2019 Gulf of Mexico Penaeid Shrimp Stock Assessments (2018 Terminal Year)

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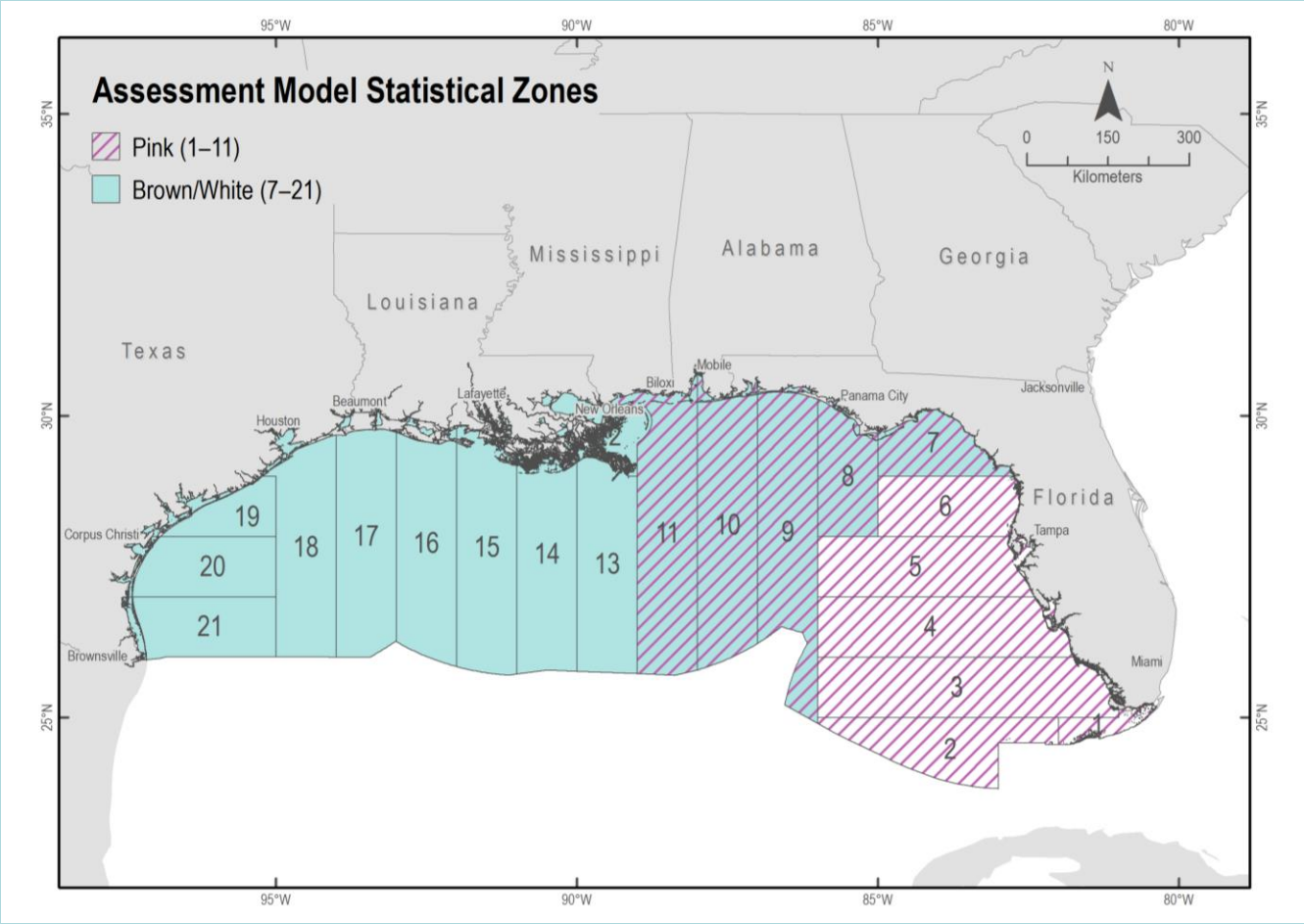
- **Pink Shrimp stat zones 1-11**
- **Brown Shrimp stat zones 7-21**
- **White Shrimp stat zones 7-21**



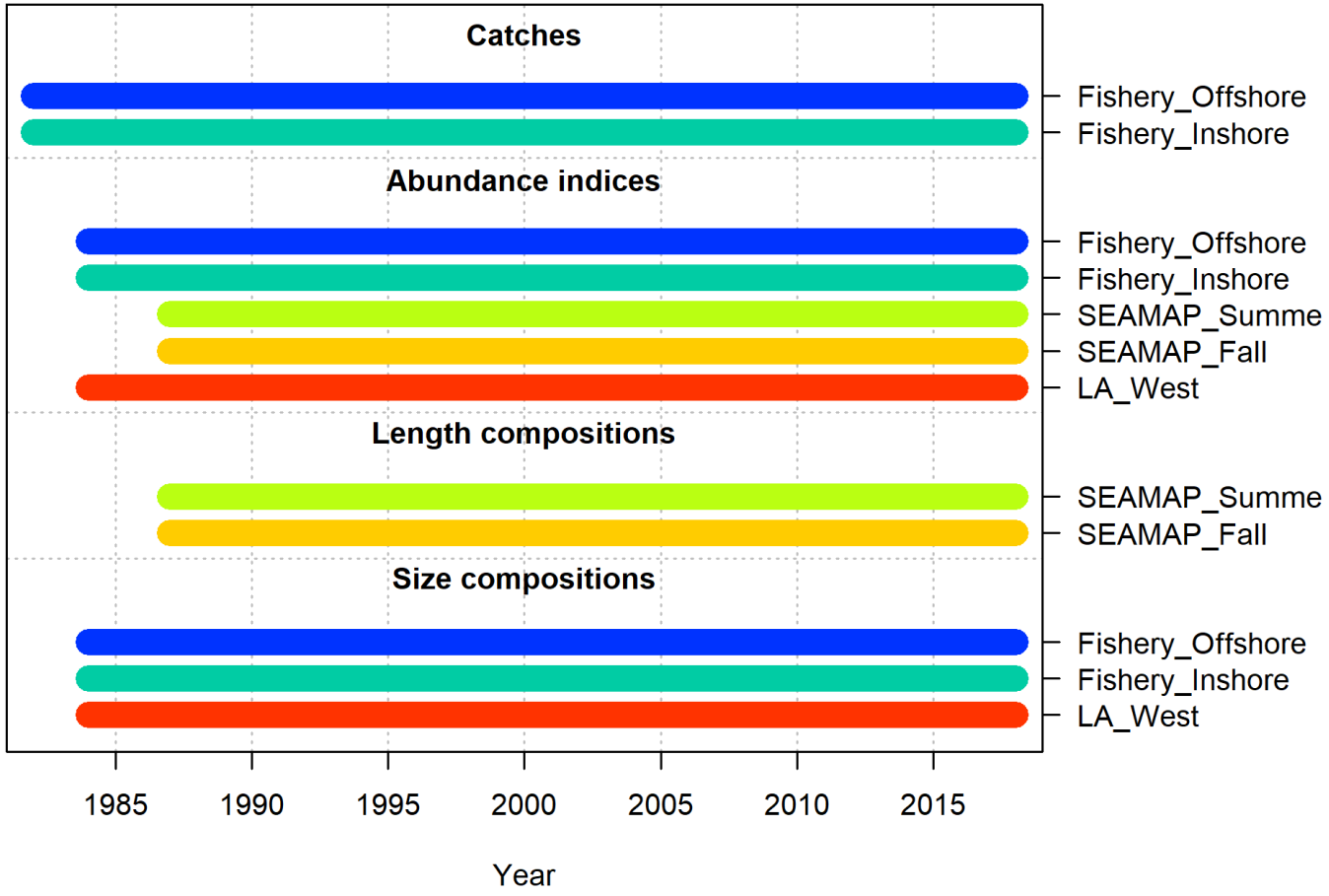
Species	(SS3.30) SSB_{2017} (millions of lbs)	F_{2017}	SSB_{2017}/SSB_{msy}
Brown Shrimp	32.9	1.73	**5.40 x SSB_{msy}**
Pink Shrimp	57.2	0.20	**2.41 x SSB_{msy}**
White Shrimp	629.1	1.58	**1.72 x SSB_{msy}**

* Brown Shrimp SSB_{msy} = 6.10 million lbs; F_{msy} = 9.12
* Pink Shrimp SSB_{msy} = 23.7 million lbs; F_{msy} = 1.35 (where SSB and F are sum of 12 monthly outputs)
* White Shrimp SSB_{msy} = 365.7 million lbs; F_{msy} = 3.48 (where SSB and F are sum of 12 monthly outputs)

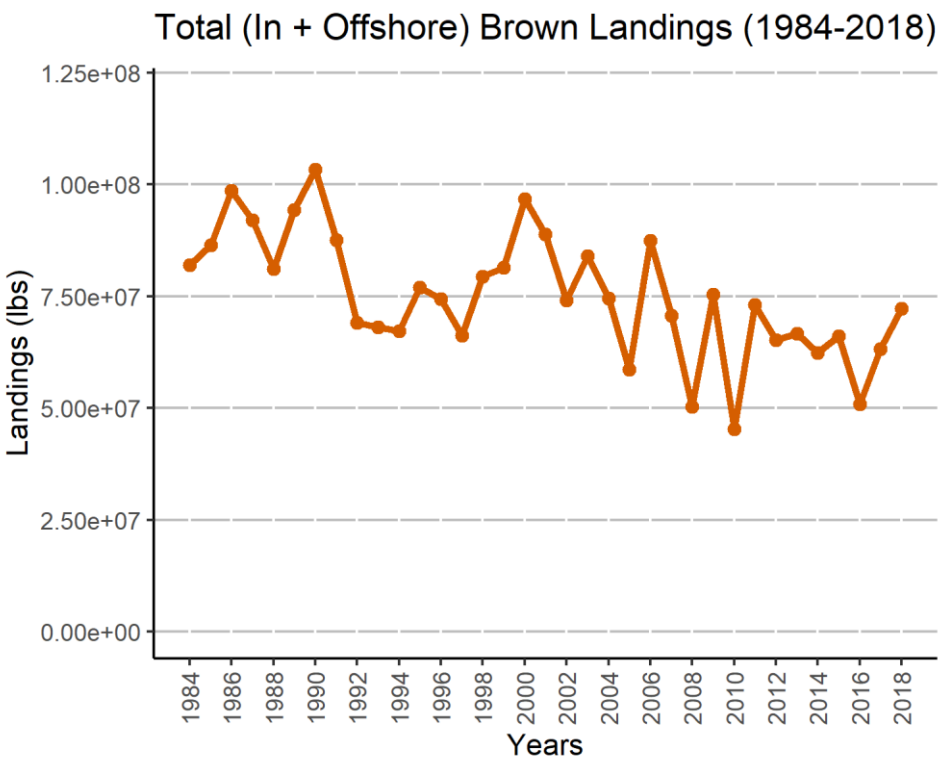
2019 Continuity Models

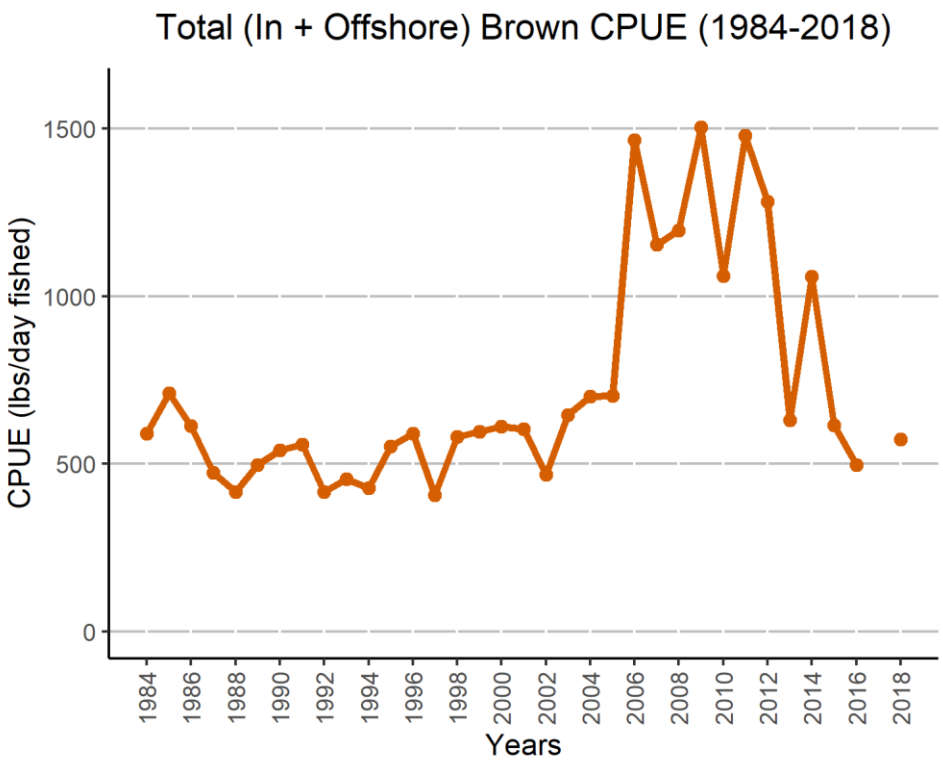
*(historical configuration, with 2018 terminal year)

2019 Brown Continuity Model Inputs



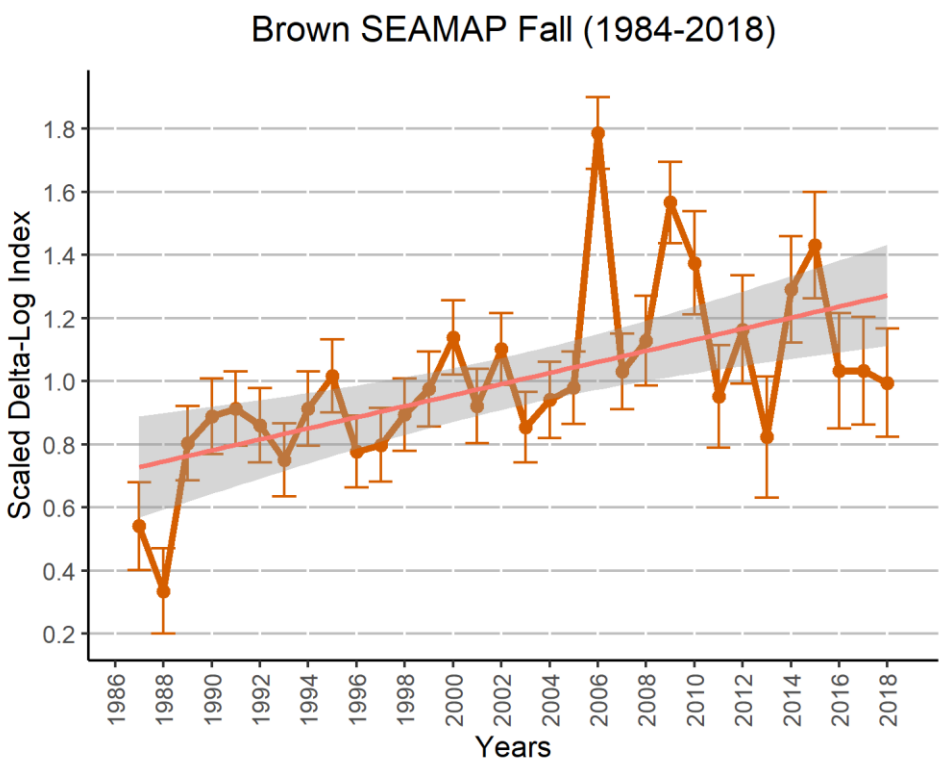
Inputs: Brown (In + Offshore) Landings & CPUE

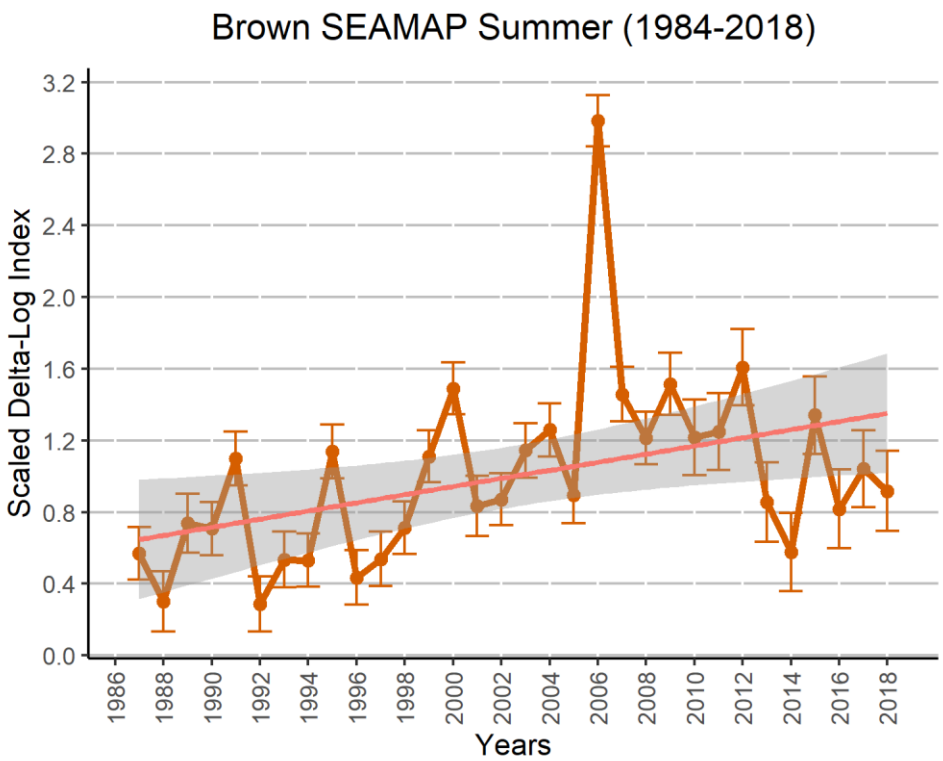




Inputs: 2019 Brown Continuity Model

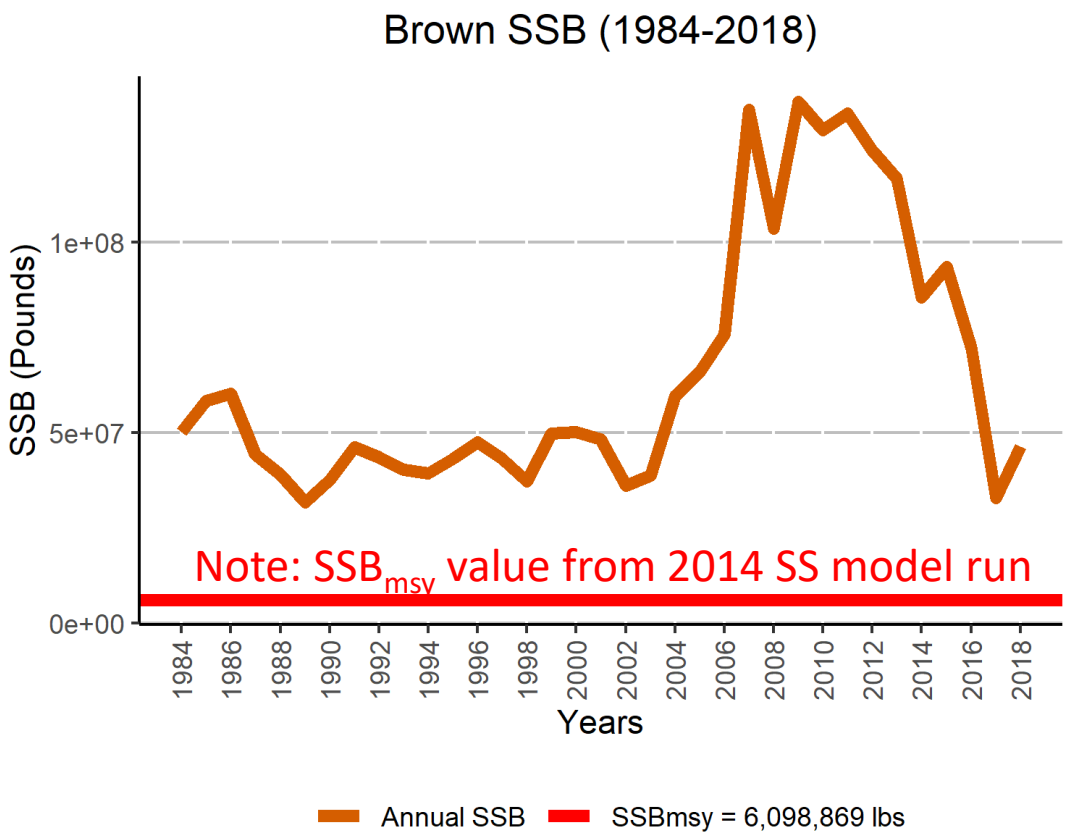
Observed SEAMAP Data (w. linear trend line)





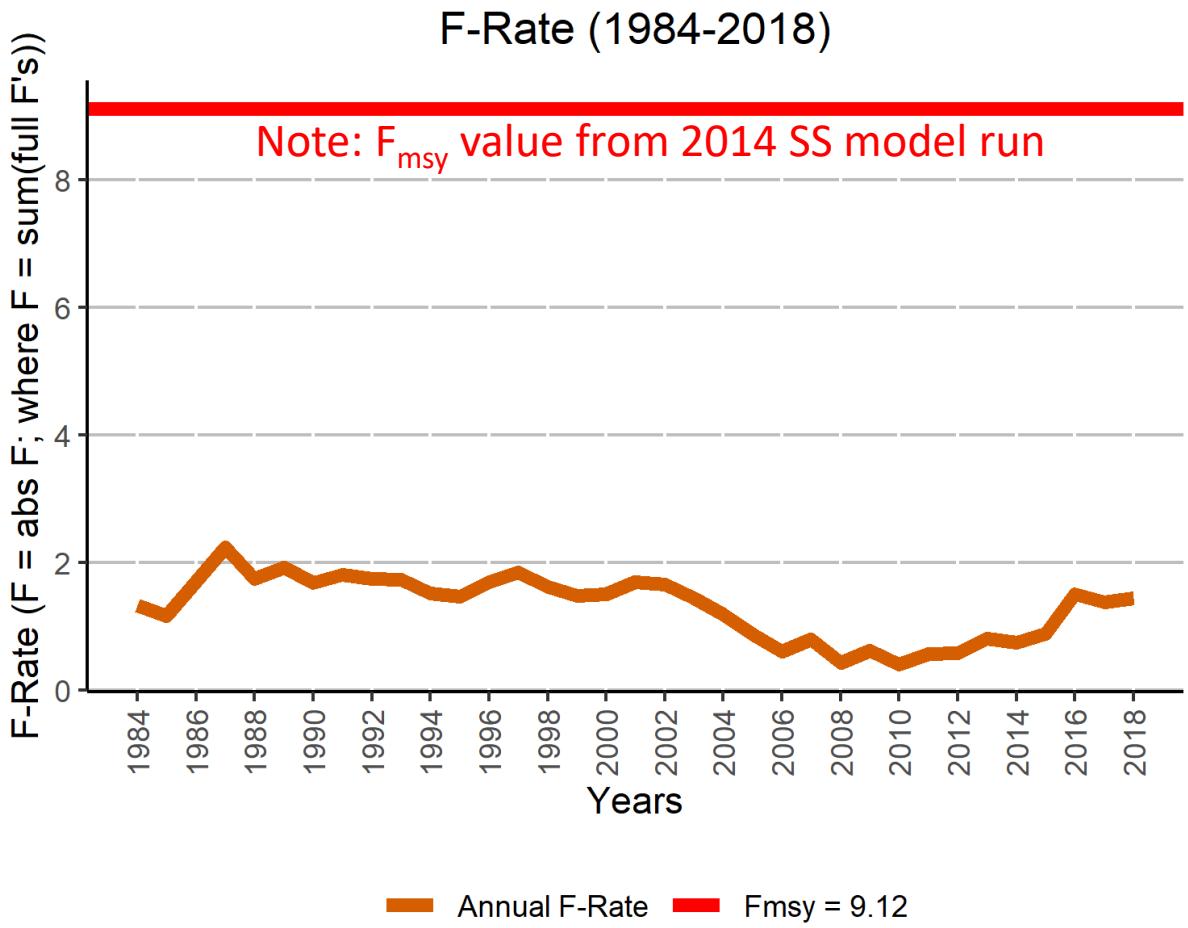
Outputs: 2019 Brown Continuity Model

SSB & SSB_{MSY}



Likelihood Component	Continuity Model
Catch	4.5e-009
Equilibrium catch	0
Survey	452.3
Length Comps	1015.2
Size Frequency Data	19034.1
Recruitment	-28.3
InitEQ_Regime	0
Forecast Recruitment	0.02
Parm Priors	10.2
Parm Softbounds	0.004
Parm Devs	87.8
Total log likelihood	**20,571.5**

Outputs: 2019 Brown Continuity Model F

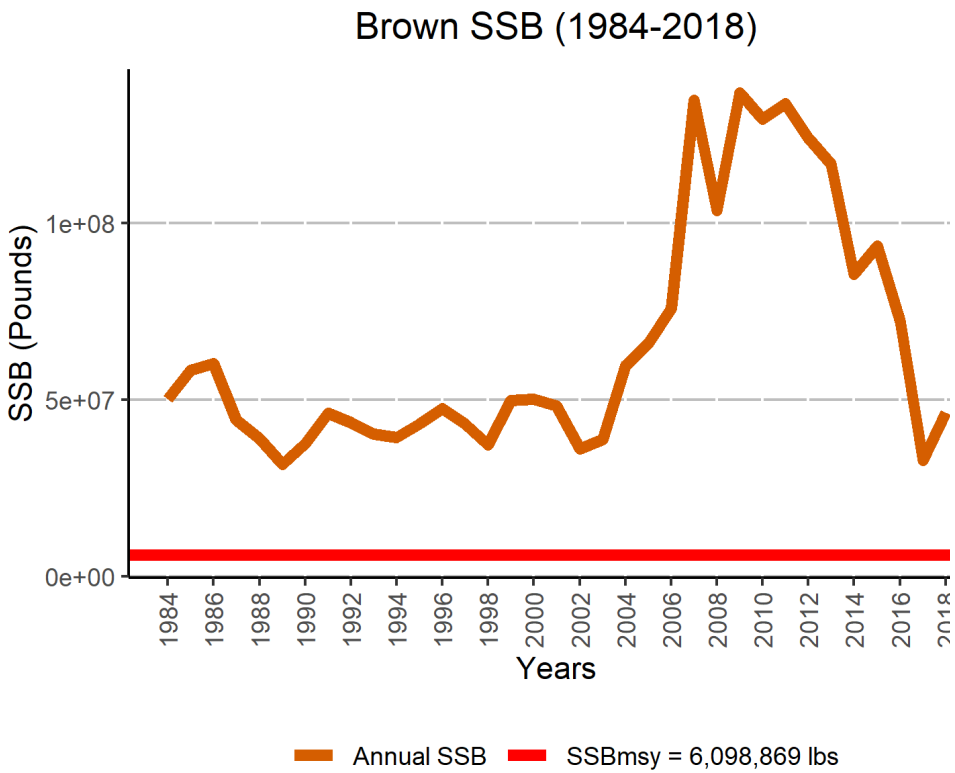


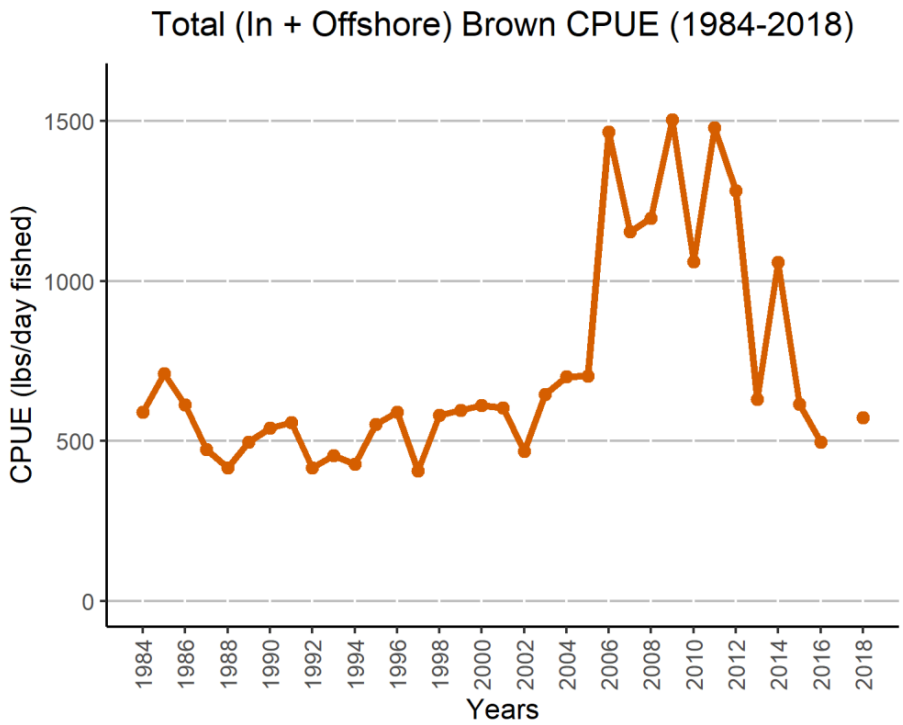
2019 Brown Continuity Model Results

SSB_{2018} (millions of lbs)	F_{2018}	SSB_{2018}/SSB_{msy}
46.3	1.4	**7.6 x SSB_{msy}**

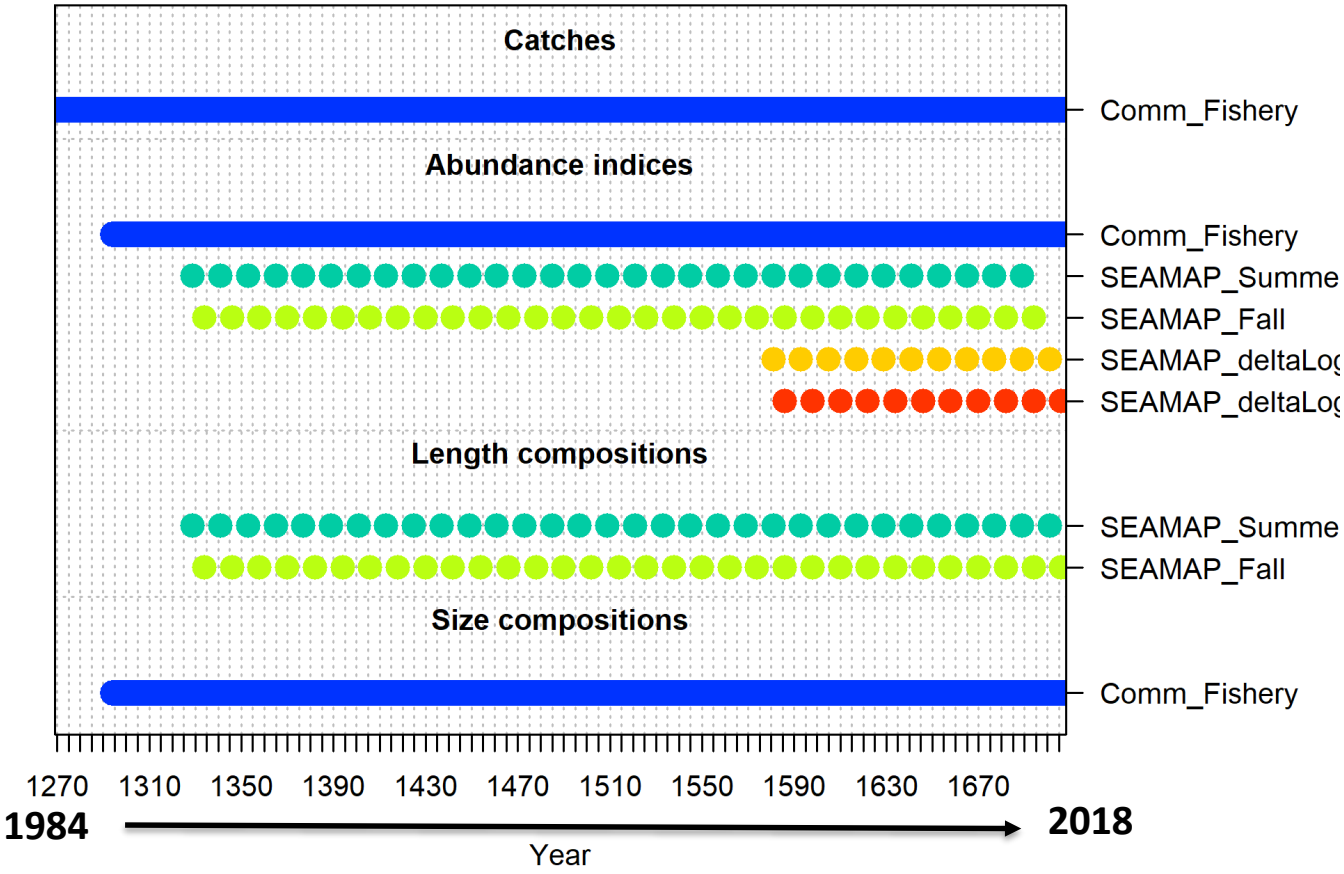
* Brown Shrimp SSB_{msy} = 6.10 million lbs (from a 2014 model run)
* Brown Shrimp F_{msy} = 9.12 (from a 2014 model run)

What's driving SSB in the model?

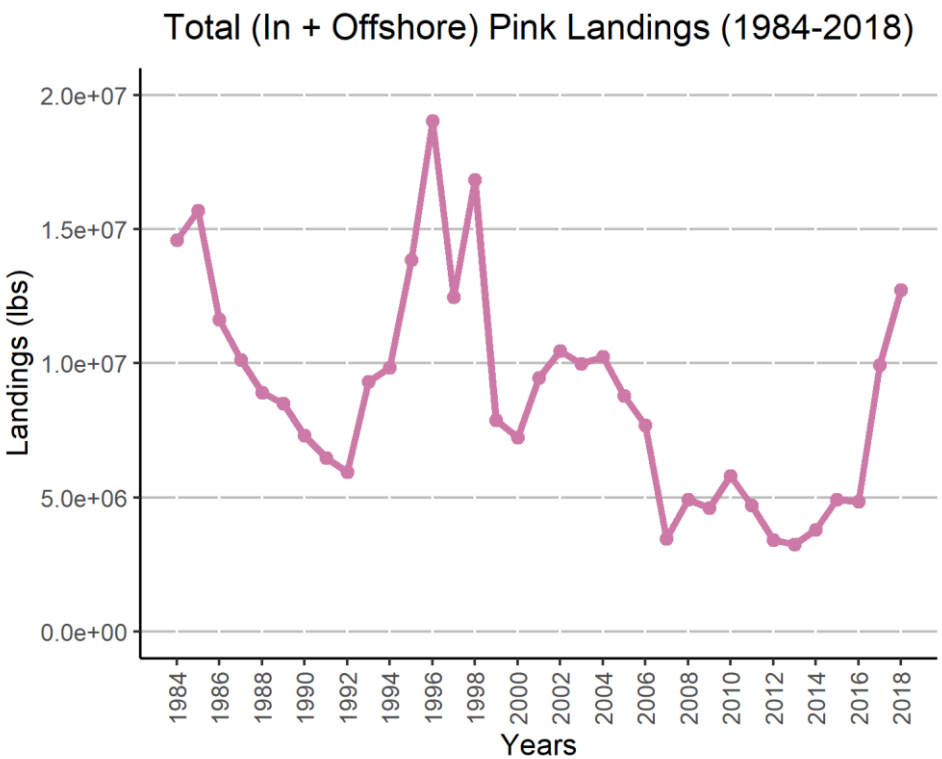


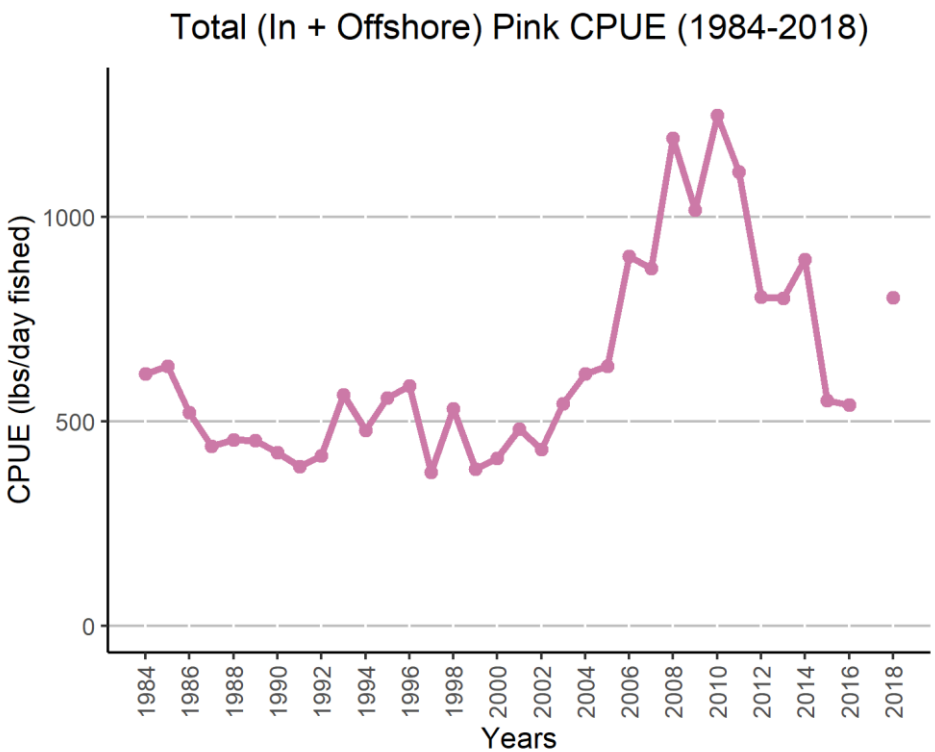


2019 Pink Continuity Model Inputs



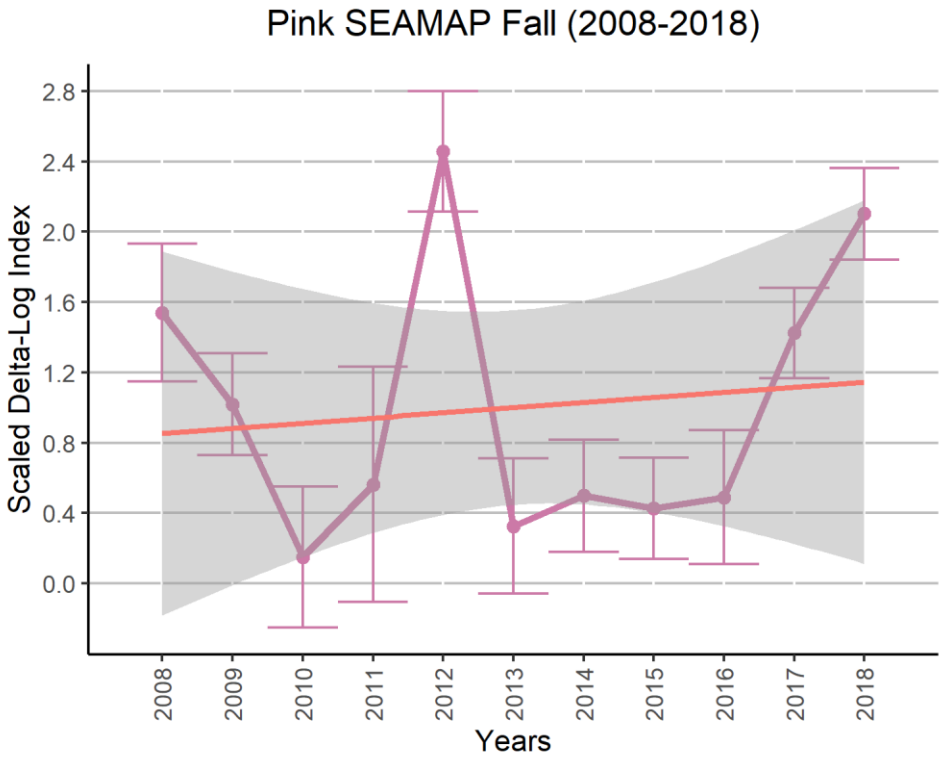
Inputs: Pink (Combined) Landings & CPUE

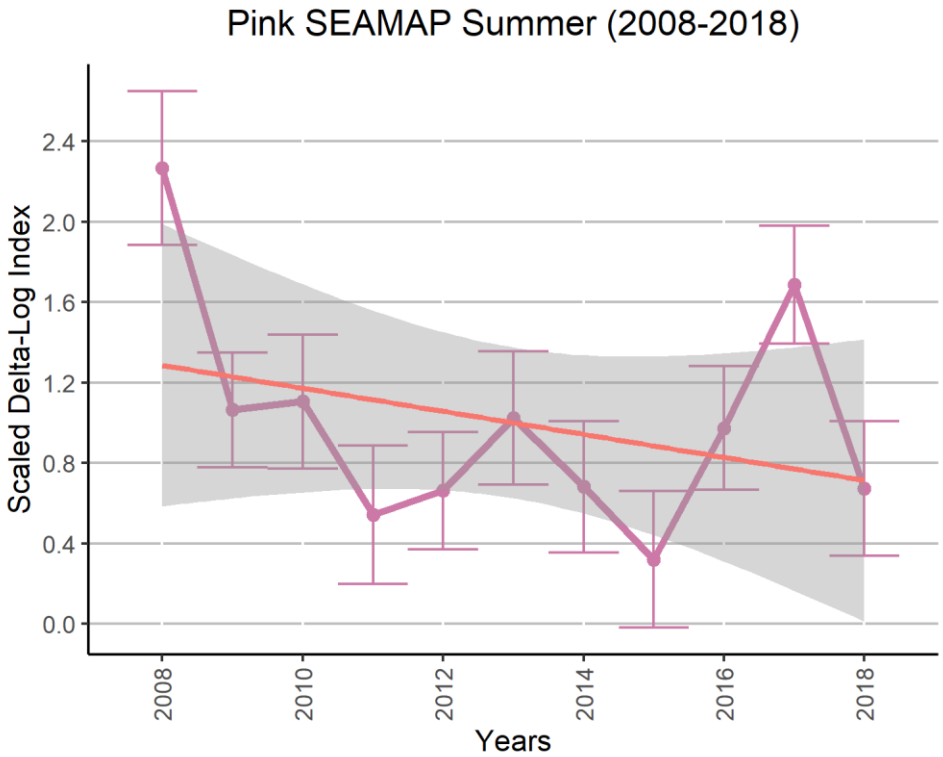




Inputs: 2019 Pink Continuity Model

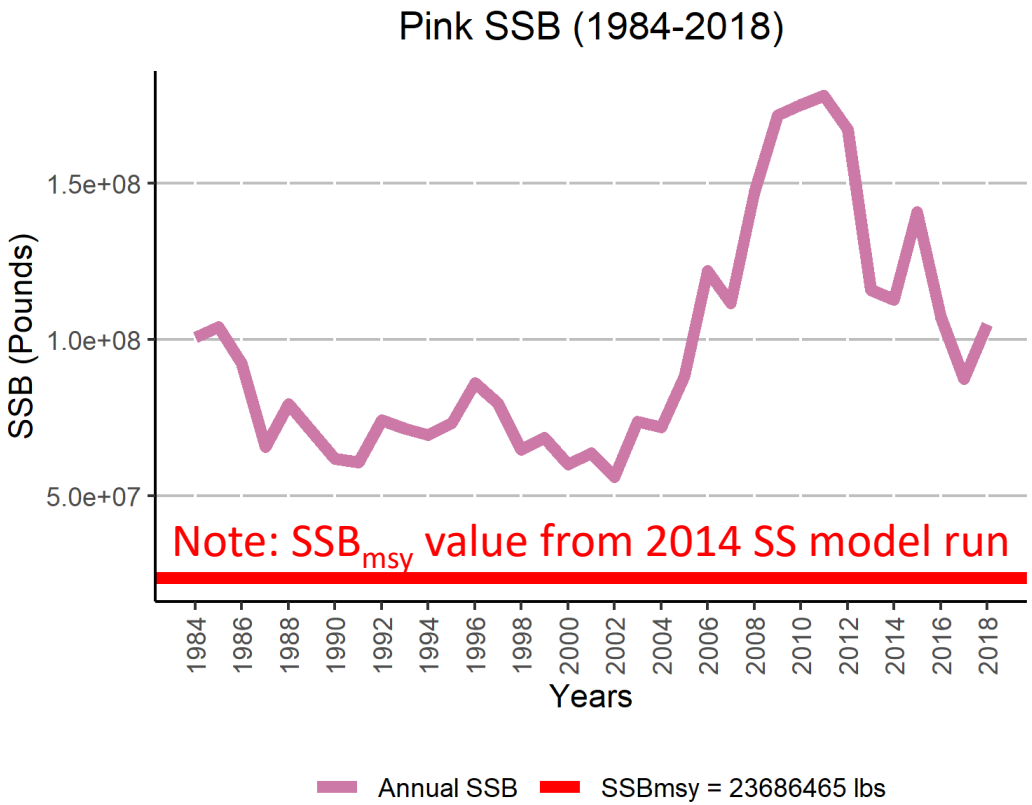
Observed SEAMAP Data (w. linear trend line)





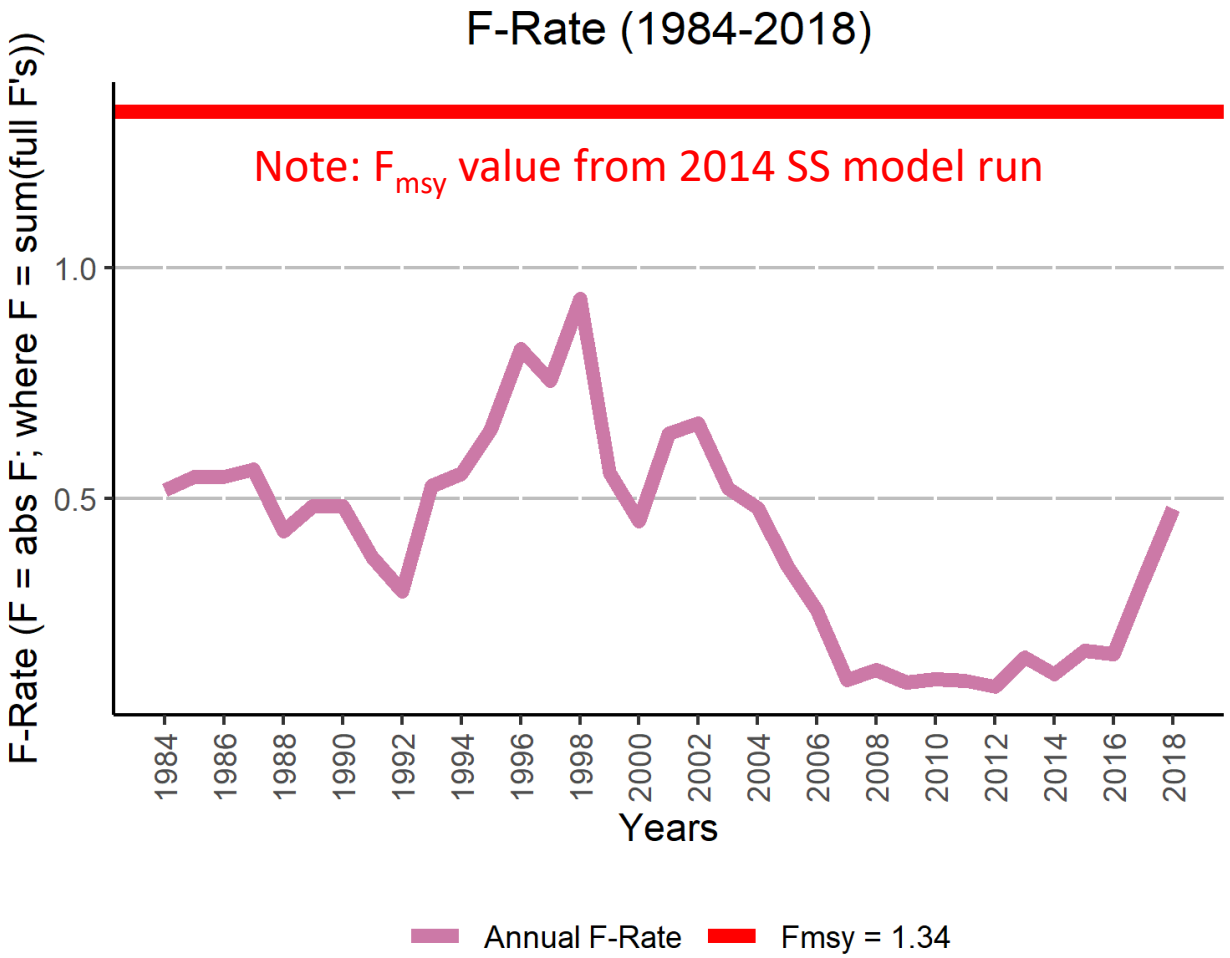
Outputs: 2019 Pink Continuity Model

SSB & SSB_{MSY}



Likelihood Component	Continuity Model
Catch	1.2e-8
Survey	-572.4
Length Comps	1619.7
Size Frequency Data	3728.1
Recruitment	-91.9
InitEQ_Regime	0
Sum_recdevs	2.6e-15
Parm Priors	5.0
Parm Softbounds	0.01
Parm Devs	128.8
Total log likelihood	**4817.2**

Outputs: 2019 Pink Shrimp Continuity Model F

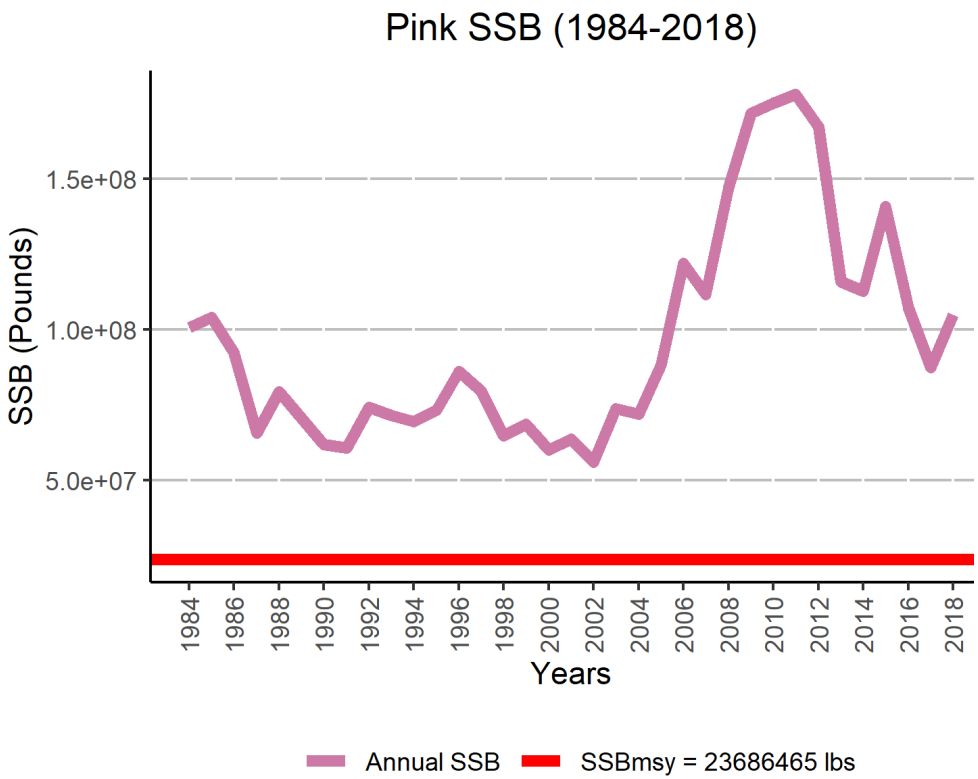


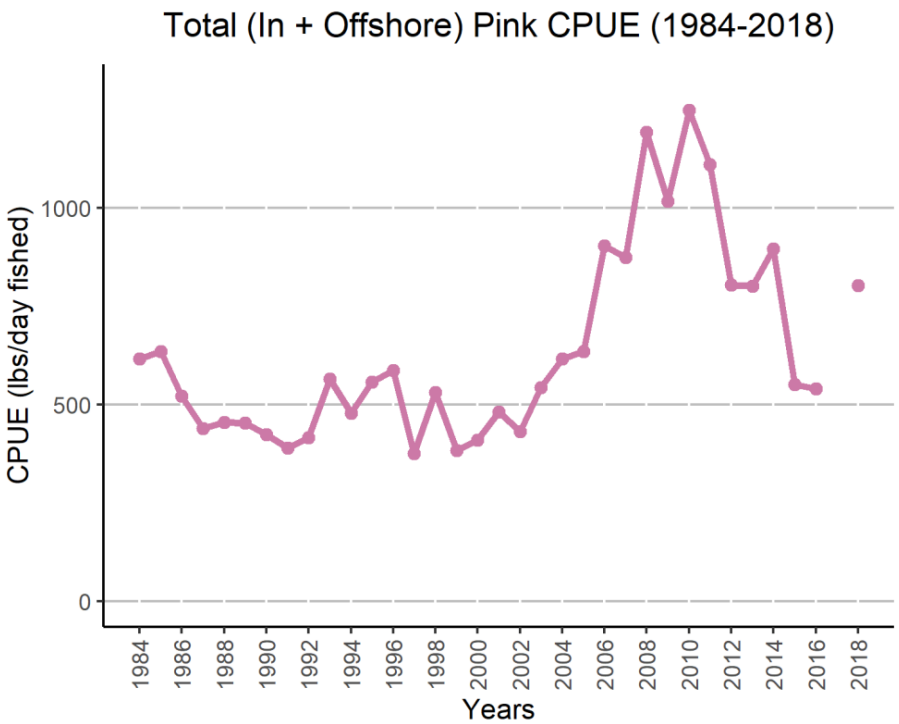
2019 Pink Continuity Model Results

SSB_{2018} (millions of lbs)	F_{2018}	SSB_{2018}/SSB_{msy}
39.7	0.14	**1.7 x SSB_{msy}**

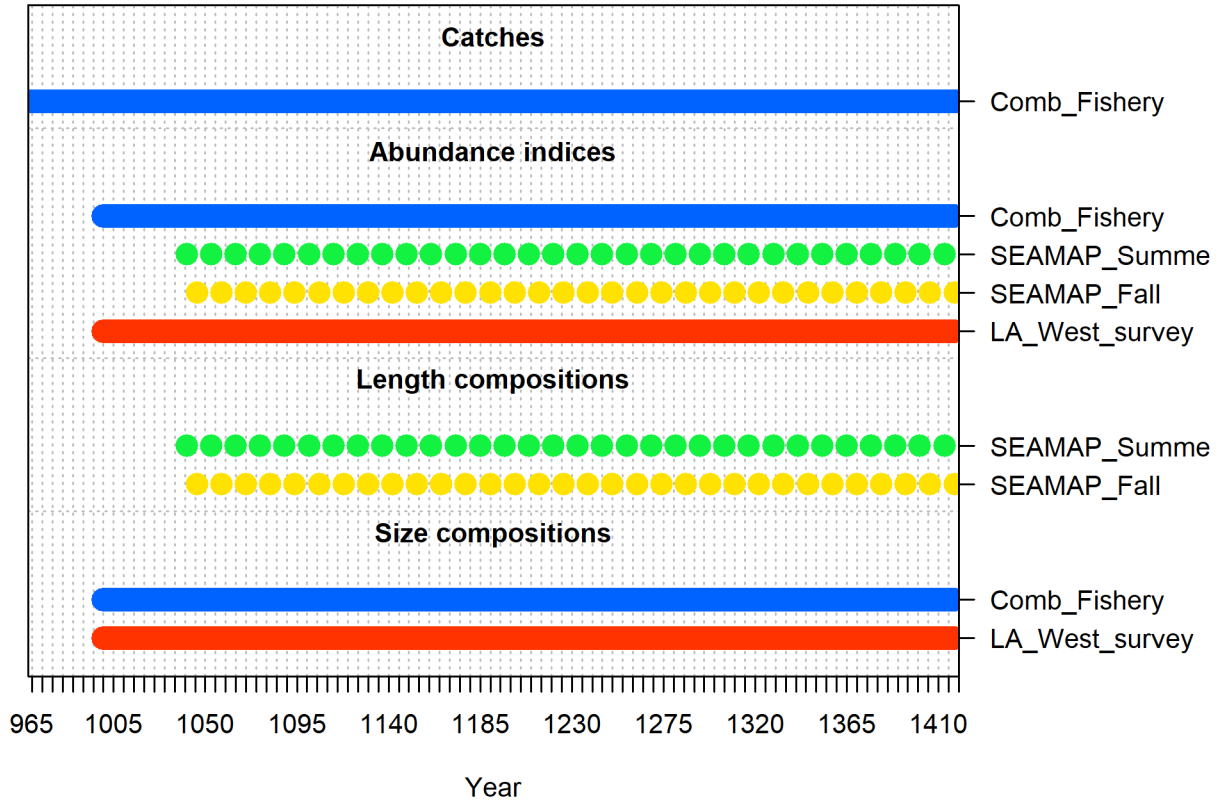
* Pink Shrimp SSB_{msy} = 23.7 million lbs (from a 2014 model run)
* Pink Shrimp F_{msy} = 1.35 (from a 2014 model run)

What's driving SSB in the model?



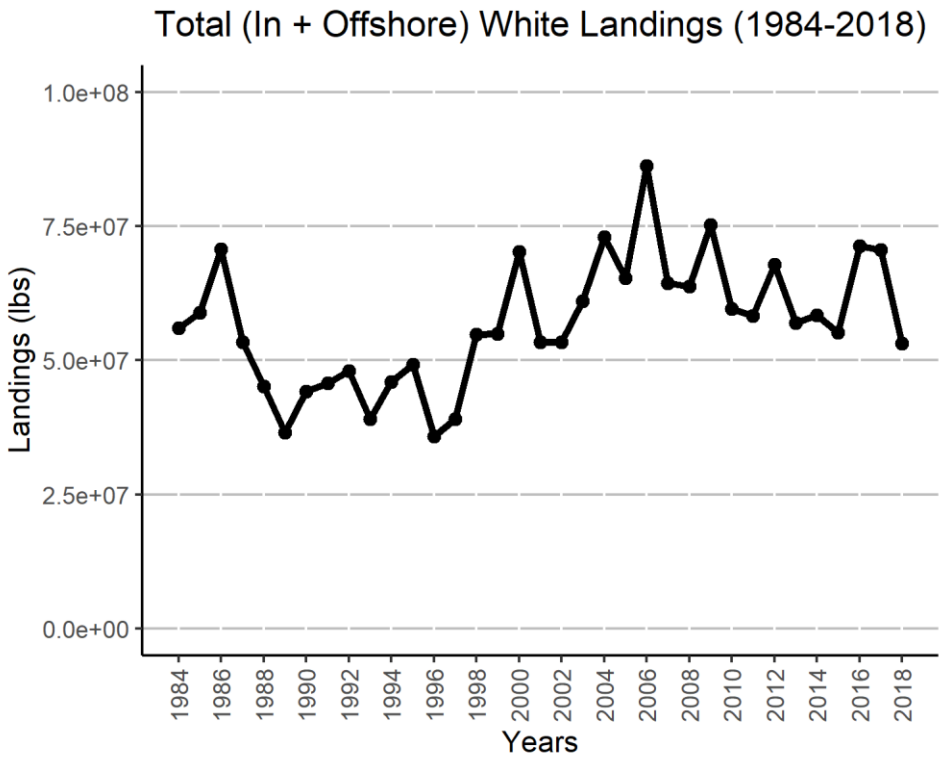


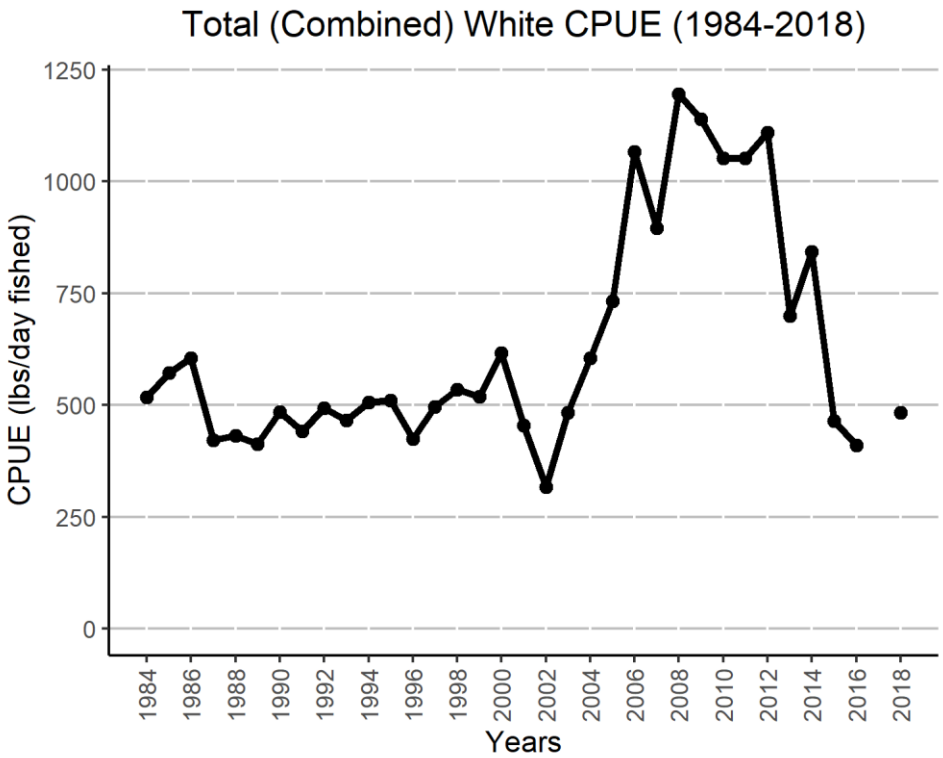
2019 White Continuity Model Inputs



1984 → **2018**

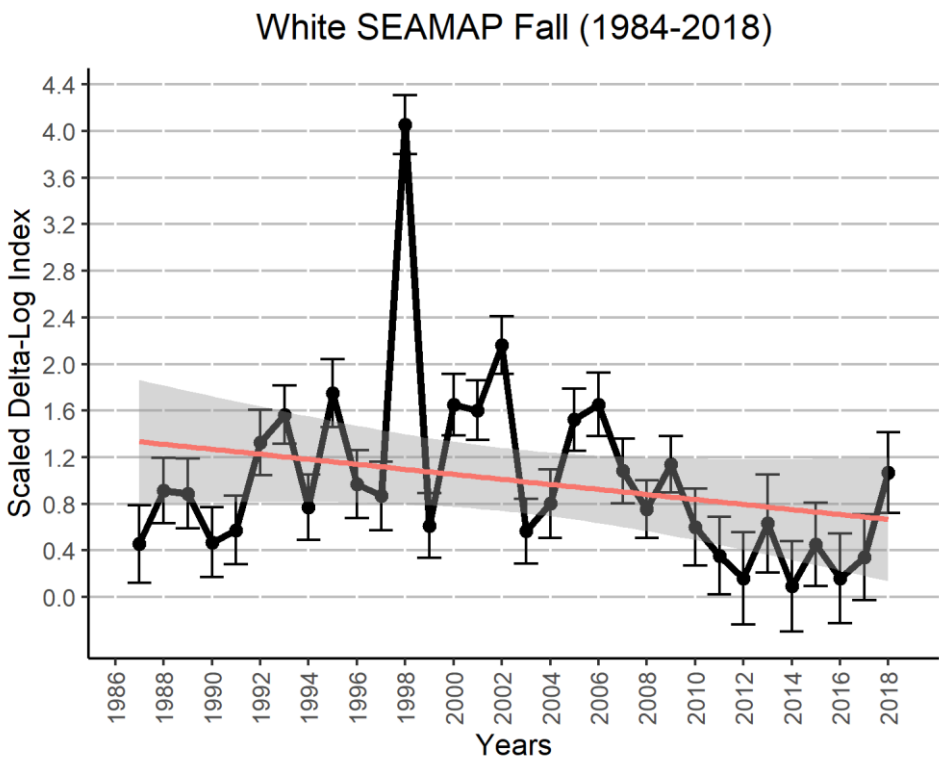
Inputs: White (Combined) Input Landings & CPUE

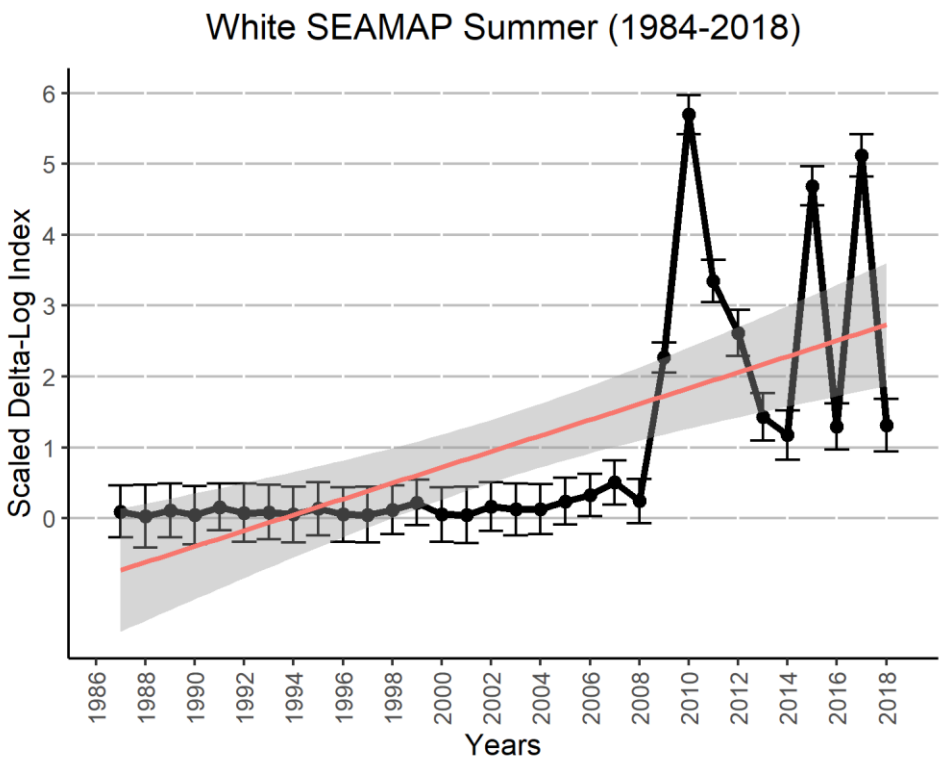




Inputs: 2019 White Shrimp Continuity Model

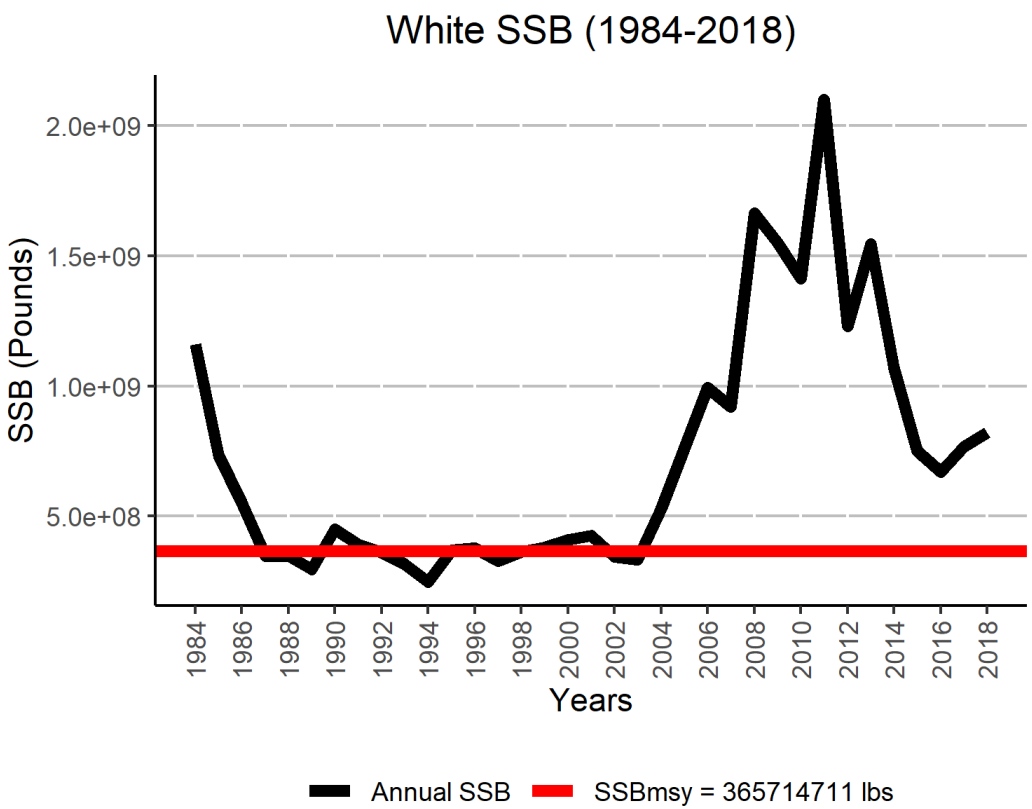
Observed SEAMAP data (w. linear trend line)





Outputs: 2019 White Continuity Model

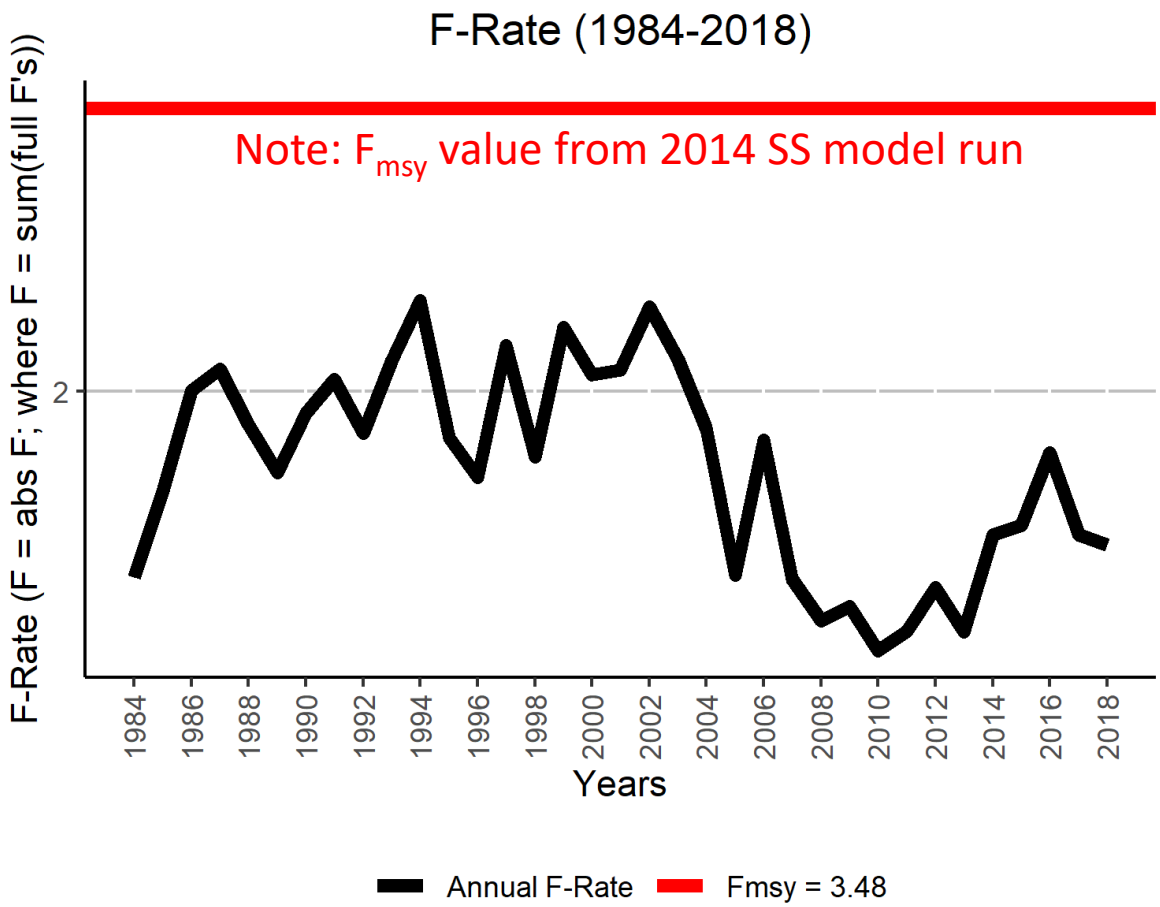
SSB & SSB_{MSY}



Likelihood Component	Continuity Model
Catch	0.19
Survey	335.8
Length Comps	1259.3
Size Frequency Data	10491.9
Recruitment	109.2
InitEQ_Regime	0
Forecast Recruitment	0
Parm Priors	13.3
Parm Softbounds	0.009
Parm Devs	11.2
Total log likelihood	**12,220.9**

Note: SSB_{msy} value from 2014 SS model run

Outputs: 2019 White Shrimp Continuity Model F

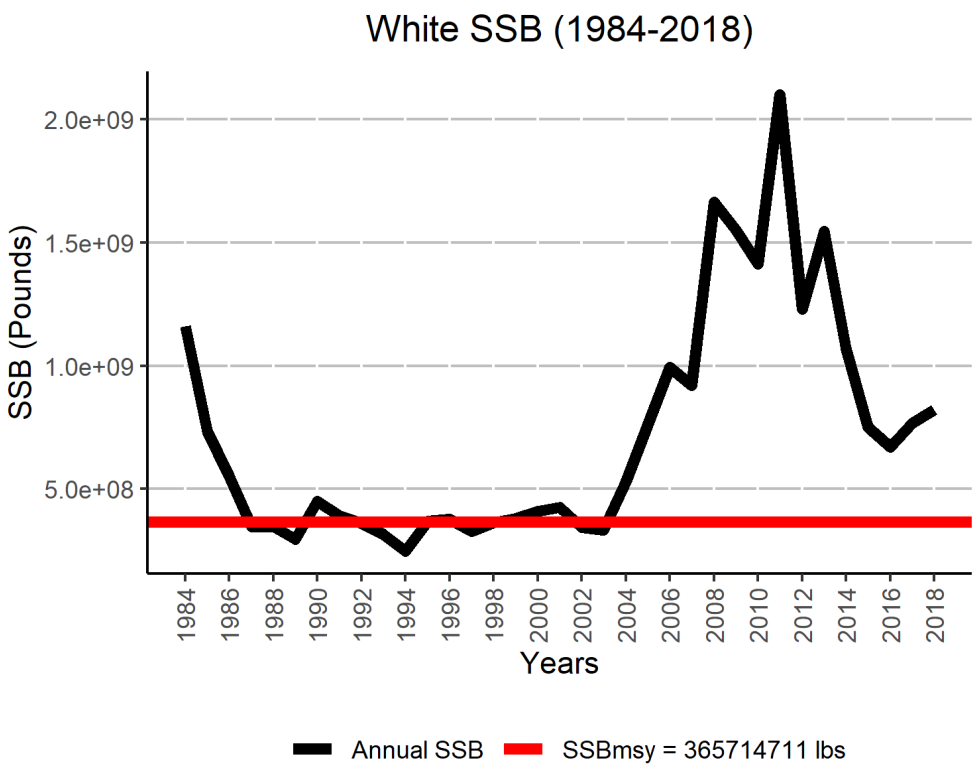


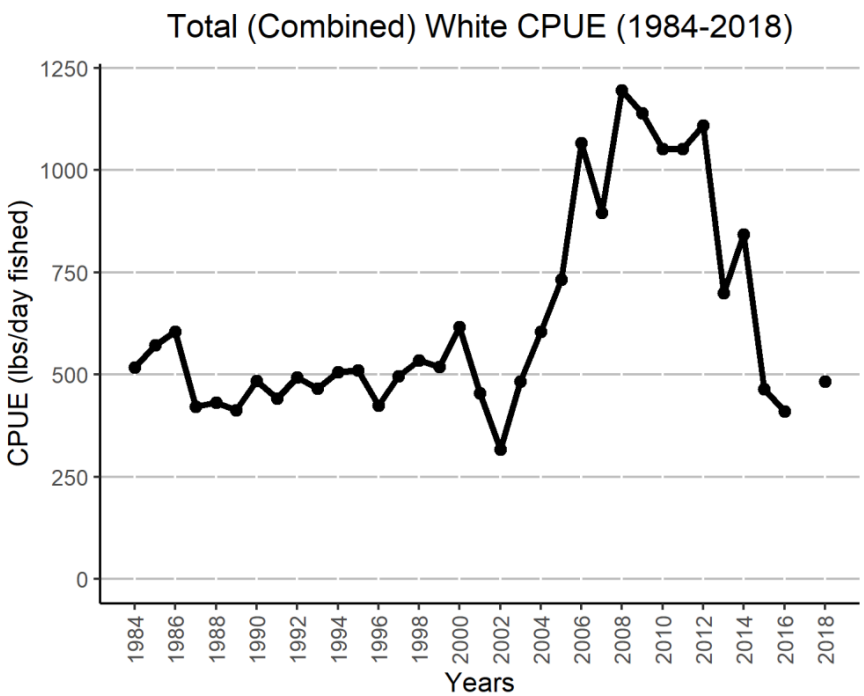
2019 White Continuity Model Results

SSB_{2018} (millions of lbs)	F_{2018}	SSB_{2018}/SSB_{msy}
860.1	1.1	**2.4 x SSB_{msy}**

* White Shrimp SSB_{msy} = 365.7 million lbs (from a 2014 model run)
* White Shrimp F_{msy} = 3.48 (from a 2014 model run)

What's driving SSB in the model?





Conclusions

1. Significant effort made - in collaboration with SEFSC SA scientists/leadership + Rick Methot, to review/improve the assessment models this year, which highlighted a number of technical concerns.
2. Therefore, a comprehensive review is suggested for all 3 assessment models - through a SEDAR “research track”, or an equivalent internal/SEFSC process.
3. Until that review is complete SEFSC has presented here a strict assessment update, but does not recommend using the continuity models to update the benchmarks at this time (i.e., 5 year update of benchmarks: per Amend 15).

Acknowledgements

Drs. Rick Hart, Rick Methot, & SEFSC Assessment Folks

National Marine Fisheries Service
Assistance with SS Model Development

Shanae Allen

Florida Fish and Wildlife
Diagnostics R code

Adam Pollack

National Marine Fisheries Service
SEAMAP indices and length comps

Joe West

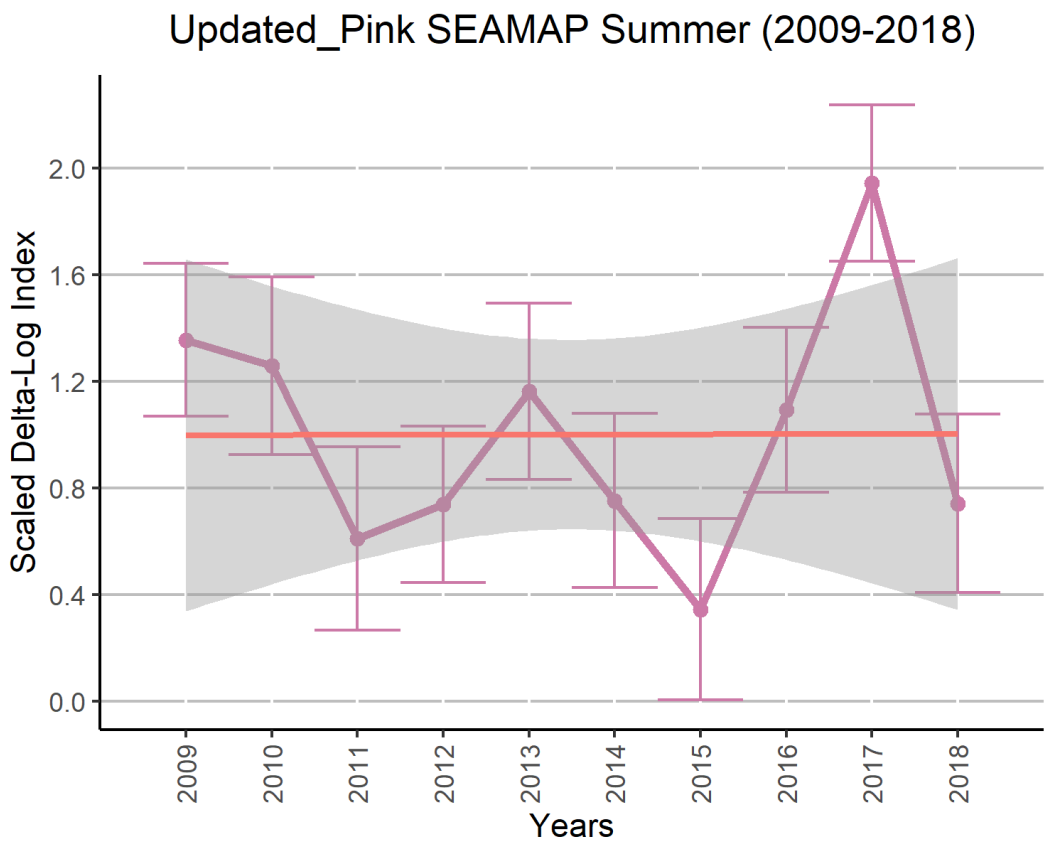
Louisiana Wildlife and Fisheries

Special Thanks To: GOM Commercial Shrimp Fishermen

Pink Shrimp

Observed SEAMAP Data

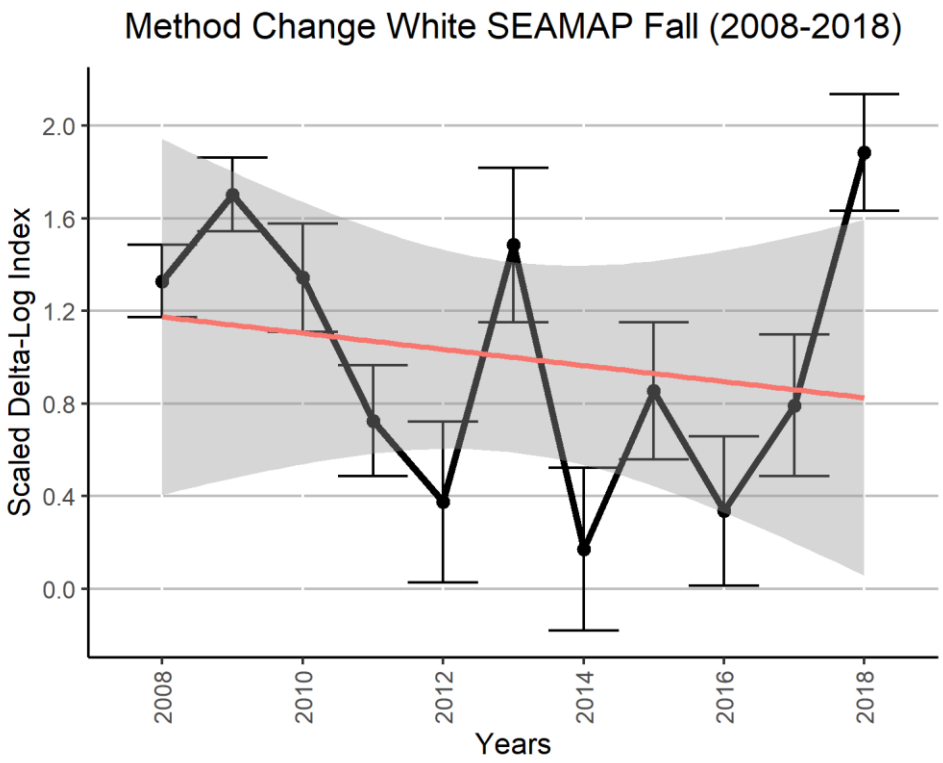
Looking @ Method Change Years Only

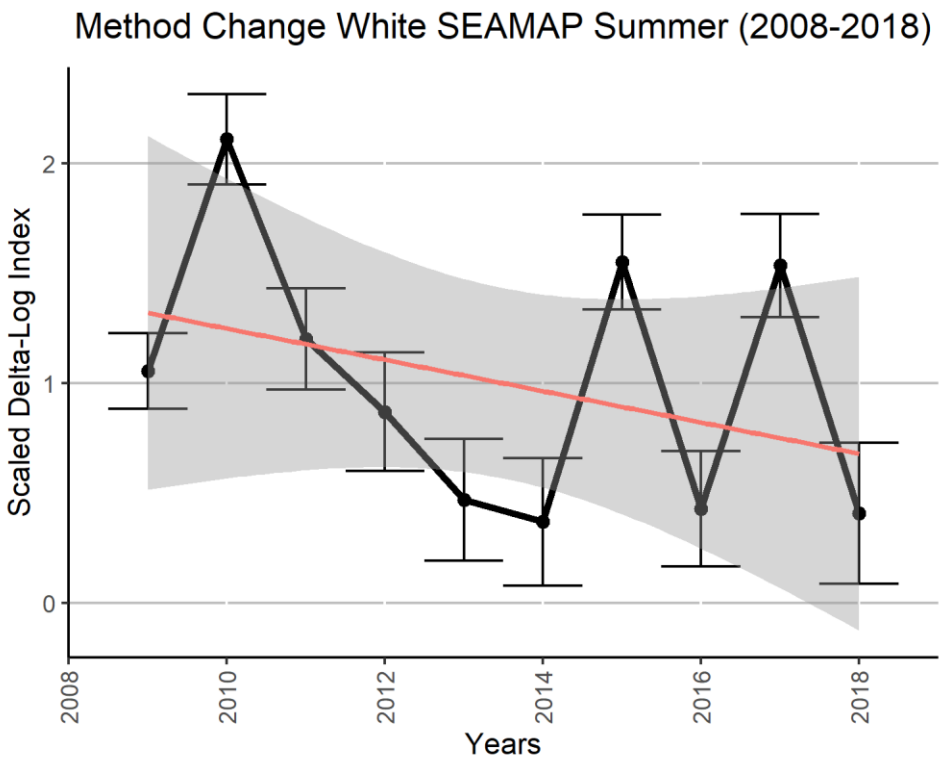


White Shrimp

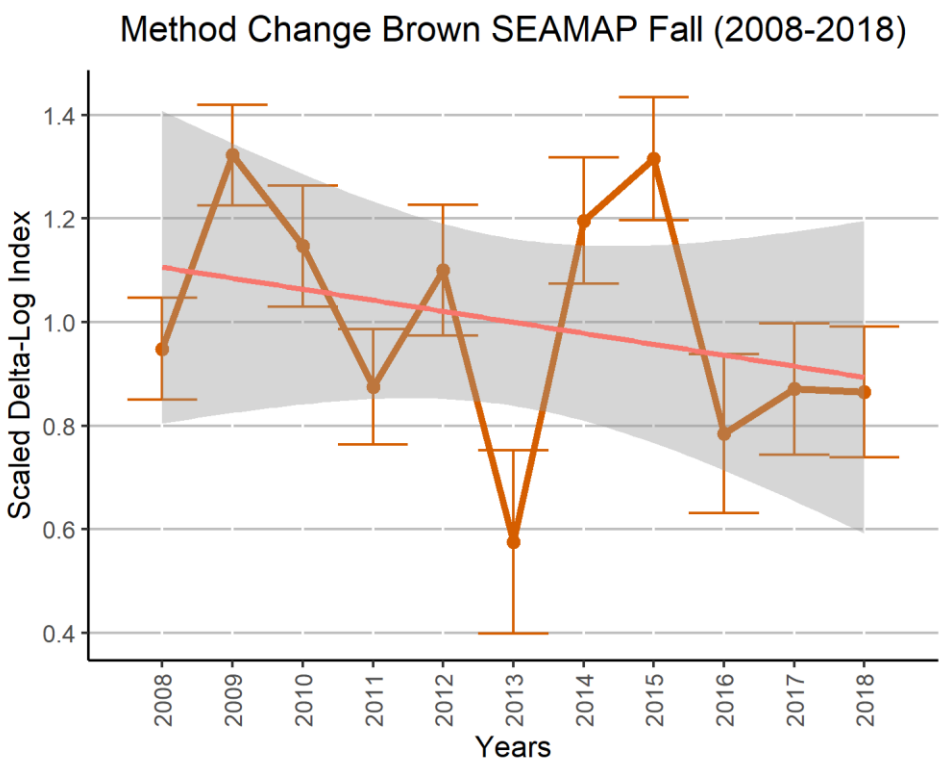
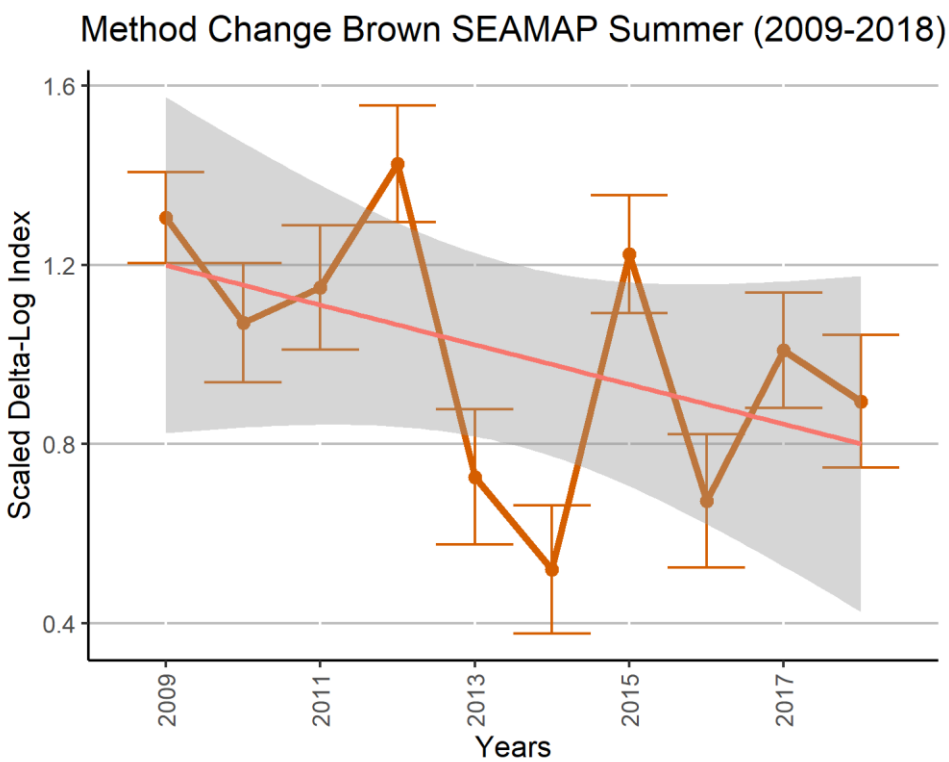
Observed SEAMAP Data

<u>Looking @ Method Change Years Only</u>





Brown Shrimp

Observed SEAMAP Data

Looking @ Method Change Years Only