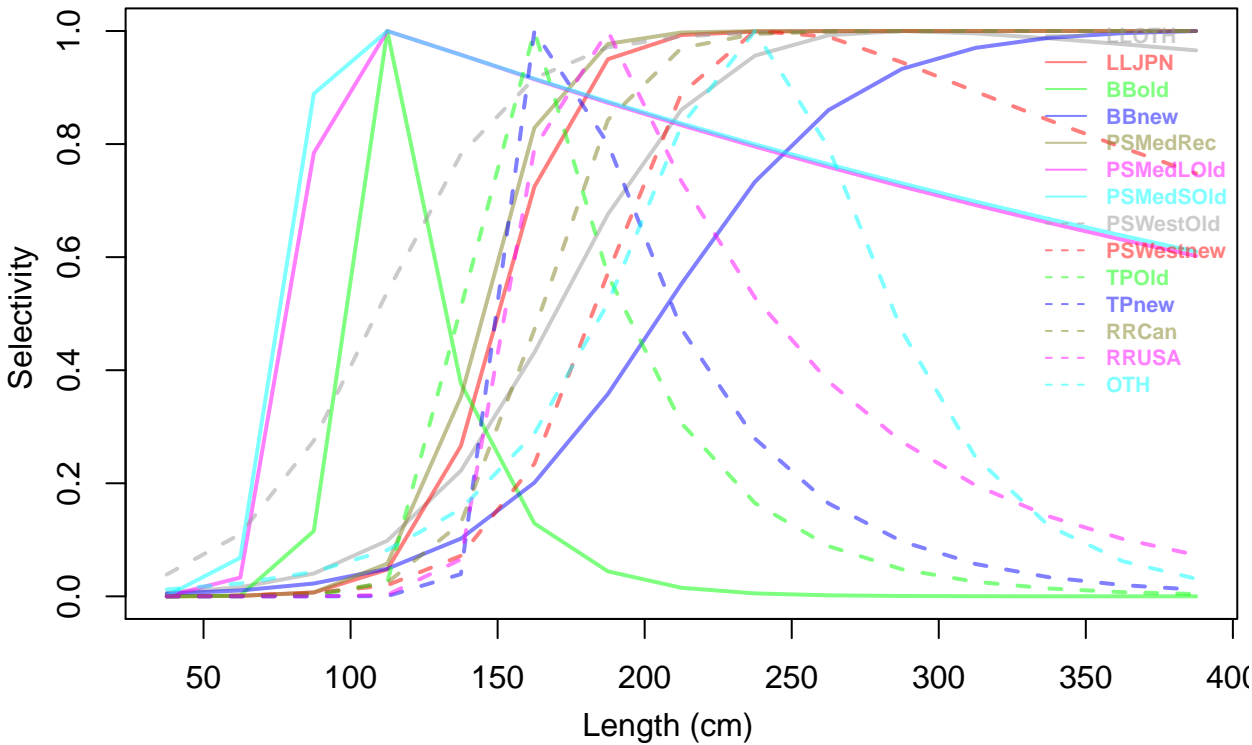


Figure 6.

## Estimated unfished movement and spatial distribution

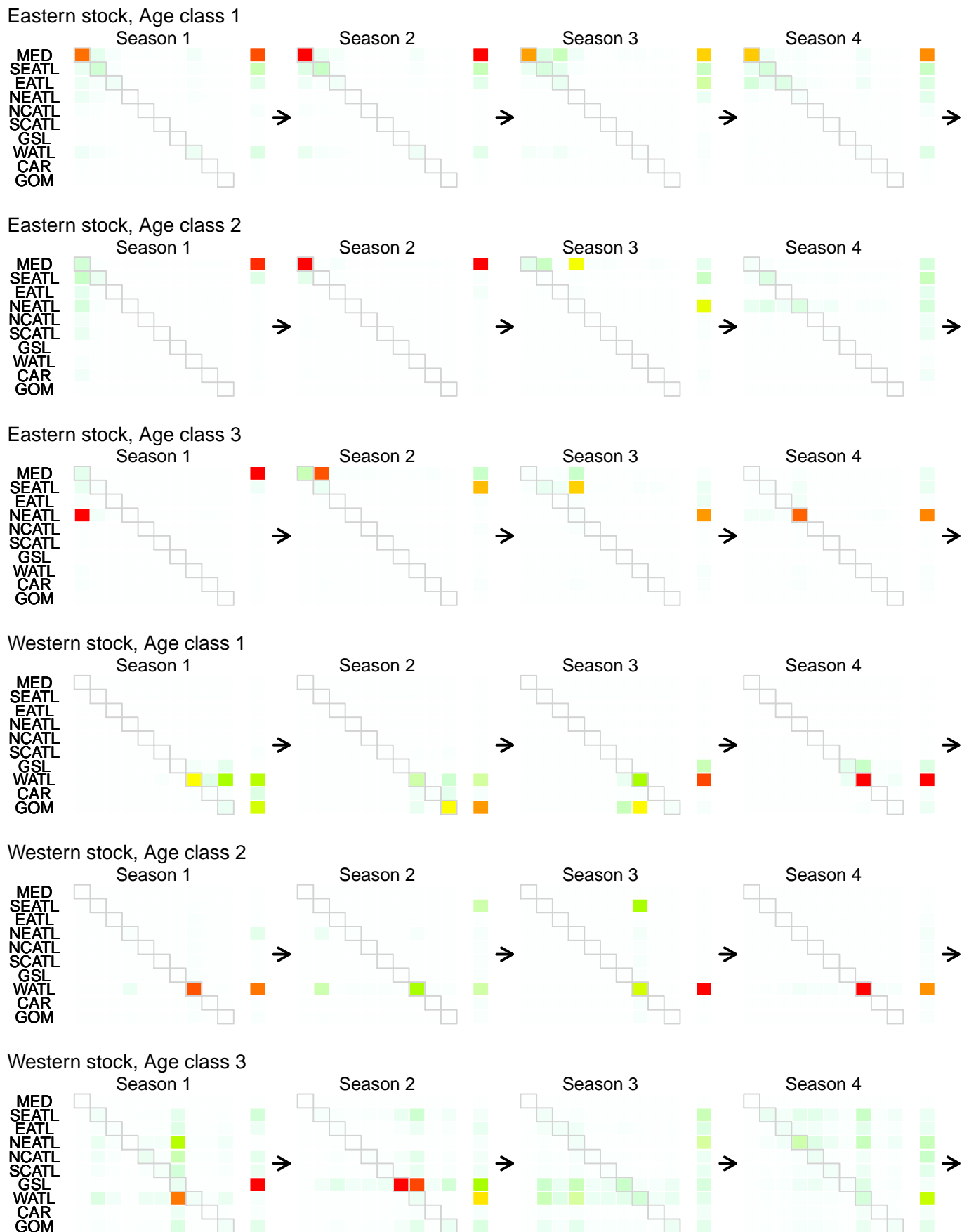


Figure 7. The implied asymptotic distribution of fish under unfished conditions (red-orange-green-white, more to less)

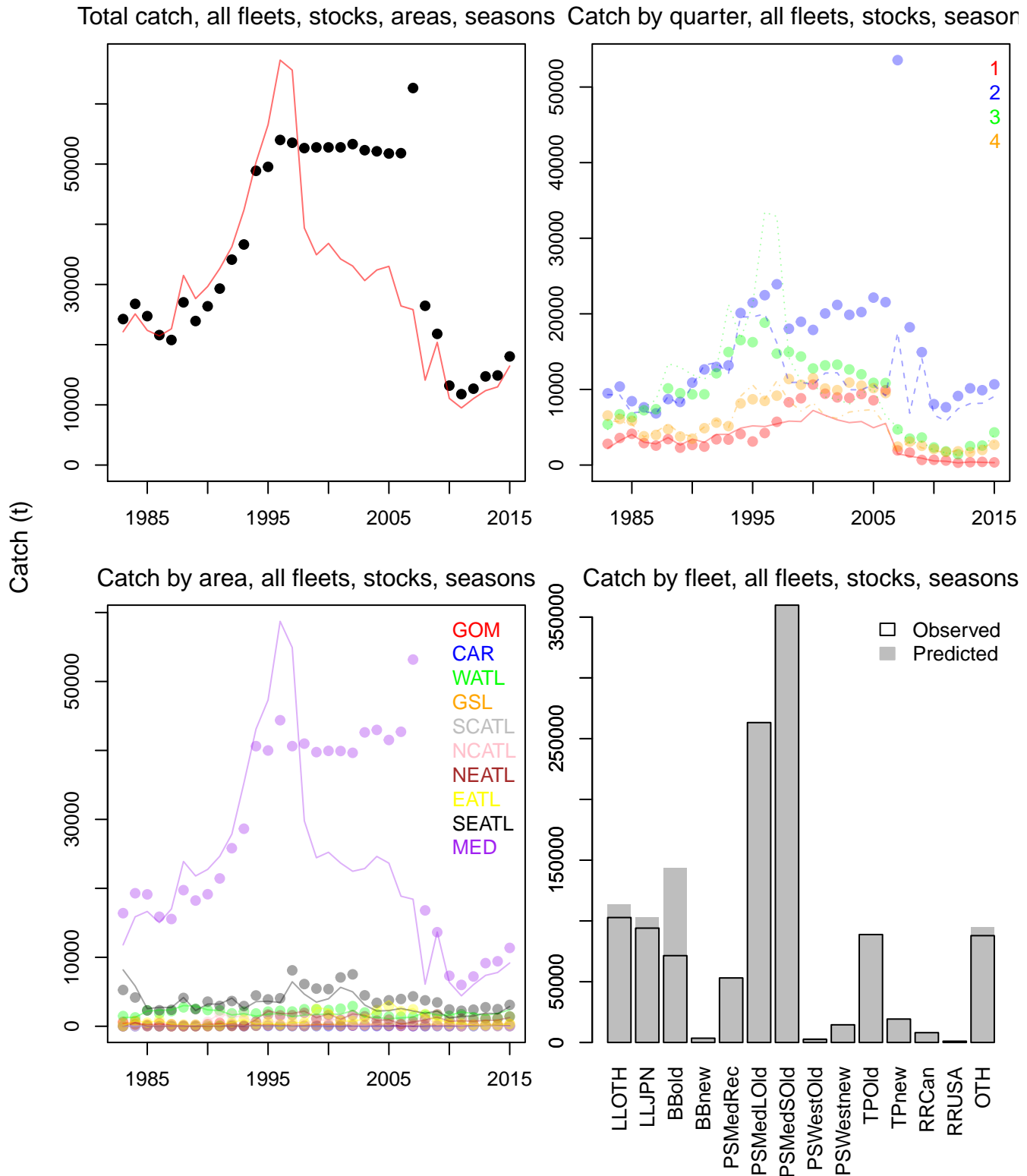


Figure 8. Fit to a observed total catches aggregated over various axes (lines = predicted, points = observed)

# Fit to aggregate length composition

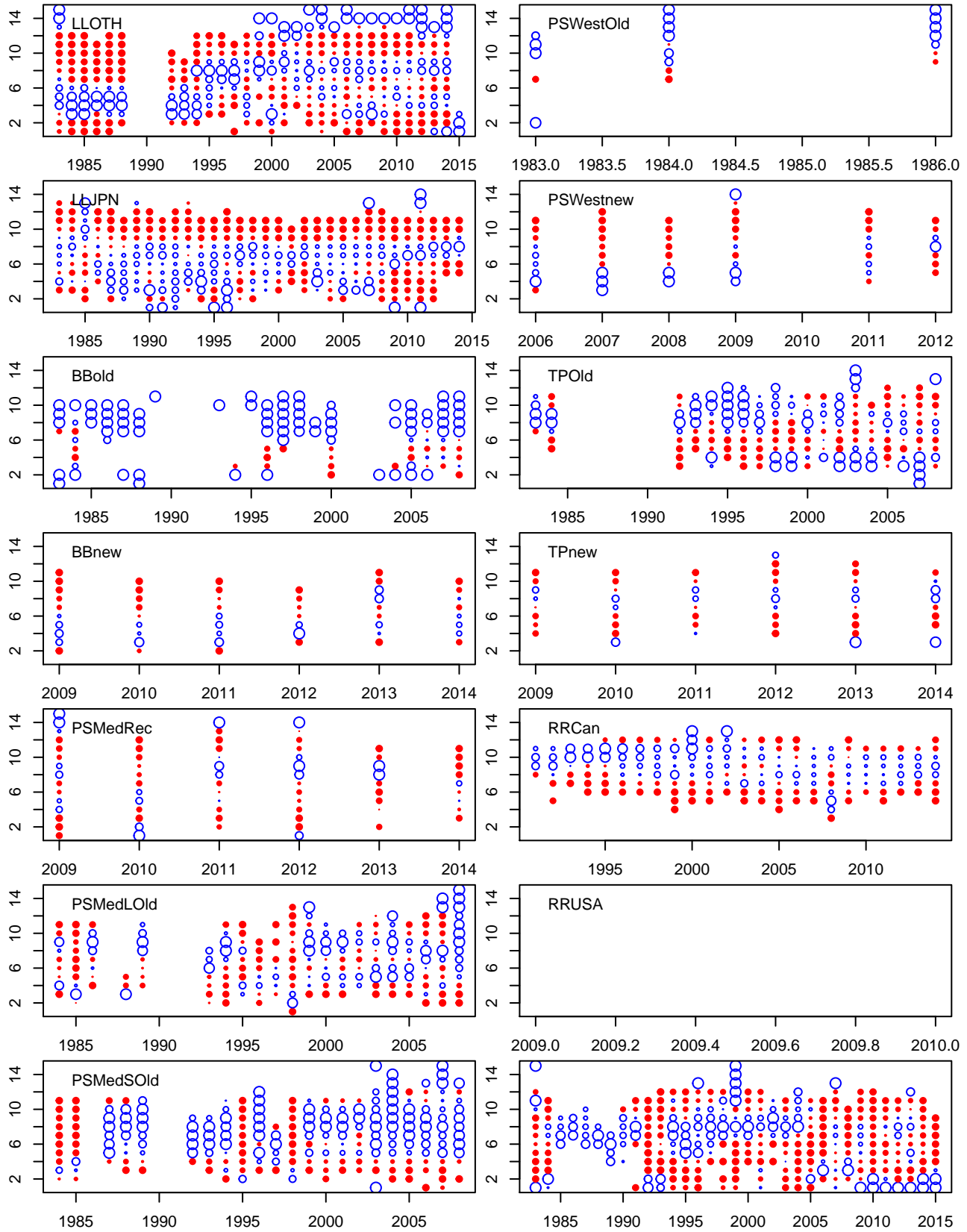


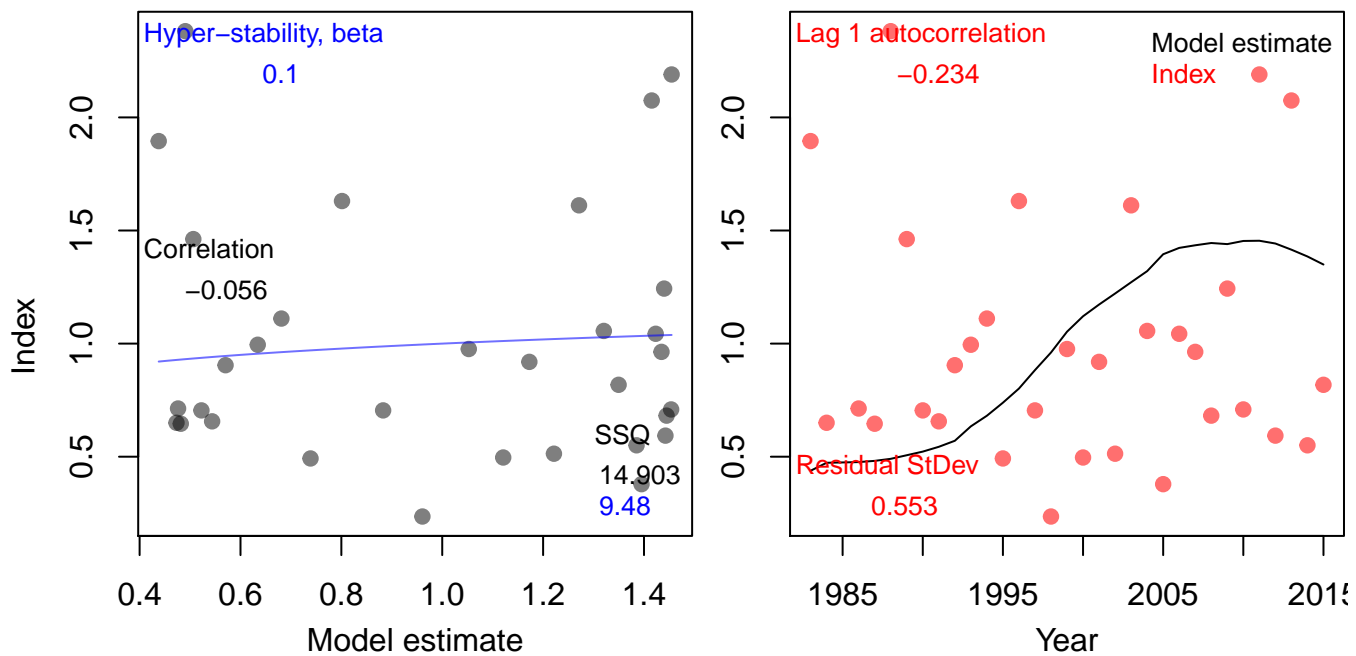
Figure 9. Length composition residuals. Red points are negative Pearson residuals (predicted is higher than observed), blue circles are positive (predicted is lower than observed)



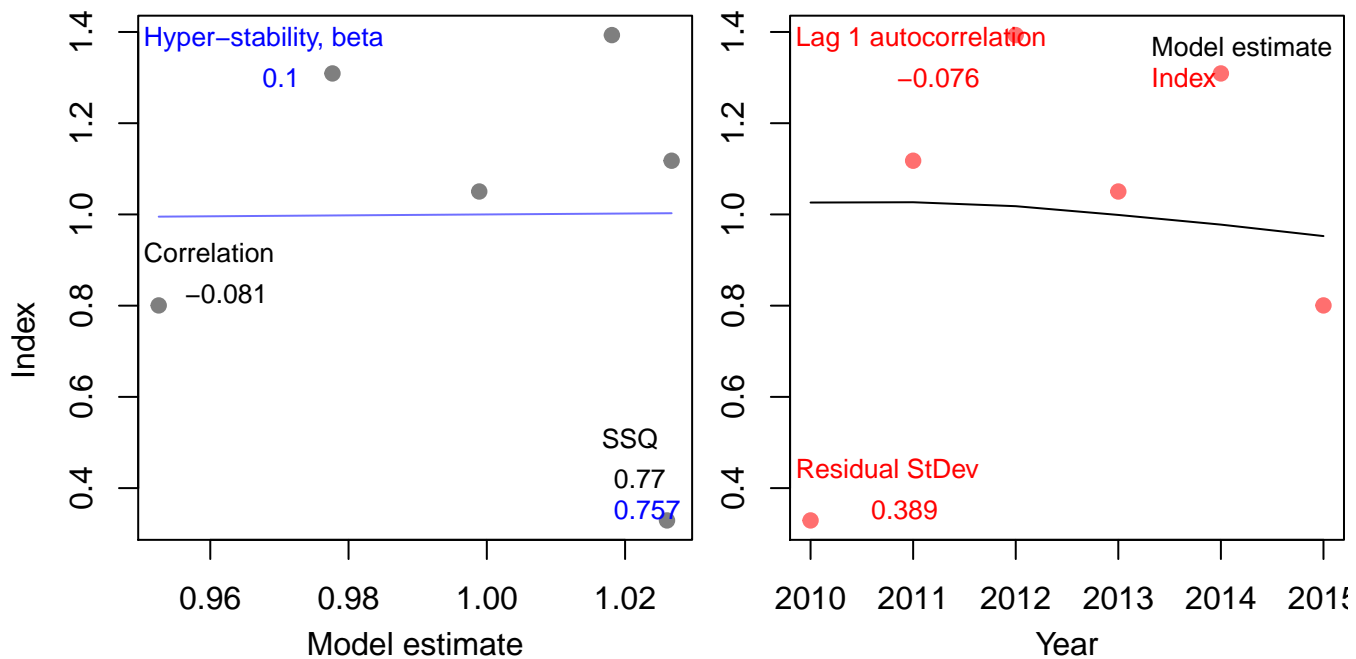
## Other model estimates and fits

### Statistical properties of indices for use in Management Procedures

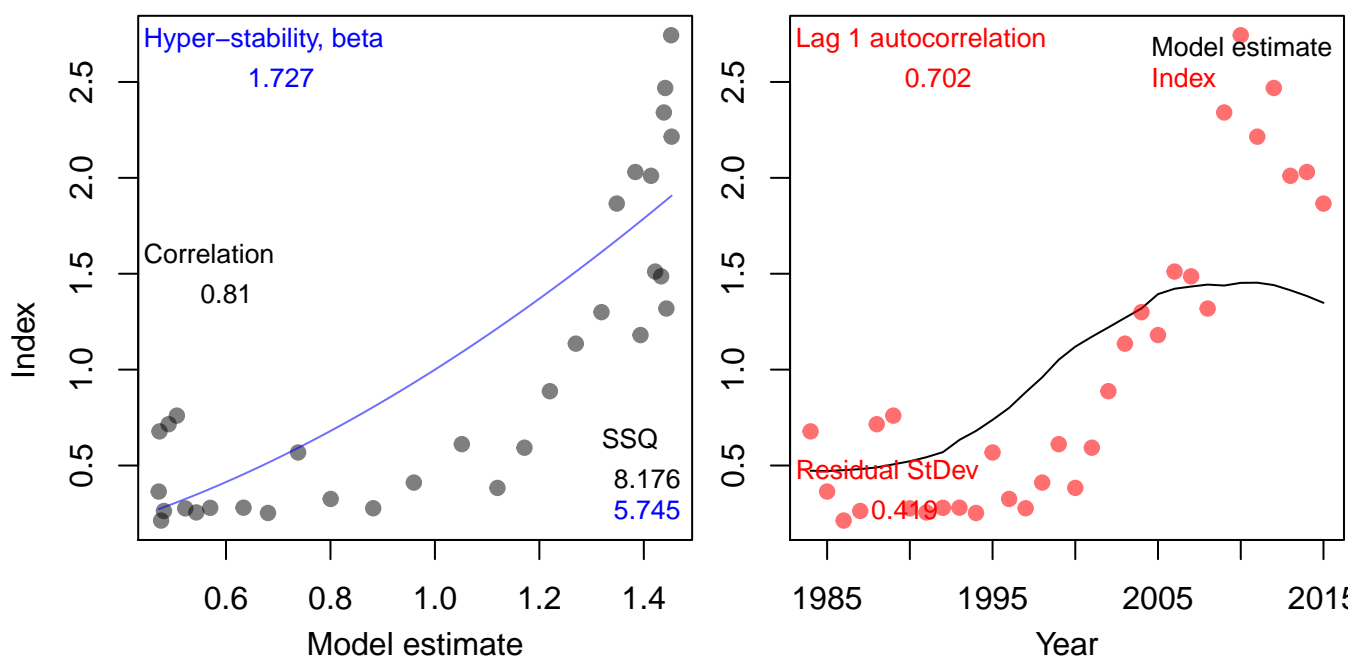
#### Index fit and statistical properties for GOM\_Larval



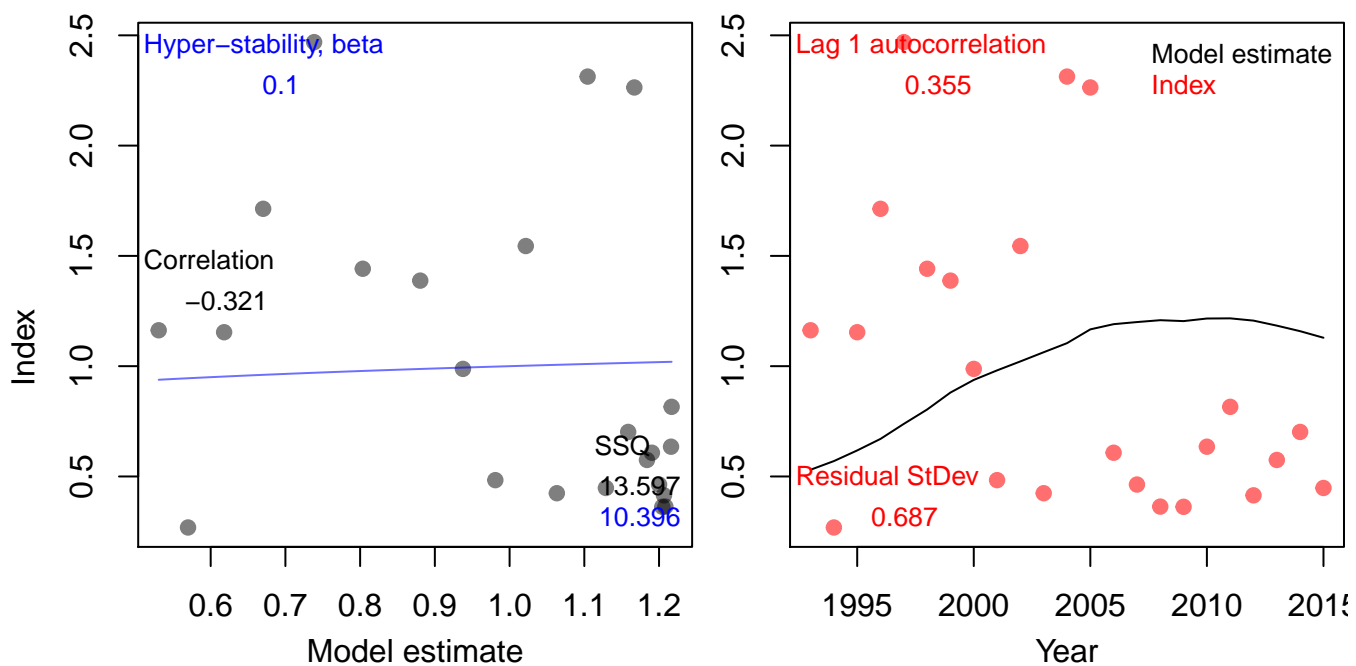
#### Index fit and statistical properties for JP\_LL\_W



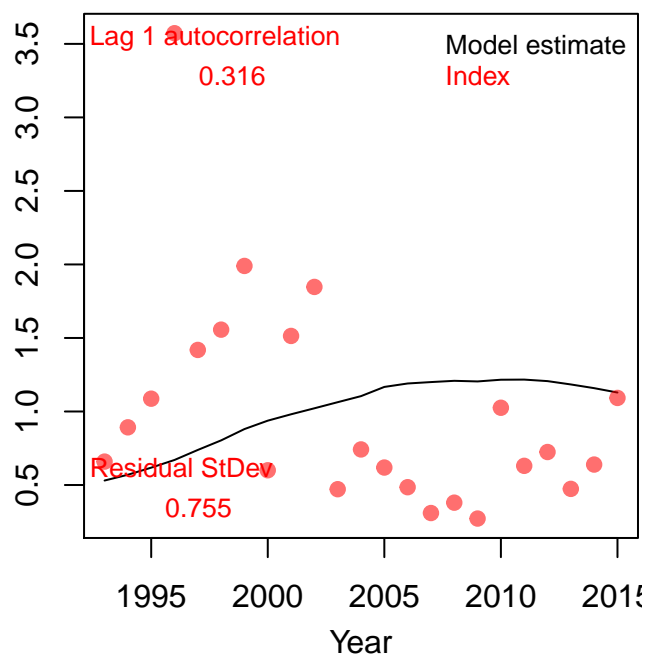
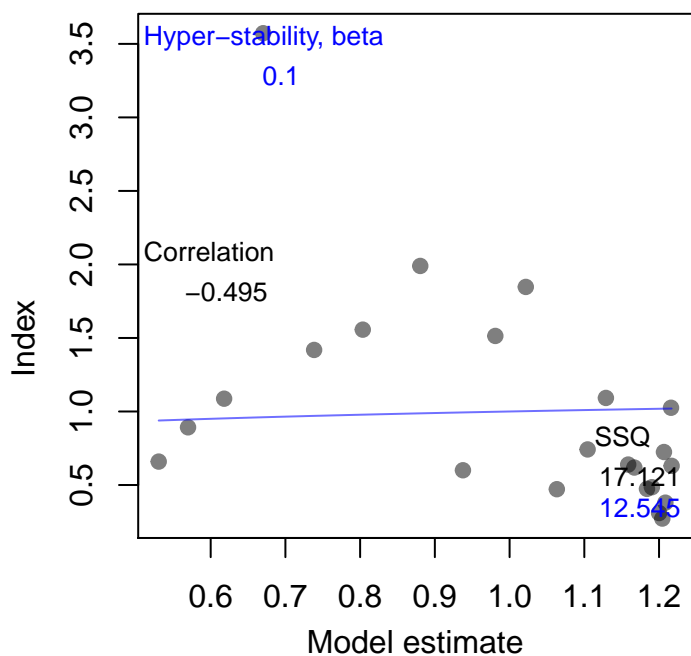
# Index fit and statistical properties for CAN-comb-RR



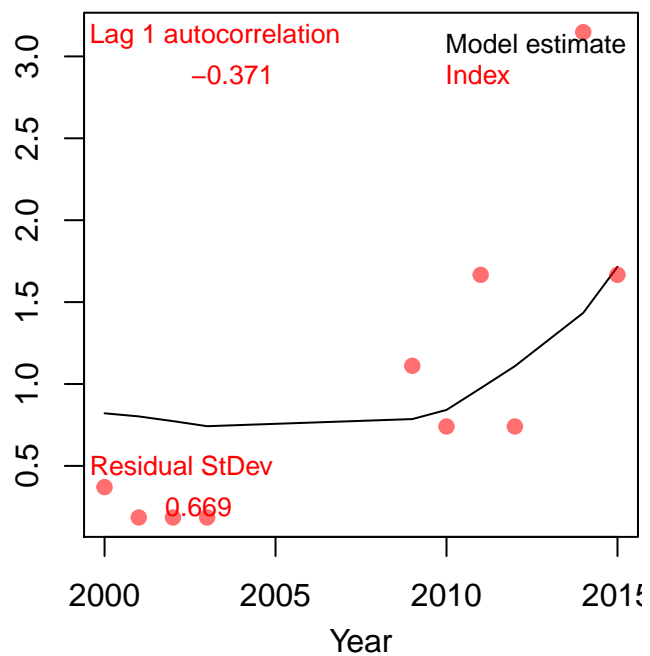
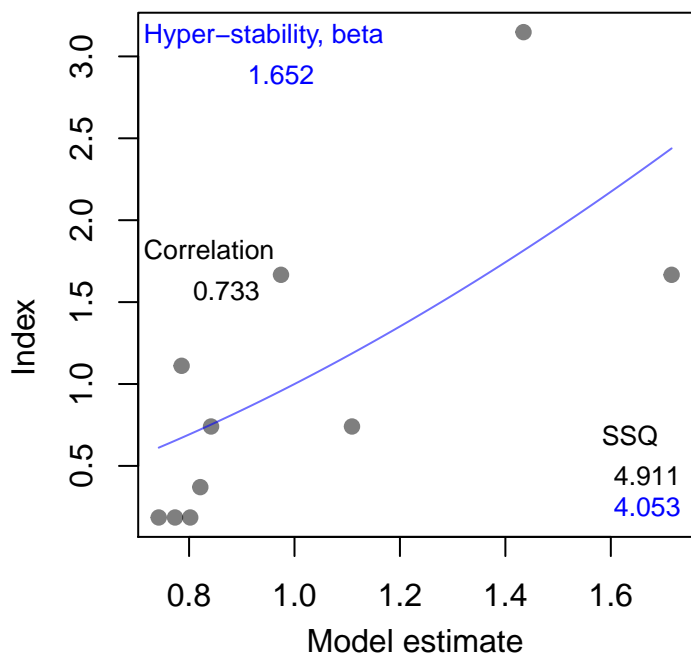
# Index fit and statistical properties for US\_RR\_66\_114



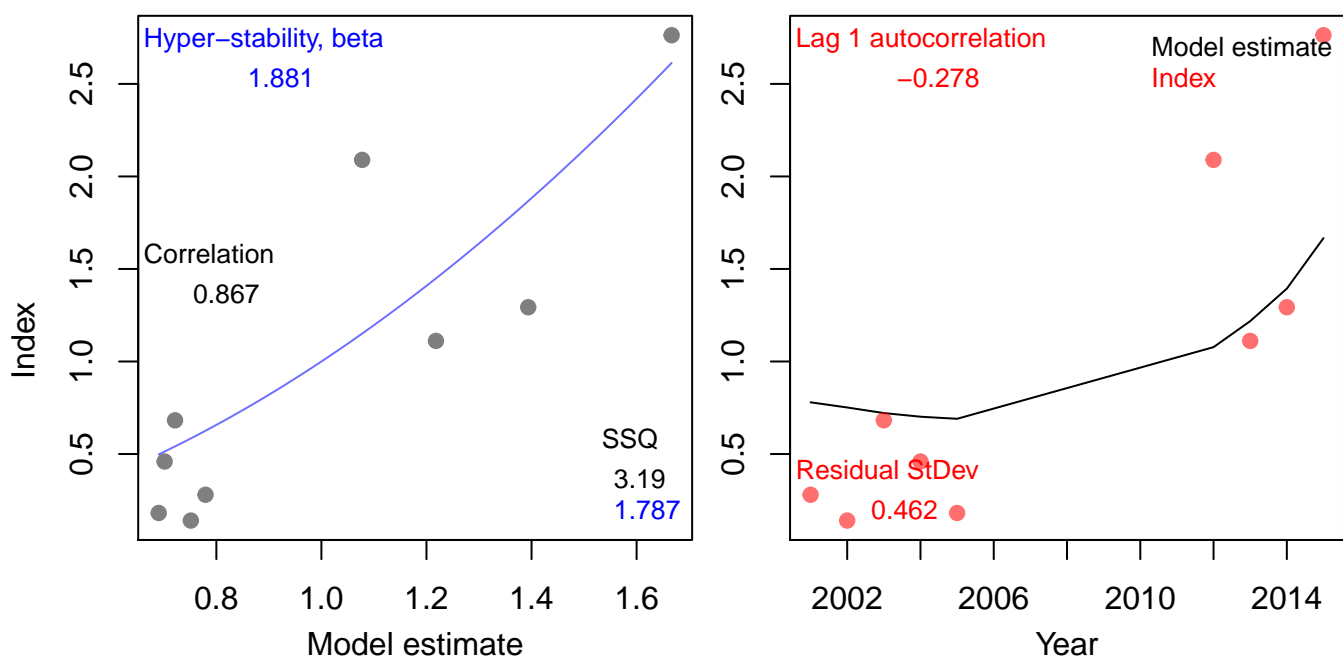
# Index fit and statistical properties for US\_RR\_177



# Index fit and statistical properties for FR\_Aerial



# Index fit and statistical properties for MED\_Larval



# Index fit and statistical properties for JP\_LL\_NE

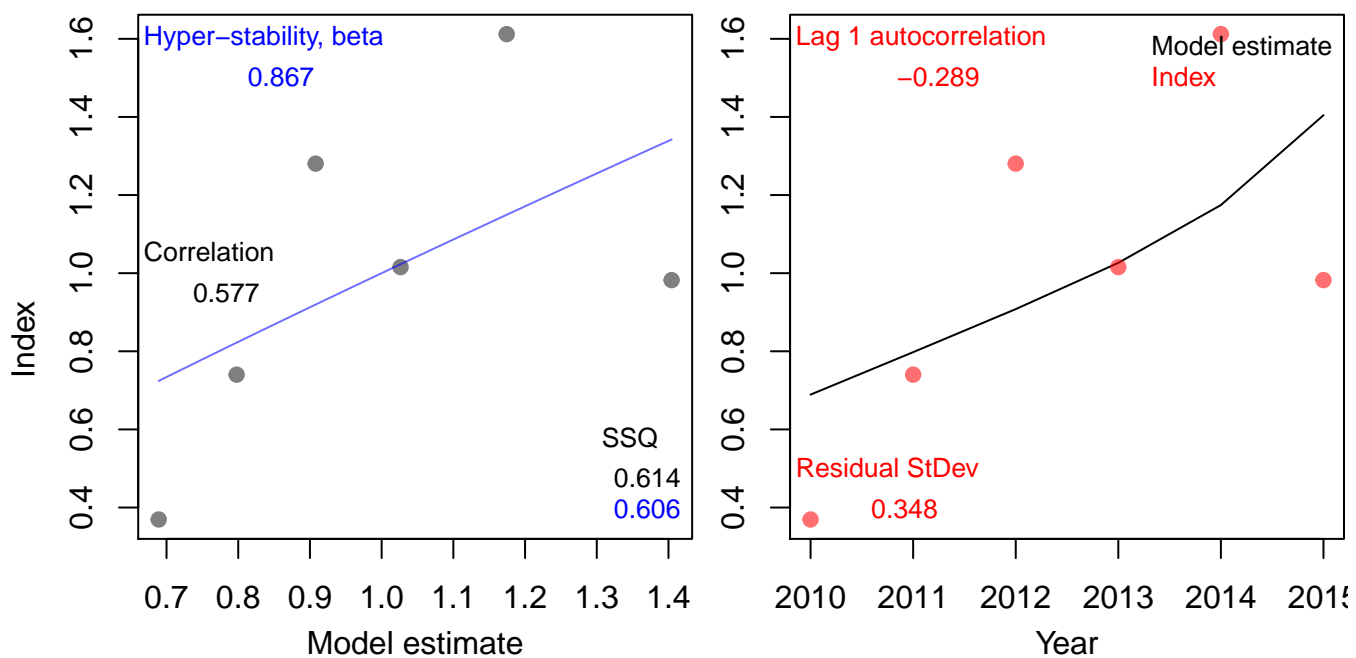
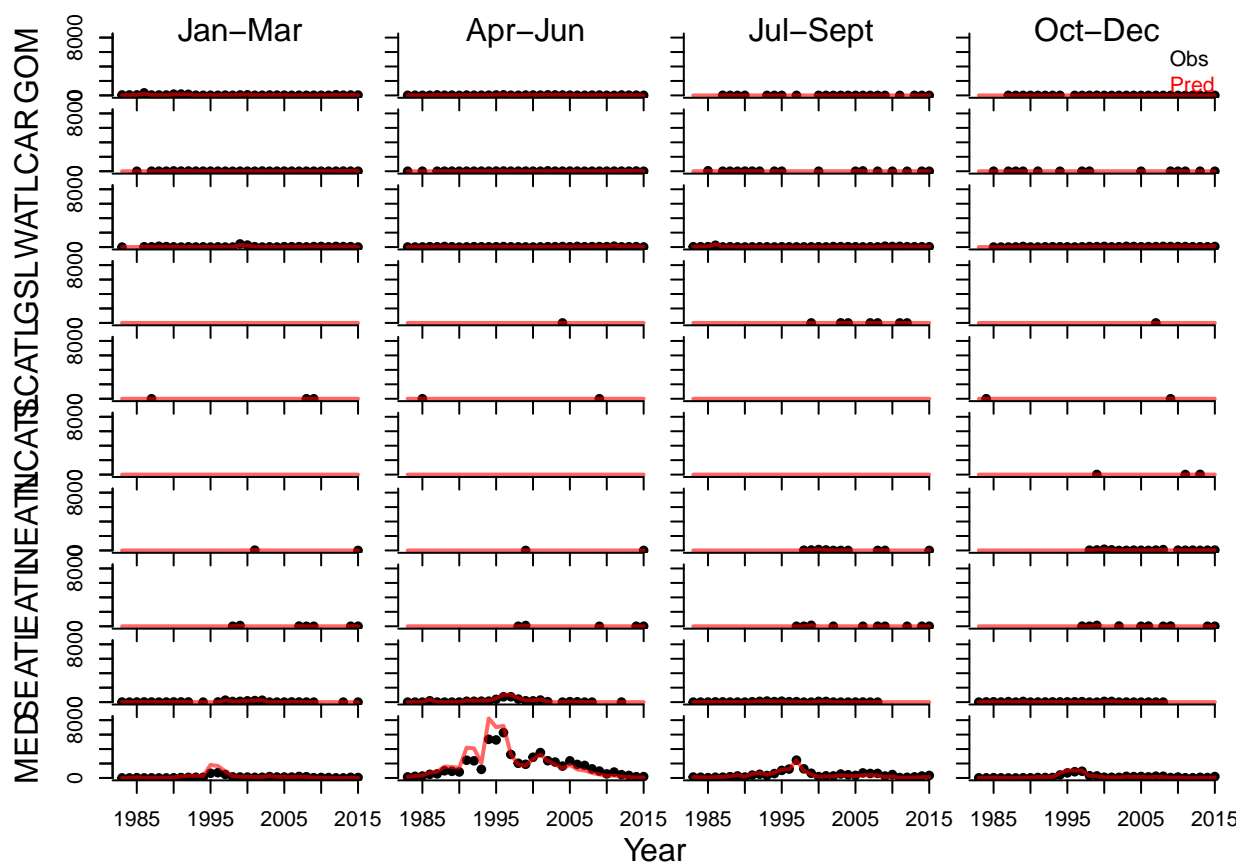


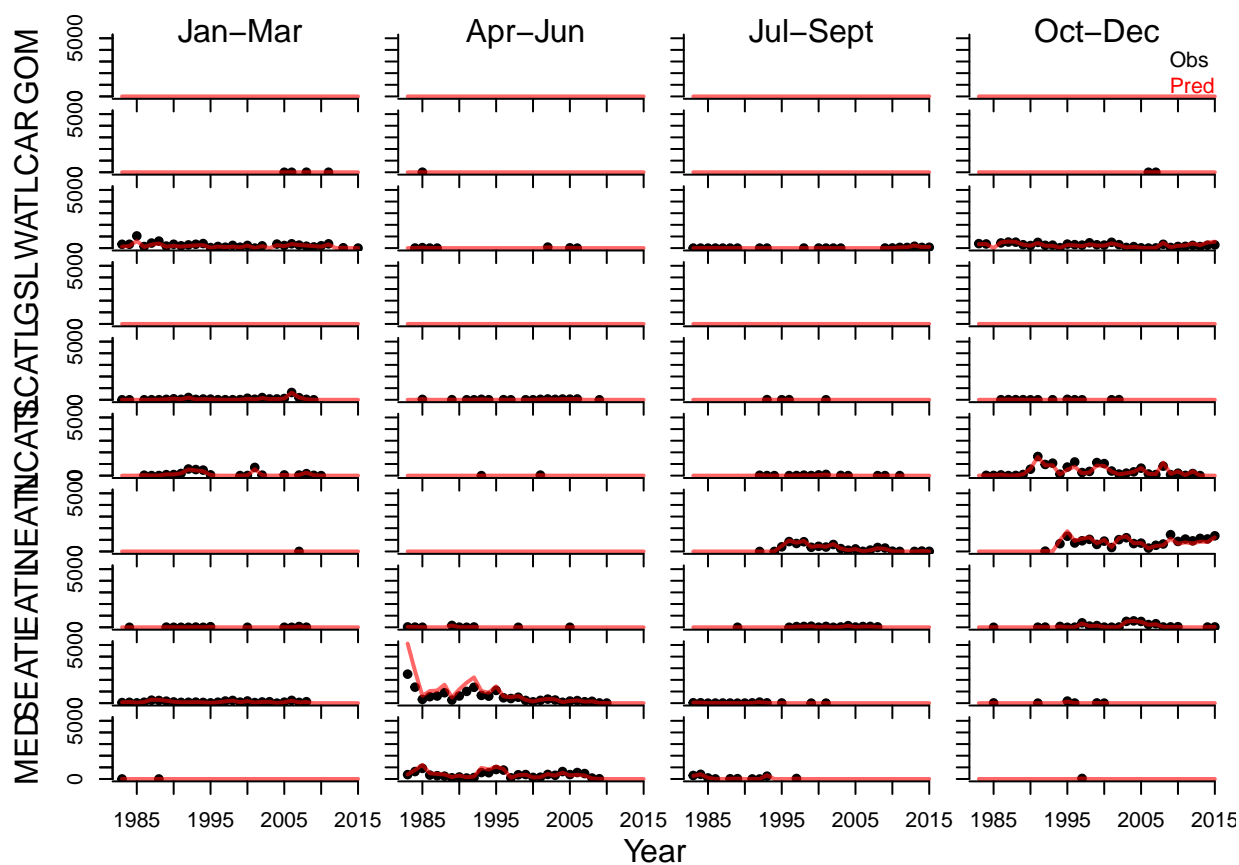
Figure 10.

Fit to observed catches

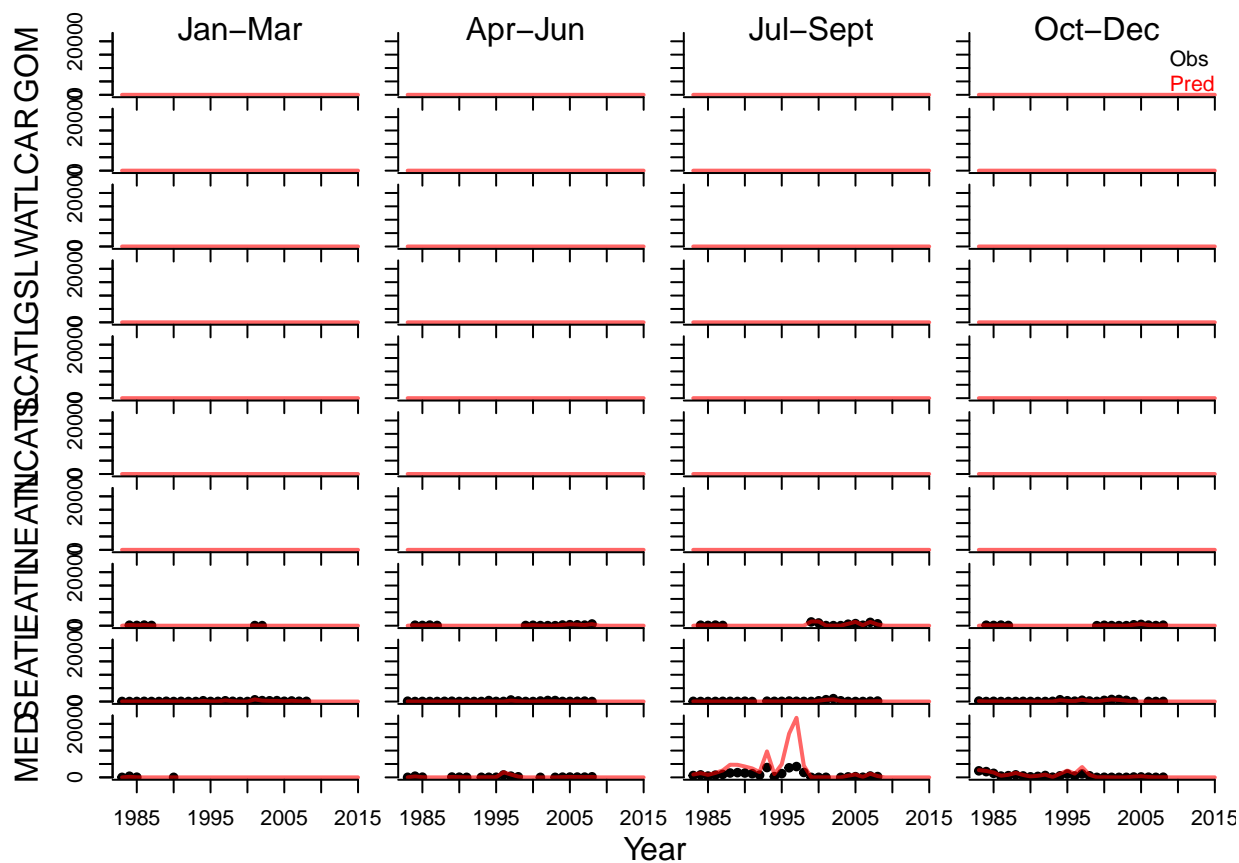
Observed catches (tonnes) for LLOTH



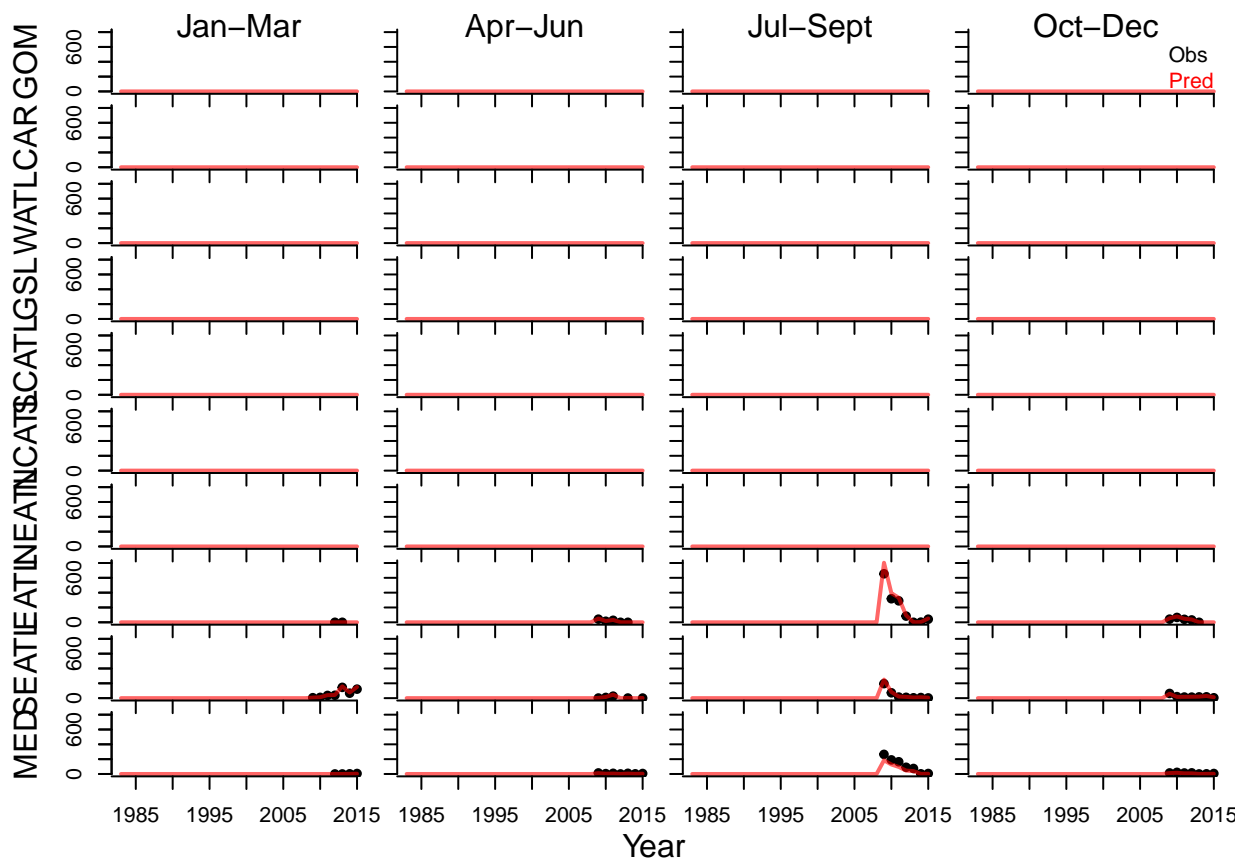
Observed catches (tonnes) for LLJPN



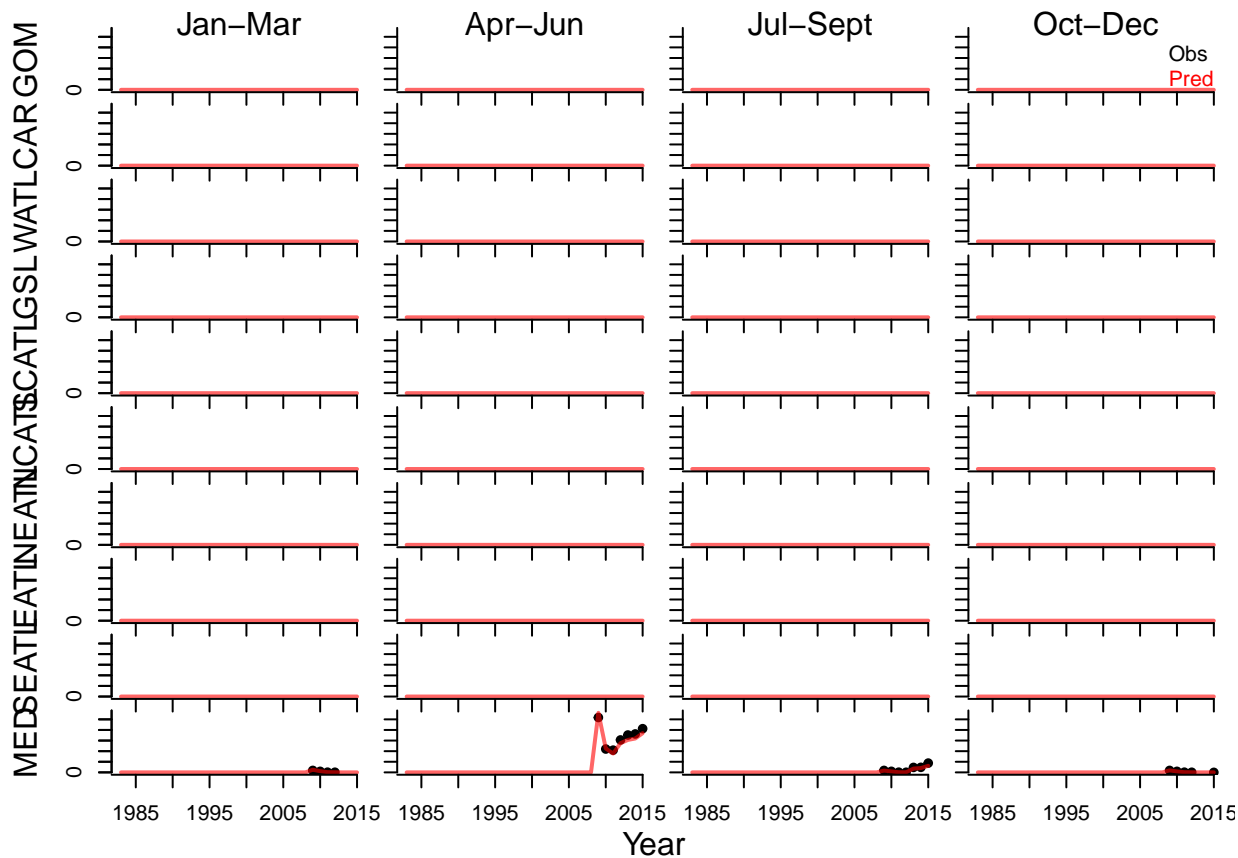
Observed catches (tonnes) for BBold



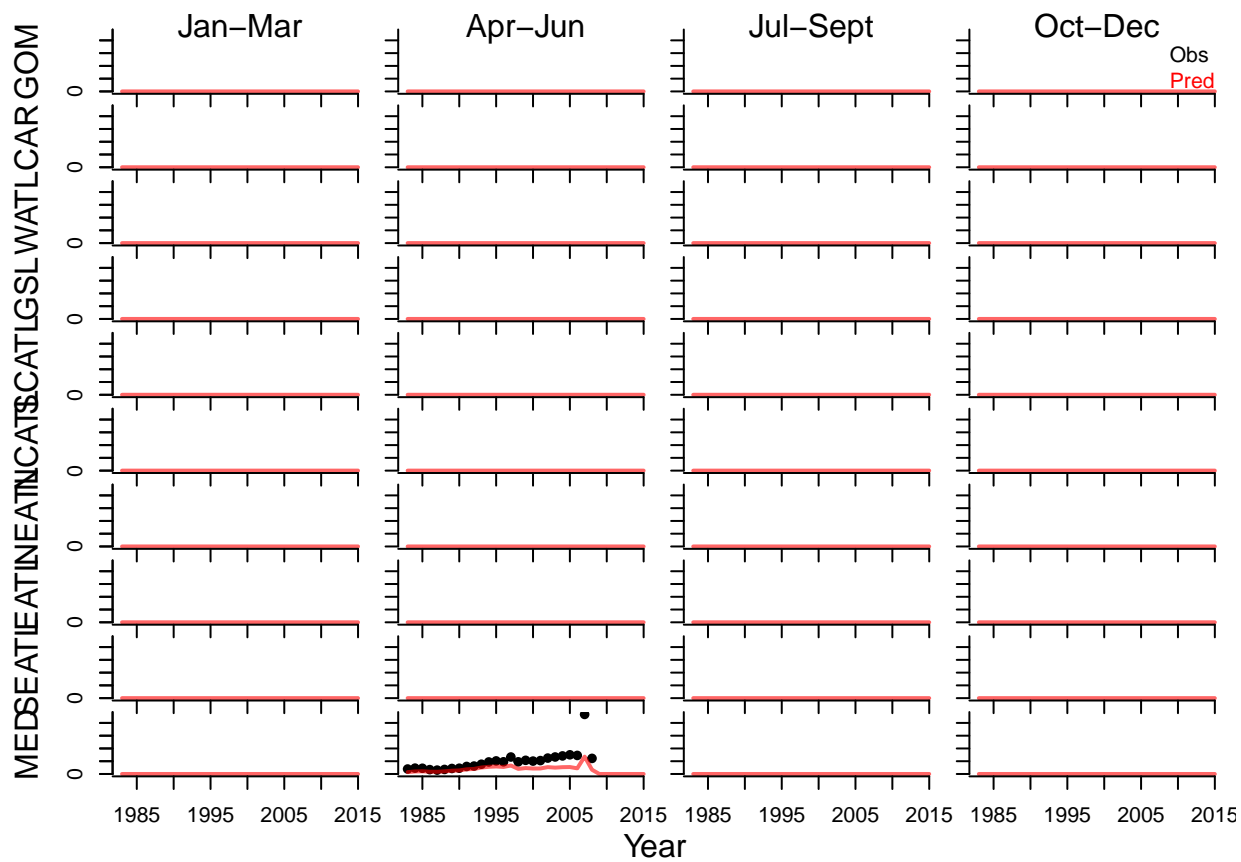
Observed catches (tonnes) for BBnew



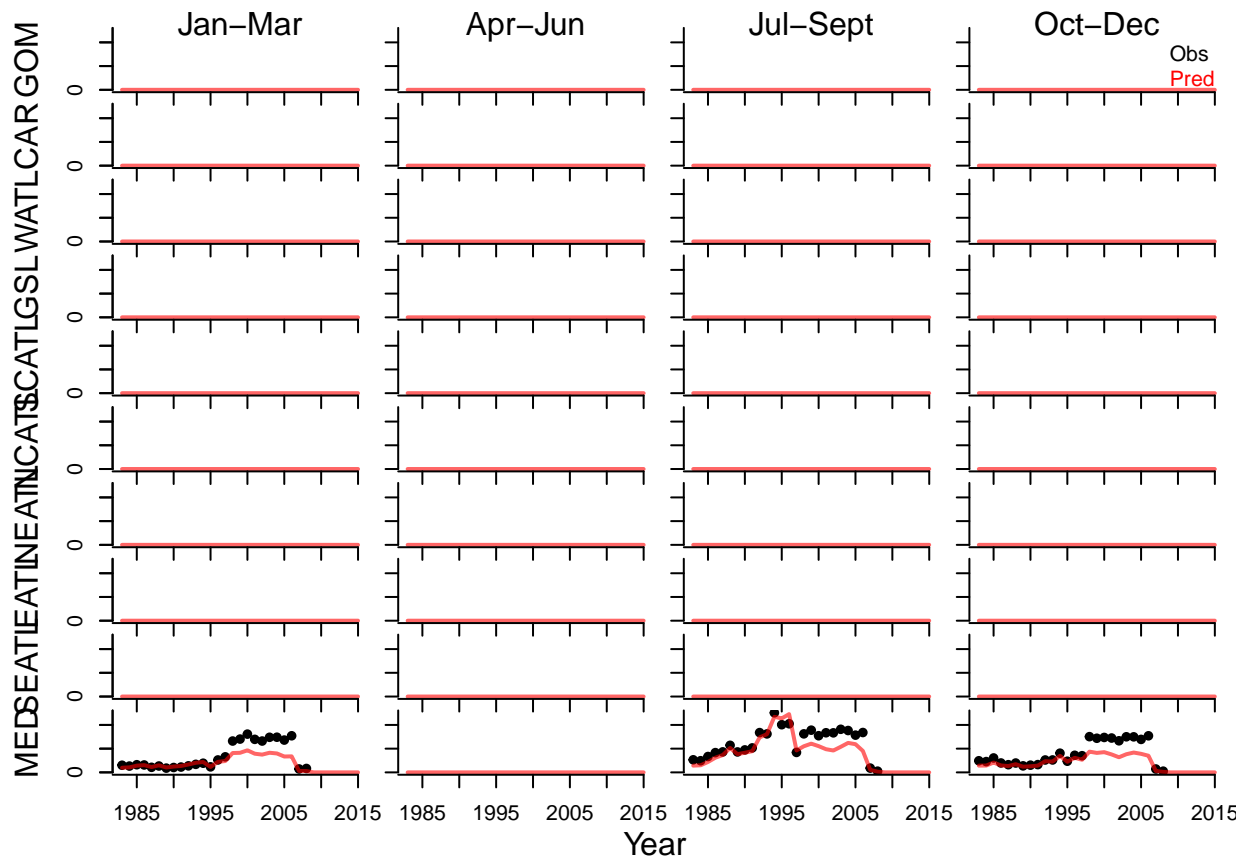
Observed catches (tonnes) for PSMedRec



Observed catches (tonnes) for PSMedLOld

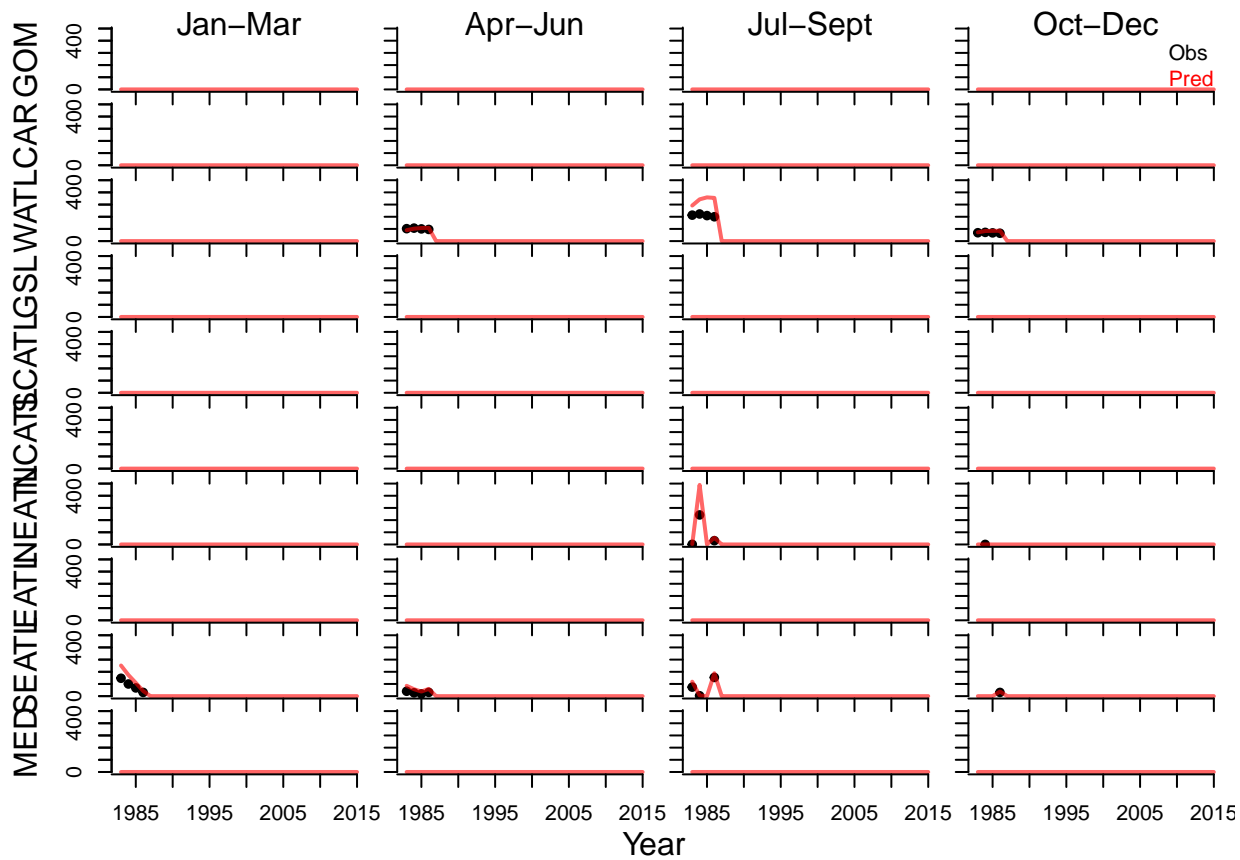


Observed catches (tonnes) for PSMedSOld

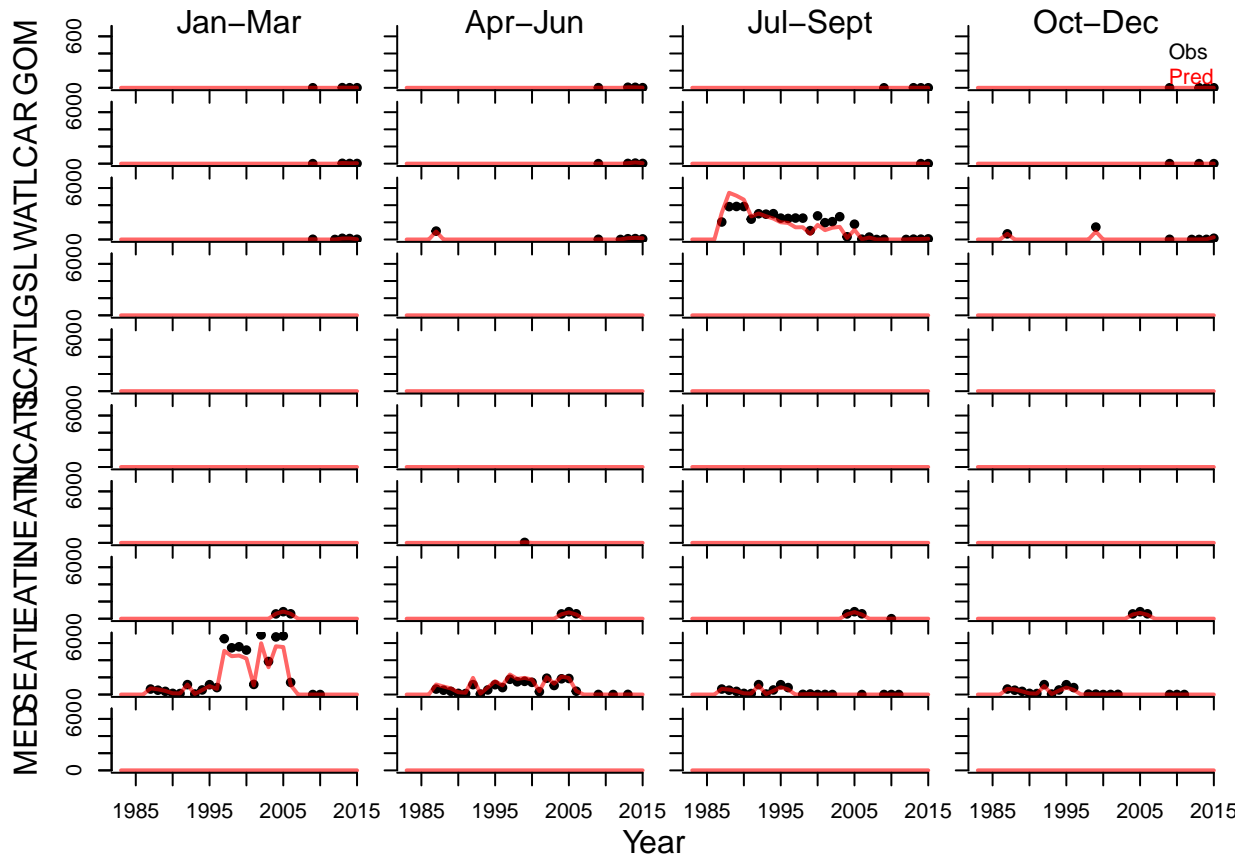




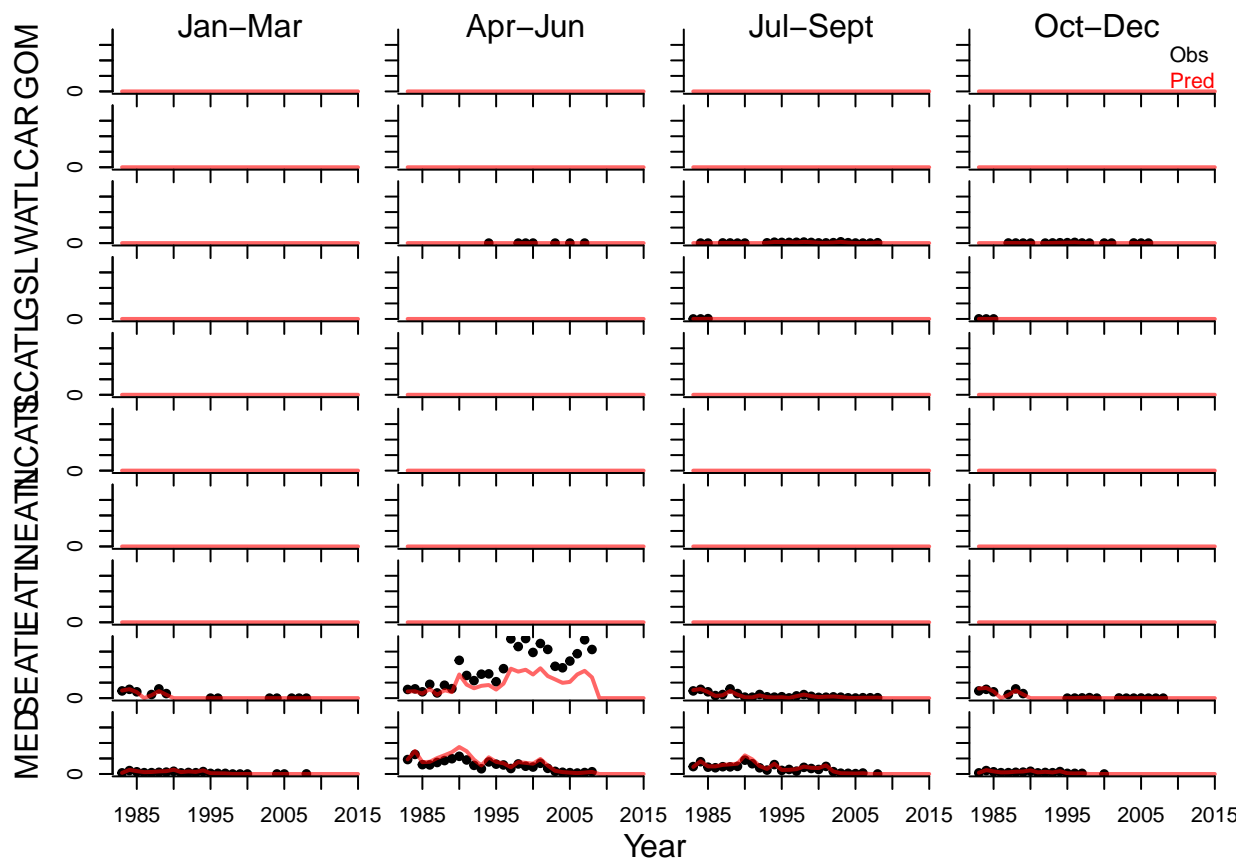
Observed catches (tonnes) for PSWestOld



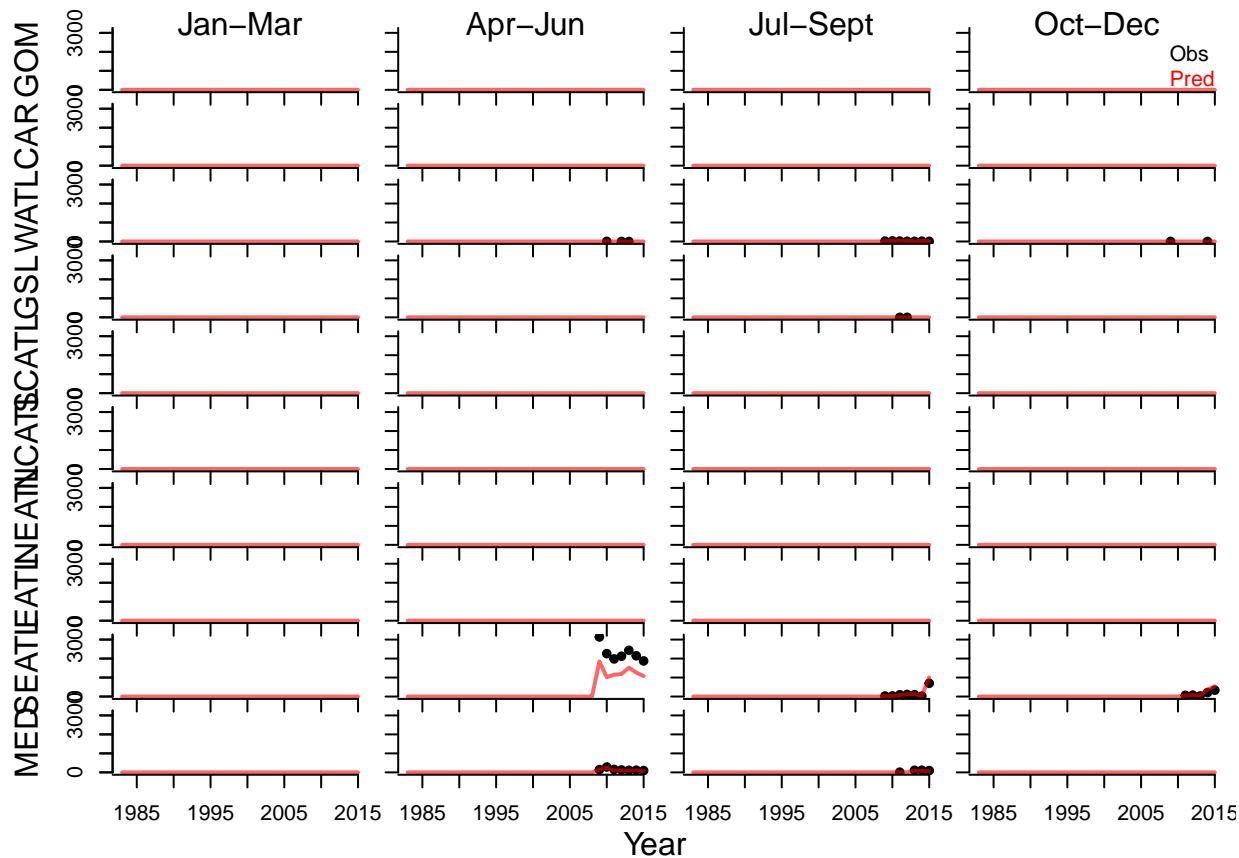
Observed catches (tonnes) for PSWestnew



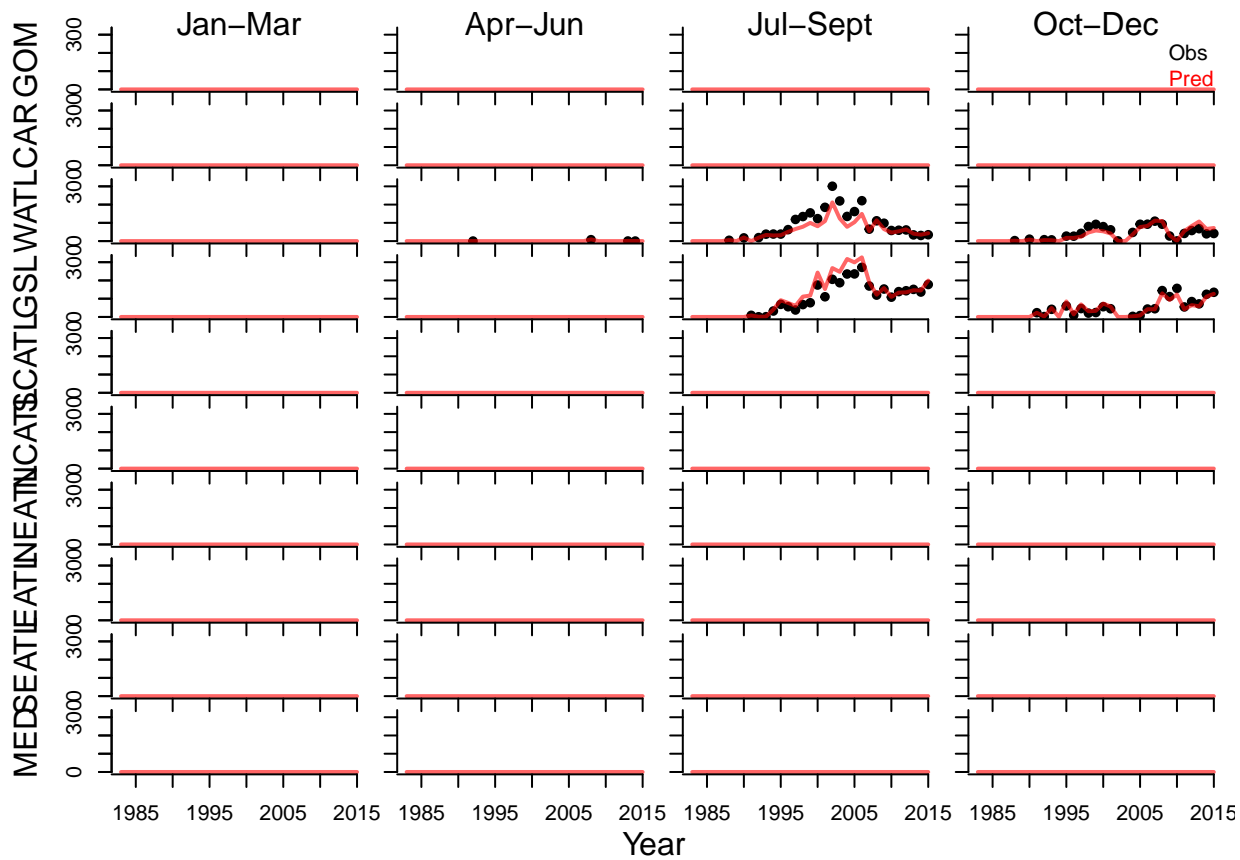
Observed catches (tonnes) for TPold



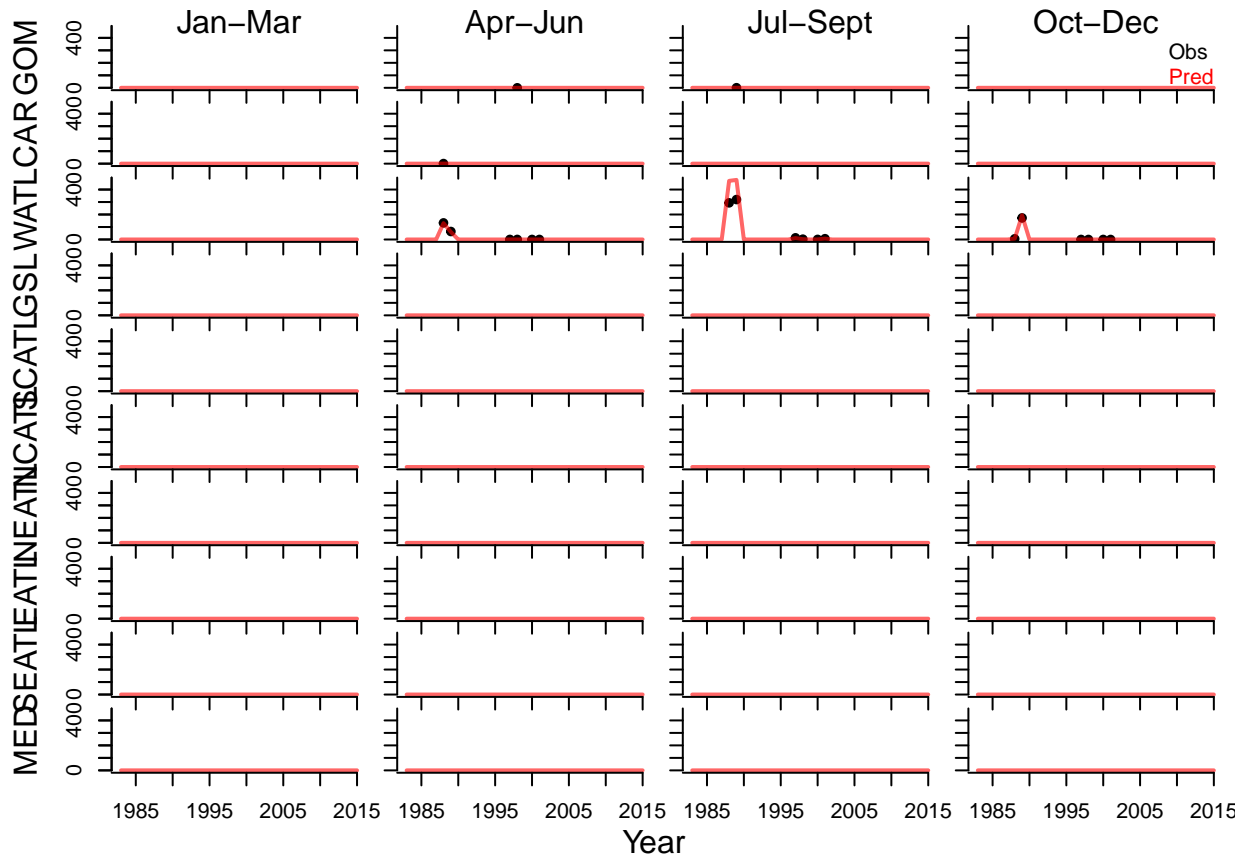
Observed catches (tonnes) for TPnew



Observed catches (tonnes) for RRCan



Observed catches (tonnes) for RRUSA



Observed catches (tonnes) for ALL OTH

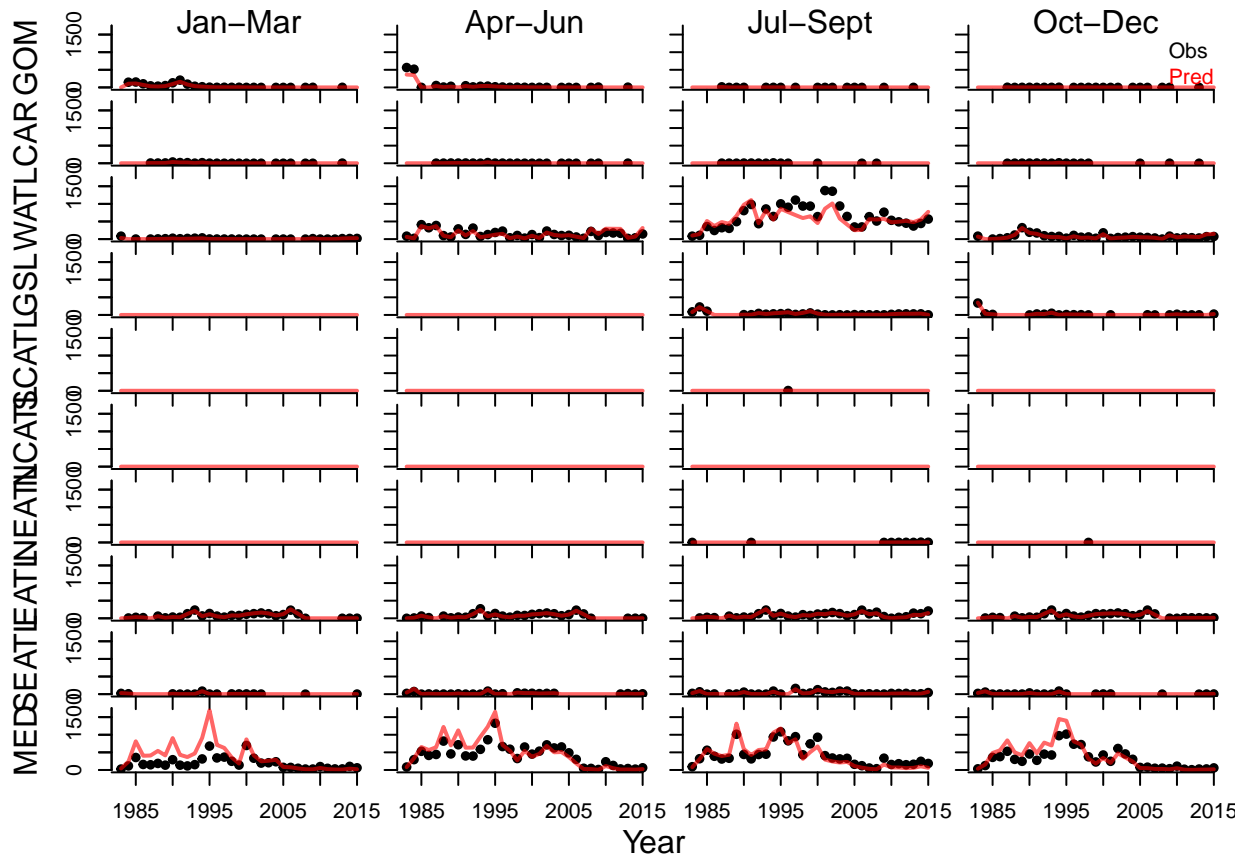
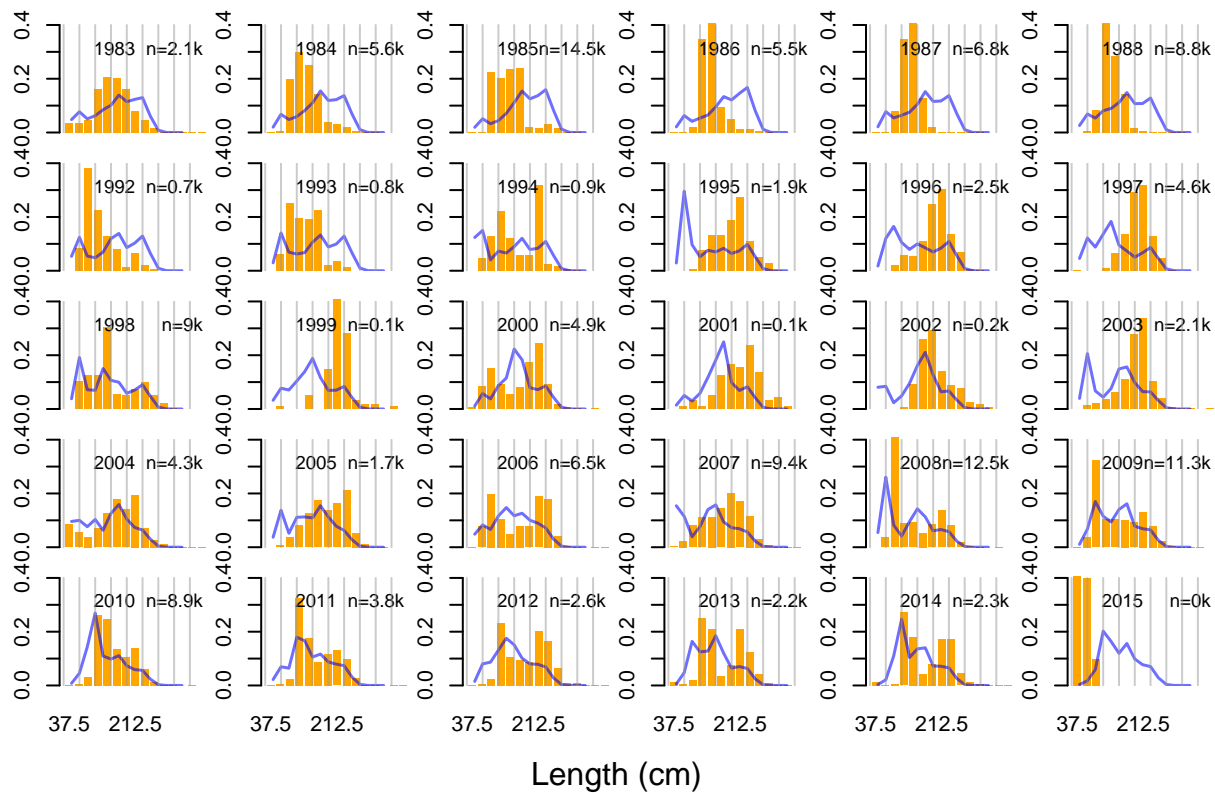


Figure 11.

## Fit to observed size composition

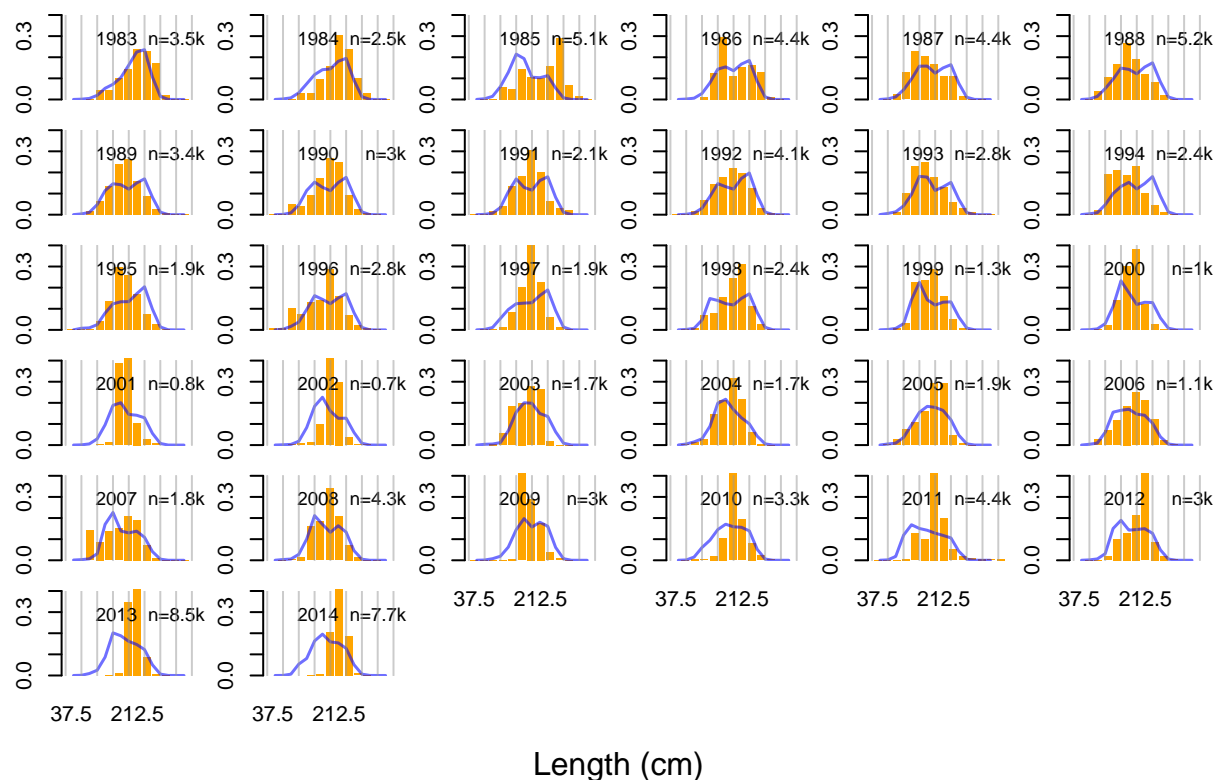
### Length composition fit for LLOTH

redicted (blue line) versus observed (orange bar) catch at length for the LLOTH fleet (n=1:



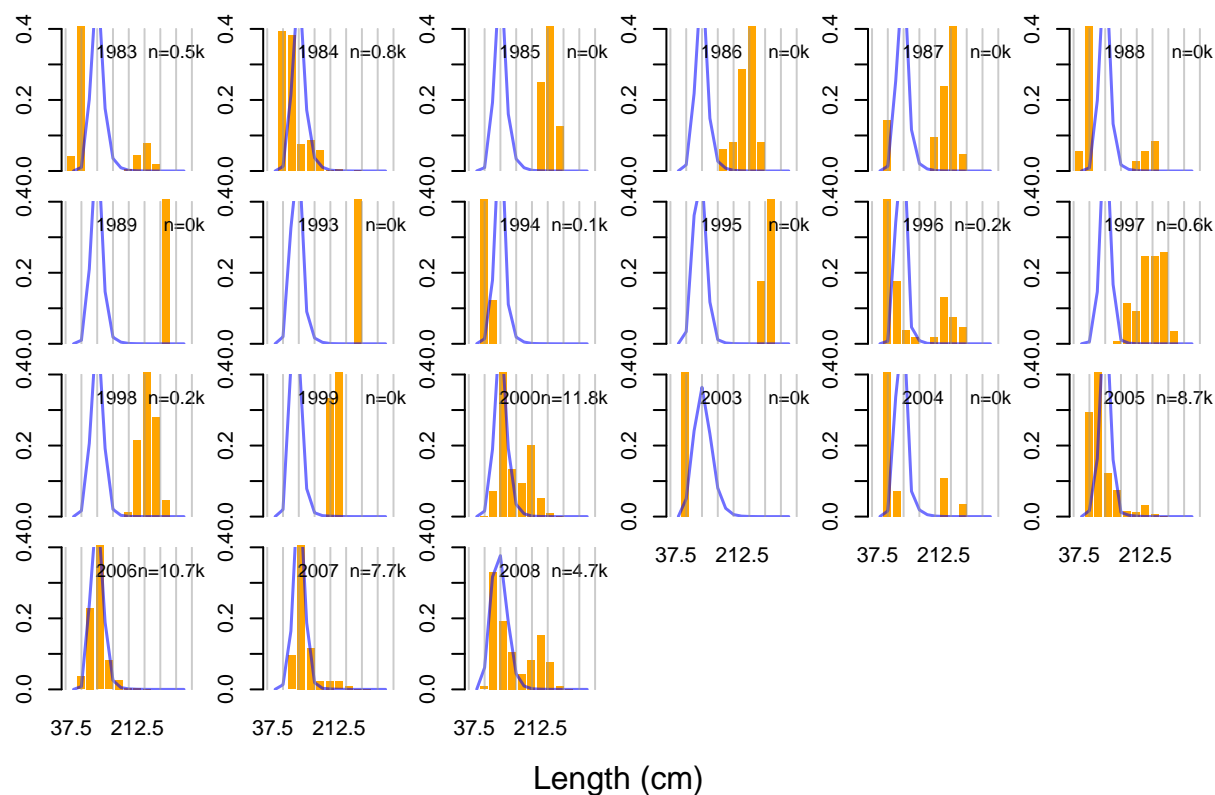
## Length composition fit for LLJPN

redicted (blue line) versus observed (orange bar) catch at length for the LLJPN fleet (n=9)



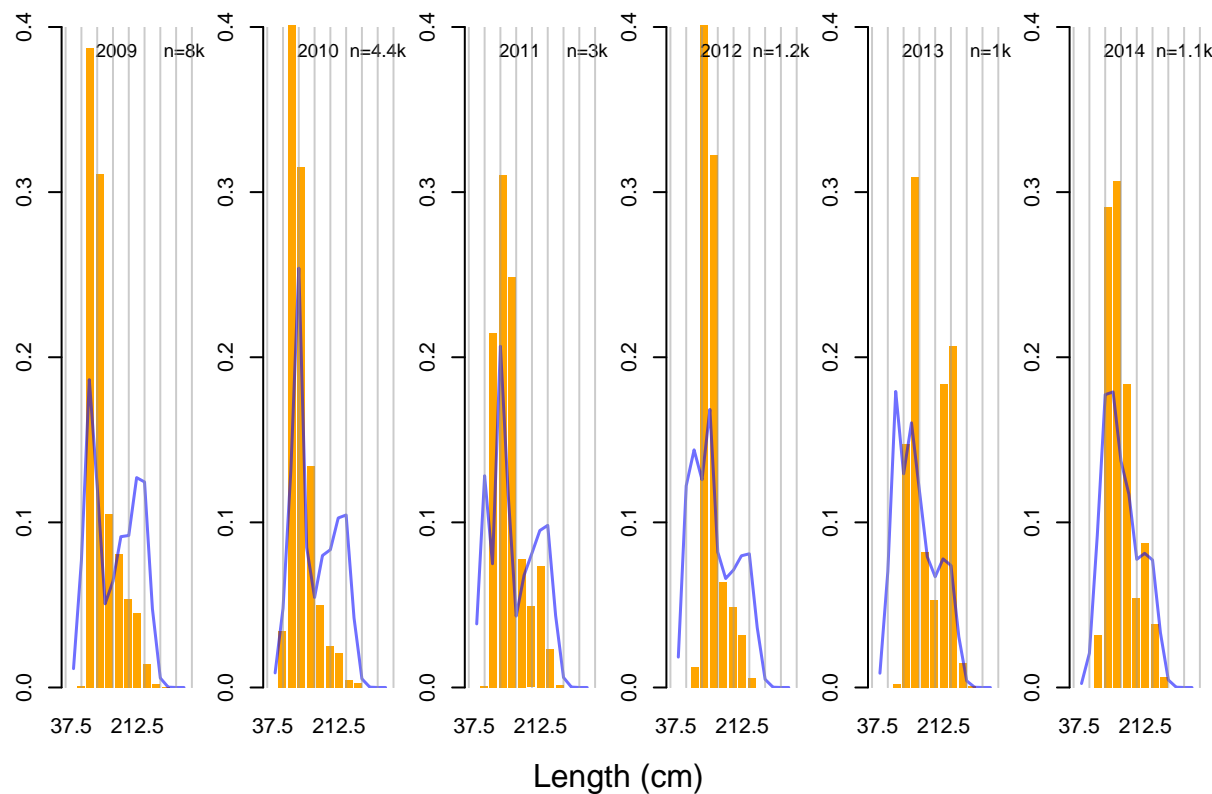
## Length composition fit for BBold

redicted (blue line) versus observed (orange bar) catch at length for the BBold fleet (n=4)



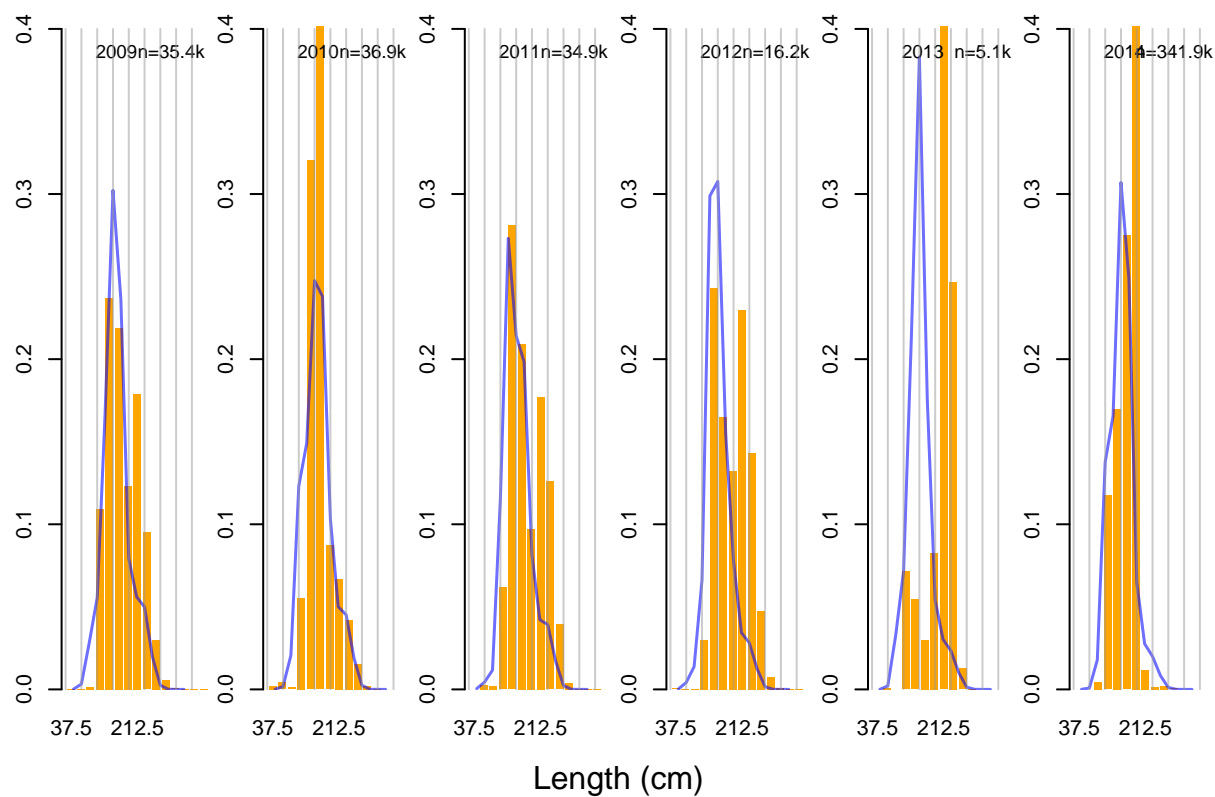
## Length composition fit for BBnew

redicted (blue line) versus observed (orange bar) catch at length for the BBnew fleet (n=1



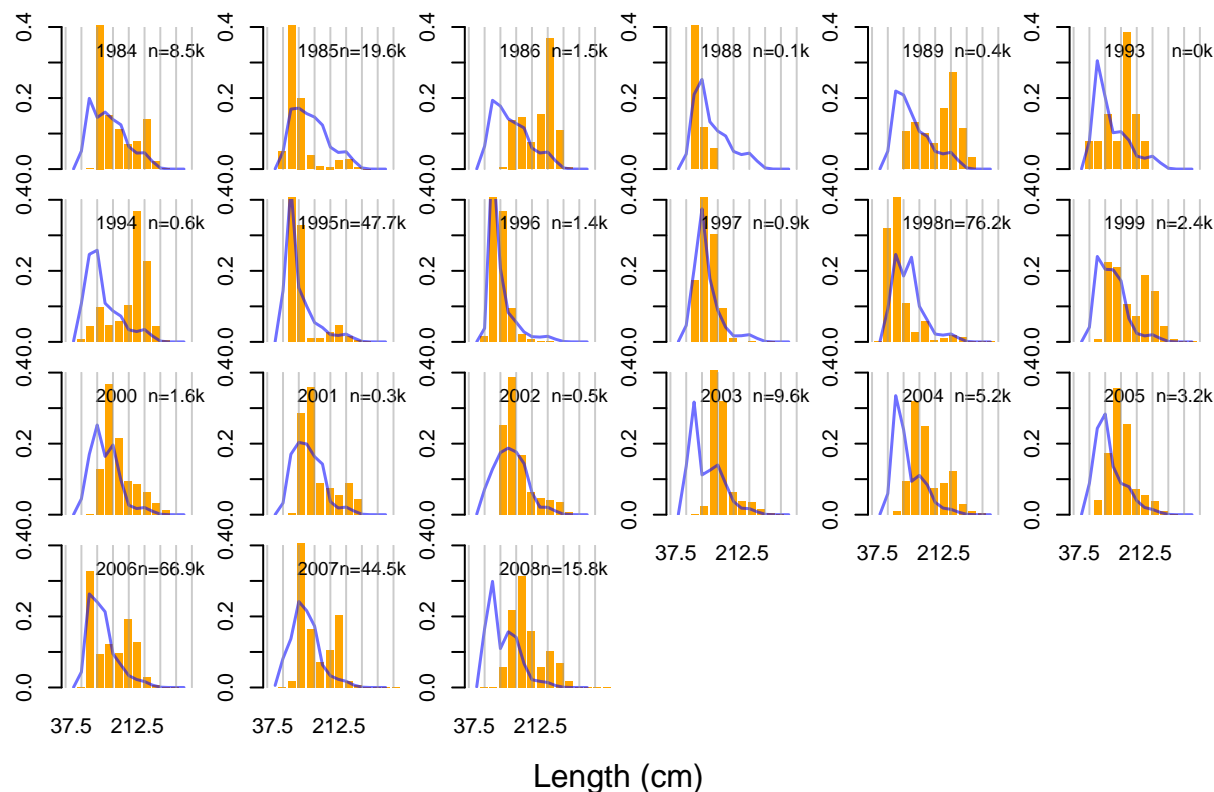
## Length composition fit for PSMedRec

redicted (blue line) versus observed (orange bar) catch at length for the PSMedRec fleet (n=



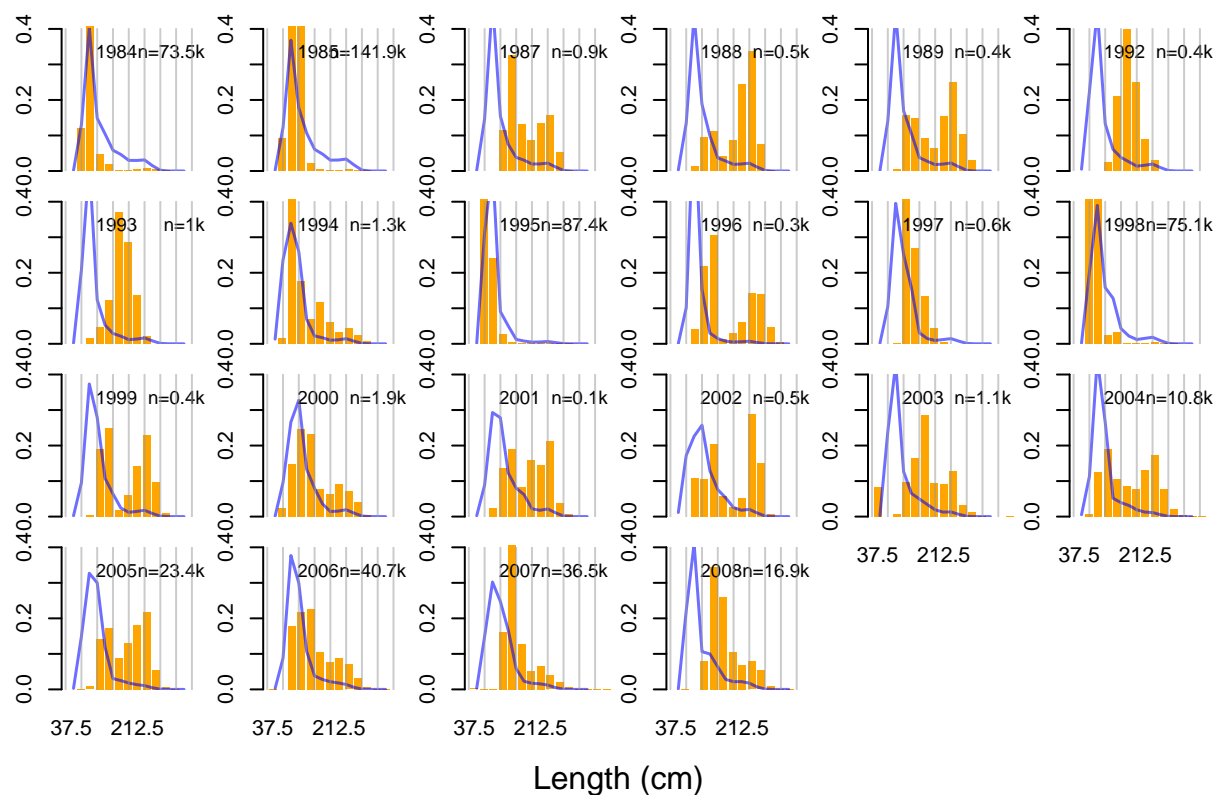
## Length composition fit for PSMedLOld

cted (blue line) versus observed (orange bar) catch at length for the PSMedLOld fleet (n:



## Length composition fit for PSMedSOLD

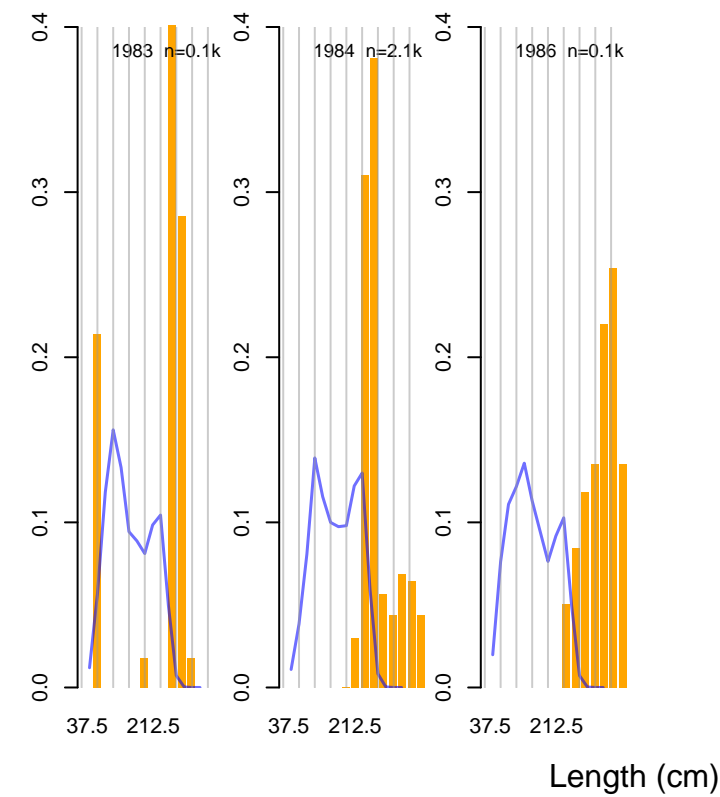
cted (blue line) versus observed (orange bar) catch at length for the PSMedSOLD fleet (n:





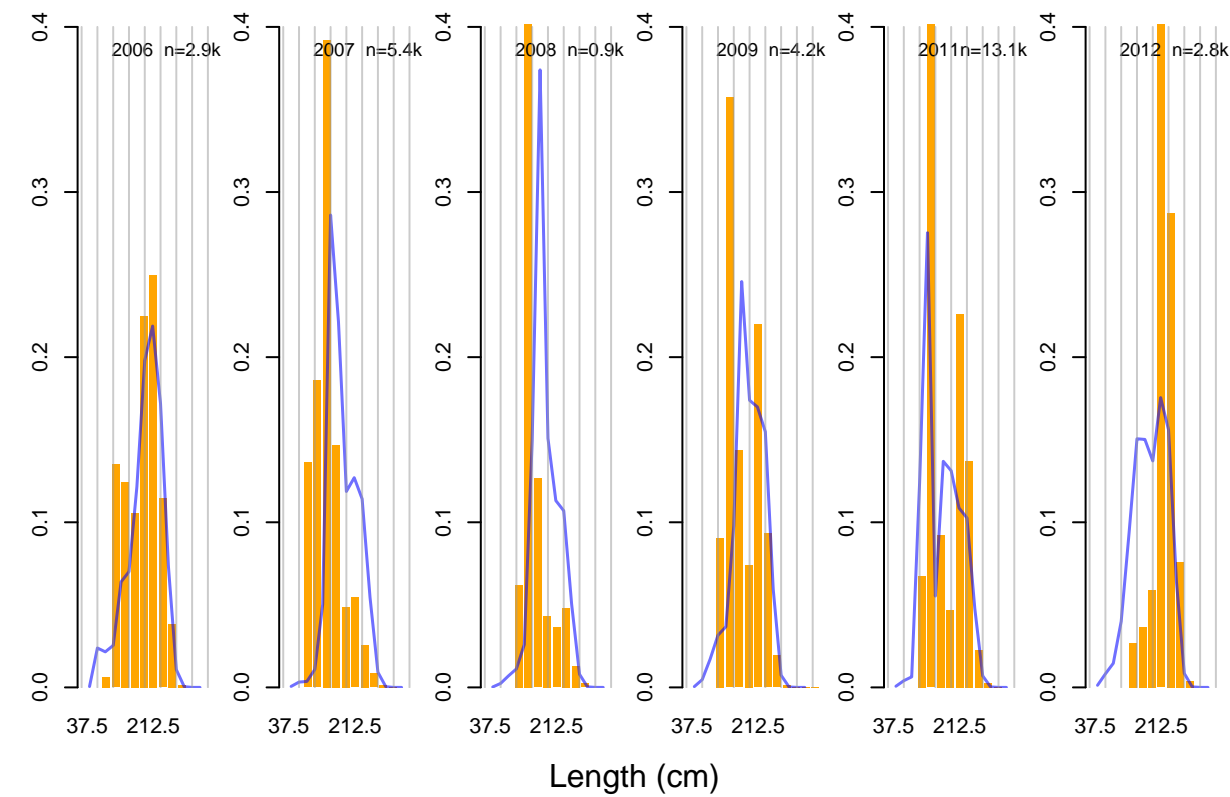
Length composition fit for PSWestOld

dicted (blue line) versus observed (orange bar) catch at length for the PSWestOld fleet (r



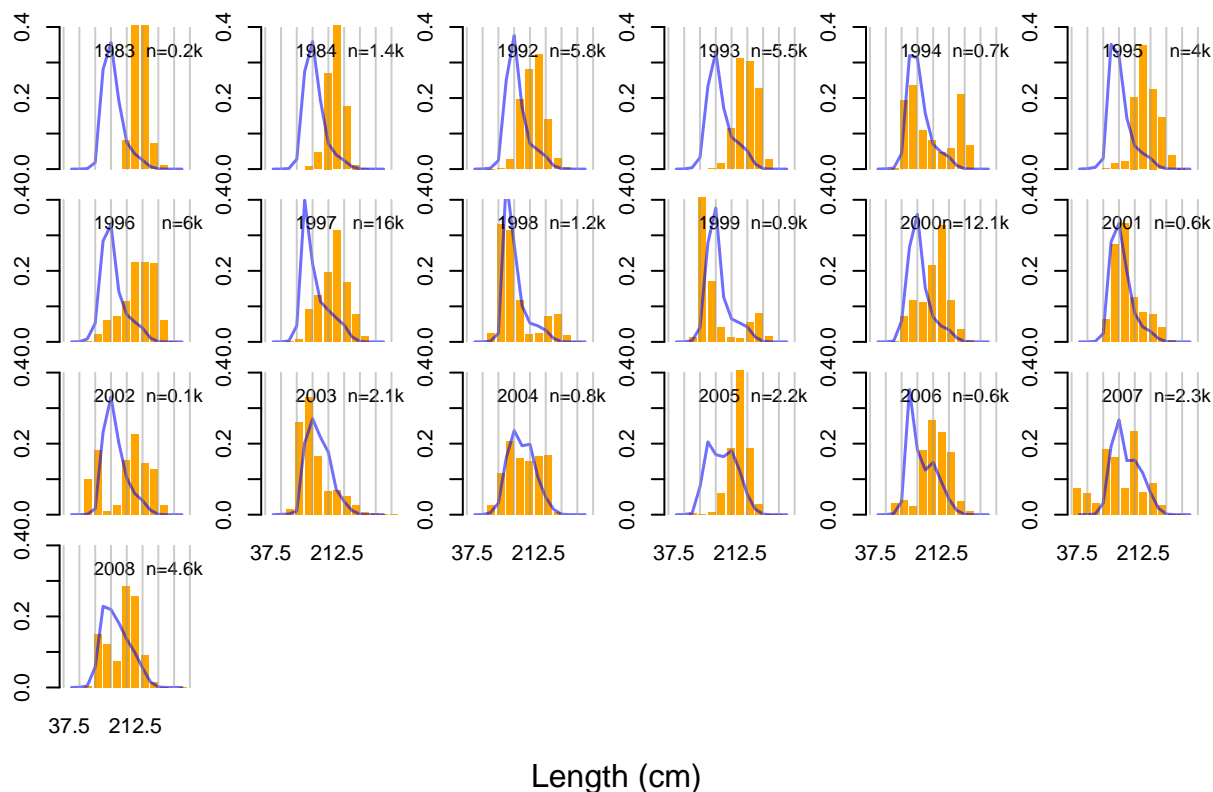
Length composition fit for PSWestnew

dicted (blue line) versus observed (orange bar) catch at length for the PSWestnew fleet (n



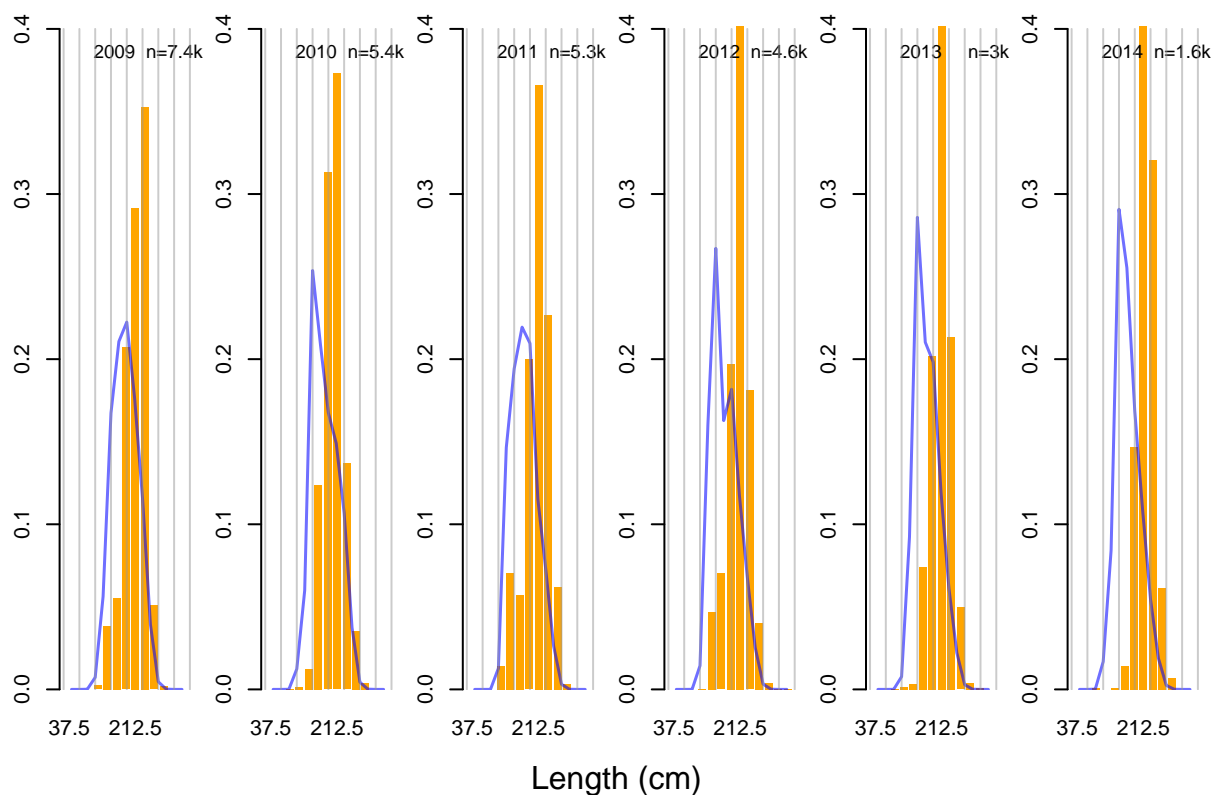
## Length composition fit for TPold

redicted (blue line) versus observed (orange bar) catch at length for the TPold fleet (n=6



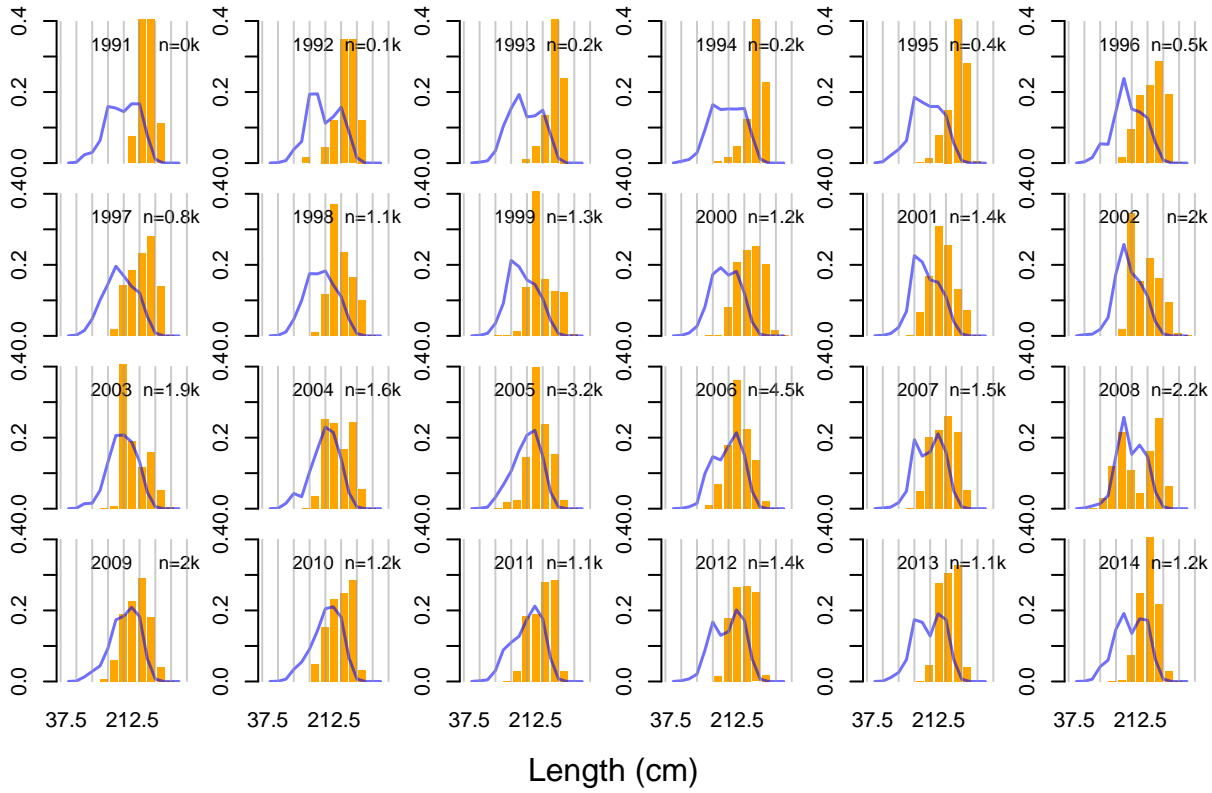
## Length composition fit for TPnew

redicted (blue line) versus observed (orange bar) catch at length for the TPnew fleet (n=2



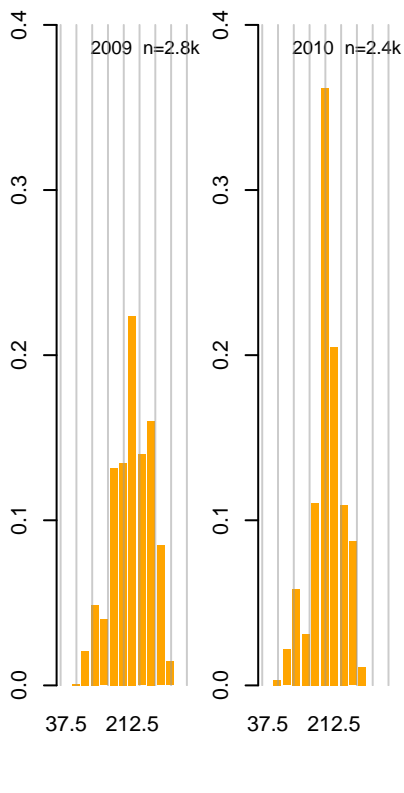
## Length composition fit for RRCan

redicted (blue line) versus observed (orange bar) catch at length for the RRCan fleet (n=3



## Length composition fit for RRUSA

redicted (blue line) versus observed (orange bar) catch at length for the RRUSA fleet (n=



## Length composition fit for ALL OTH

dicted (blue line) versus observed (orange bar) catch at length for the ALL OTH fleet (n=

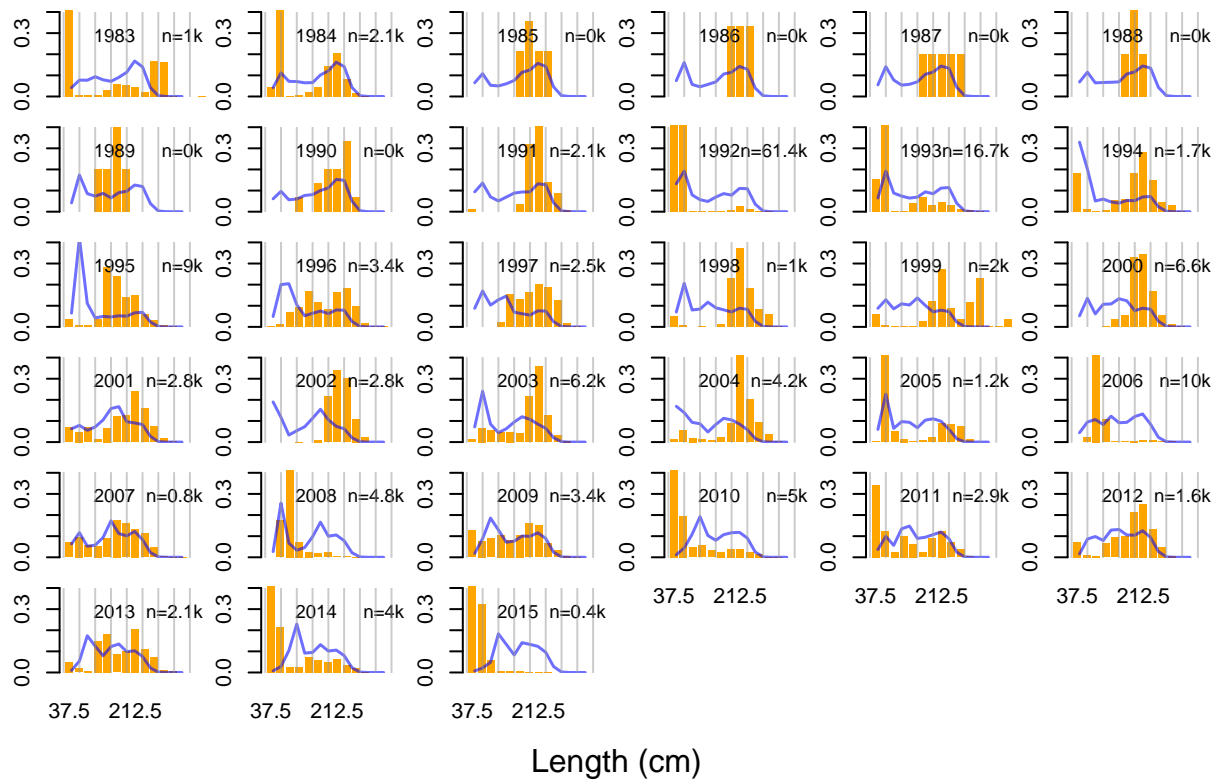


Figure 12. blue = predicted, orange = observed.