SEDAR 32 Blueline Tilefish Projections

SSC meeting
April 2014

Outline

I. Assessment summary (brief)

II. Projections

III. Inspection of recent age compositions

Assessment Summary

- Assessment conducted through the SEDAR process (Jan-Aug 2013)

- Review Workshop in August 2013

- 3 models presented (catch-age, age-structured prodn, age-aggregated prodn)

- Recommendation: Status determined using BAM base configuration
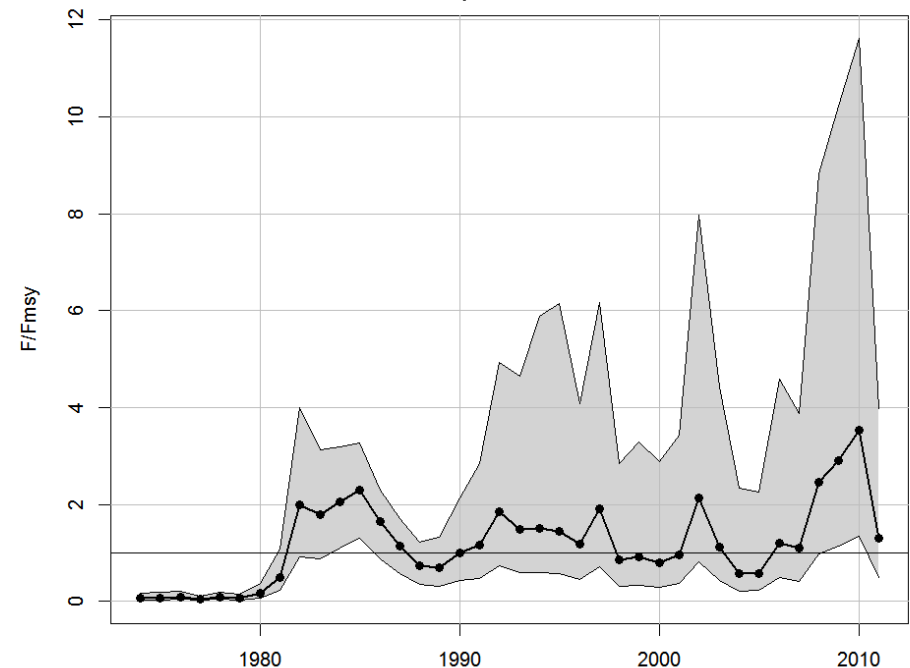
- Presented to SSC October 2013

Biomass Status: Overfished
$(SSB_{2011}/MSST = 0.91)$
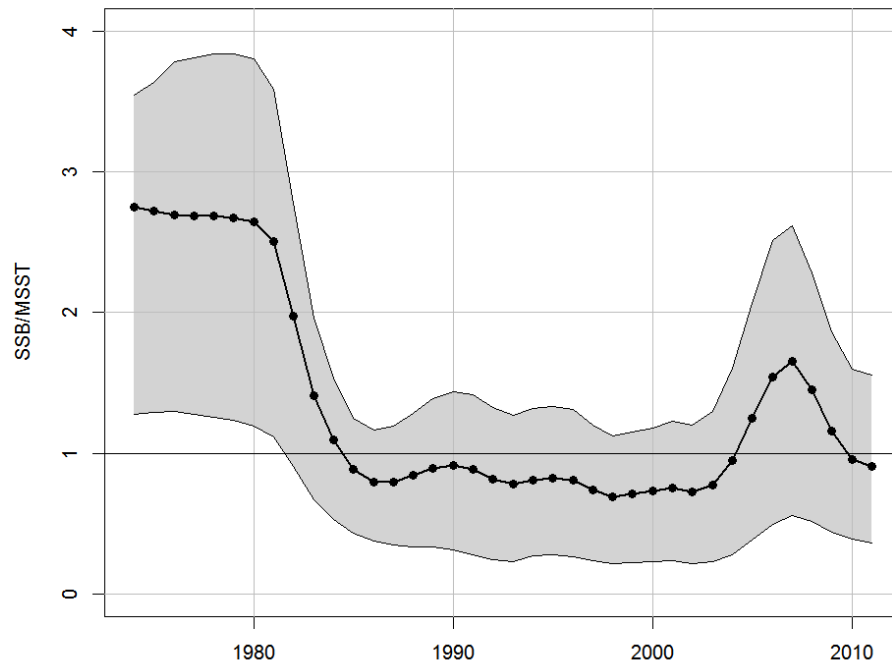
Exploitation Status: Overfishing
$F_{2011}/F_{msy} = 1.29$
$F_{2009-2011}/F_{msy} = 2.37$
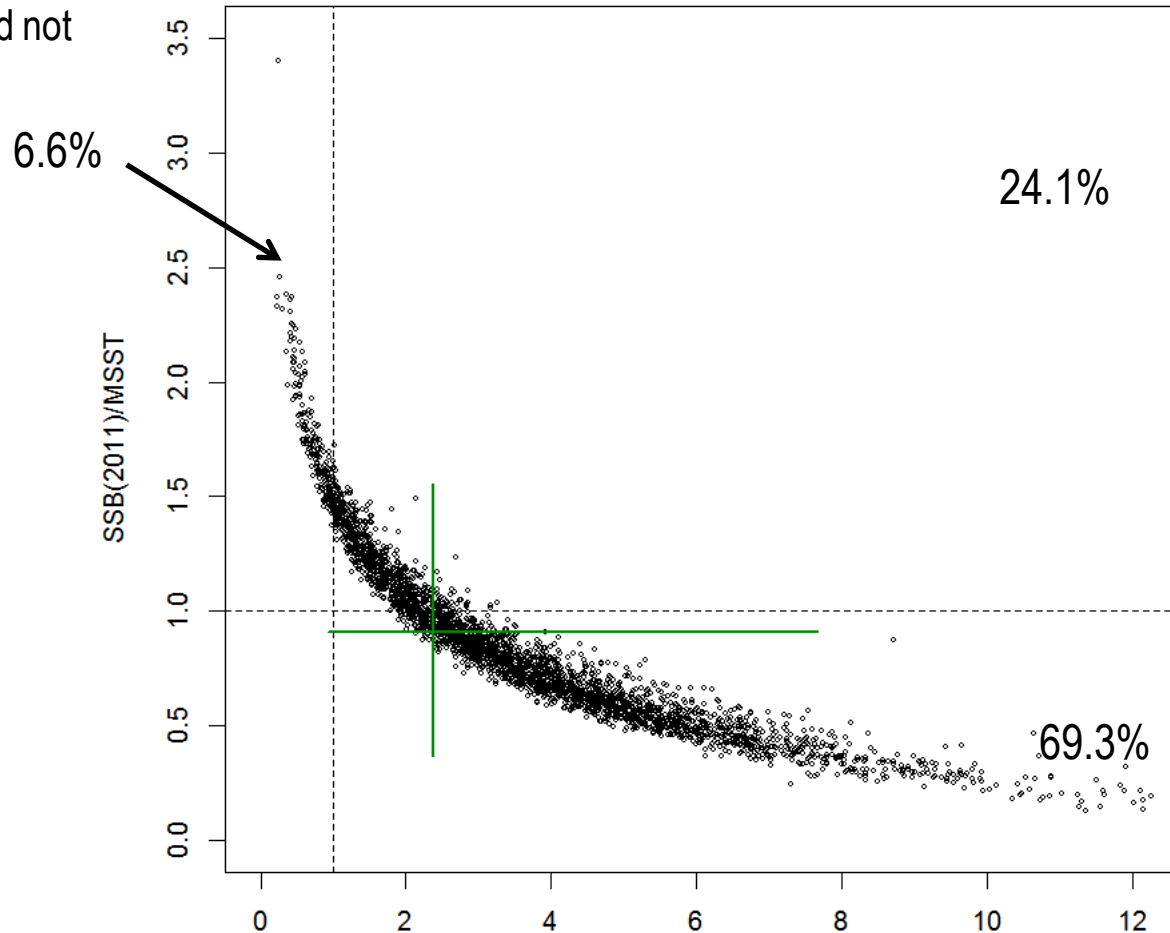
MCB Analysis

Monte carlo: steepness (base=0.84, range: 0.32-0.99)
              natural mortality (base=0.1, range 0.046-0.155)
Bootstrap: landings, indices, and age comps

No overfishing and not
overfished

Overfishing but not
overfished

6.6%

24.1%

69.3%

SSB(2011)/MSST

F(2009-2011)/Fmsy

No overfishing but overfished

Overfishing and overfished

Model Outputs: Management Quantities

Table 3.12. *Estimated status indicators, benchmarks, and related quantities from the Beaufort catch-age model, conditional on estimated current selectivities averaged across fisheries. Rate estimates (F) are in units of y^{-1}; status indicators are dimensionless; and biomass estimates are in units of metric tons or pounds, as indicated. Spawning stock biomass (SSB) and minimum stock size threshold (MSST) are measured by total biomass of mature females. Symbols, abbreviations, and acronyms are listed in Appendix A.*

Quantity	Units	Estimate	SE	MCB median
F_{MSY}	y^{-1}	0.302	0.262	0.229
$85\%F_{MSY}$	y^{-1}	0.256	0.223	0.194
$75\%F_{MSY}$	y^{-1}	0.226	0.196	0.171
$65\%F_{MSY}$	y^{-1}	0.196	0.170	0.149
$F_{30\%}$	y^{-1}	0.356	0.213	0.356
$F_{40\%}$	y^{-1}	0.203	0.101	0.200
$F_{50\%}$	y^{-1}	0.126	0.056	0.124
B_{MSY}	mt	679.5	341.4	785.3
SSB_{MSY}	mt	246.6	165.0	298.7
MSST	klb	489.4	157.0	268.9
MSY	klb	226.5	27.2	234.4
R_{MSY}	1000 age-1 fish	124.0	46.3	129.4
Y at $85\%F_{MSY}$	1000 lb	225.8	26.8	233.4
Y at $75\%F_{MSY}$	1000 lb	224.1	25.9	231.4
Y at $65\%F_{MSY}$	1000 lb	221.0	24.6	227.6
$F_{2009-2011}/F_{MSY}$	—	2.37	2.15	3.34
F_{2011}/F_{MSY}	—	1.30		
$SSB_{2011}/MSST$	—	0.909	0.378	0.801

Consistency Among Alternative Model Structures

Exploitation Status
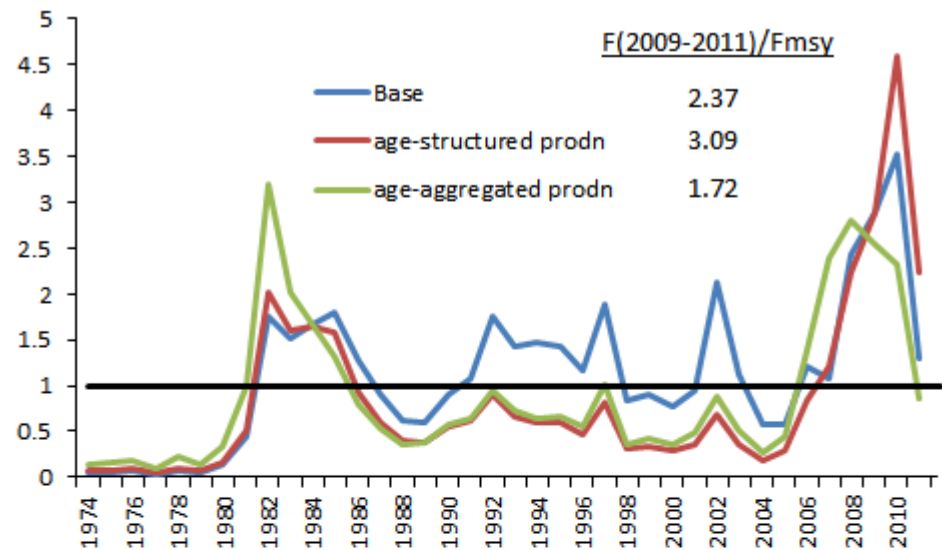
Biomass Status
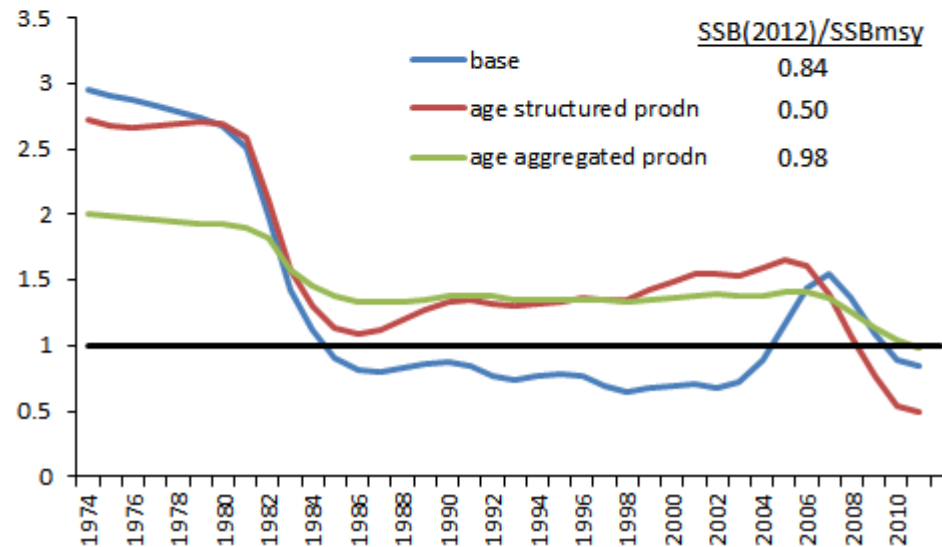
Available Projections

Projection	Projection Scenarios	Interim pd	Mgmt Applied	Projection pd	Duration	Source
1	F=0	1 yr	2013	4 yrs	5	Assessment Rpt
2	F=Frebuild 50%	1 yr	2013	9 yrs	10	Assessment Rpt
3	F=Fmsy	1 yr	2013	4 yrs	5	Assessment Rpt
4	F=Fcurrent	1 yr	2013	4 yrs	5	Assessment Rpt
5	F=0	3 yr	2015	9 yrs	12	Nov. 25 document
6	F=Frebuild 50%	3 yr	2015	9 yrs	12	Nov. 25 document
7	F=Fmsy	3 yr	2015	9 yrs	12	Nov. 25 document
8	F=Fcurrent	3 yr	2015	9 yrs	12	Nov. 25 document
9	F=Frebuild 72.5%	3 yr	2015	9 yrs	12	Nov. 25 document
10	Pstar (0.5)	3 yr	2015	3 yr	6	Nov. 25 document
11	Pstar (0.3)	3 yr	2015	3 yr	6	Nov. 25 document
12	Pstar (0.5)	2 yr	2014	5 yr	7	Apr. 7 document
13	Pstar (0.3)	2 yr	2014	5 yr	7	Apr. 7 document
14	Constant L=224.1 klb	2 yr	2014	5 yr	7	Apr. 7 document
15	F=75% Fmsy	2 yr	2014	5 yr	7	Apr. 7 document
16	F=Fmsy	2 yr	2014	5 yr	7	Apr. 7 document
17	Pstar (0.5), update data	2 yr	2014	5 yr	7	Apr. 28 document
18	Pstar (0.3), update data	2 yr	2014	5 yr	7	Apr. 28 document
19	F=75% Fmsy, update data	2 yr	2014	5 yr	7	Apr. 28 document
20	F=Fmsy, update data	2 yr	2014	5 yr	7	Apr. 28 document

Projections

Projection time period: 7 years (2012-2018)

Data:
- Updated 2012 and 2013 landings and discards (April 21, 2014)

- 2013 data are still considered preliminary

- Assumed catch of 224,100 lb for 2014 (equilibrium yield at 75% F_{msy})—emergency action rule under consideration for 2014

Projections:
- Constant F projections at 75% F_{msy} and F_{msy}

- P* Analysis at P*=0.3 and P*=0.5

Projection Methodology

- Same methodology as in previous SEDAR assessments (since SEDAR 15)

- Uses same parameters (e.g., selectivity, S-R, catchability) estimated or assumed (e.g., natl mortality) by the assessment model

- Each projection replicate (10,000 reps) is an extension into the future of a single, randomly chose MCB run. Incorporates uncertainty in:
    - Data (bootstrap of landings + discards, indices, and age compositions)
    - Key model parameters (monte carlo on steepness, natural mortality)

- Initialization (2012 age-1 abundance) based on 2011 SSB and average S-R relationship with variability added. Variability added to ages 2-4 in 2012— year classes where rec devs not estimated.

- Assumptions:
    - No structural model uncertainty
    - Fishery selectivity patterns and proportion of total effort are the same
    - Past recruitment residuals represent future uncertainty in recruitment
    - No implementation uncertainty (e.g., ABC is taken each year)
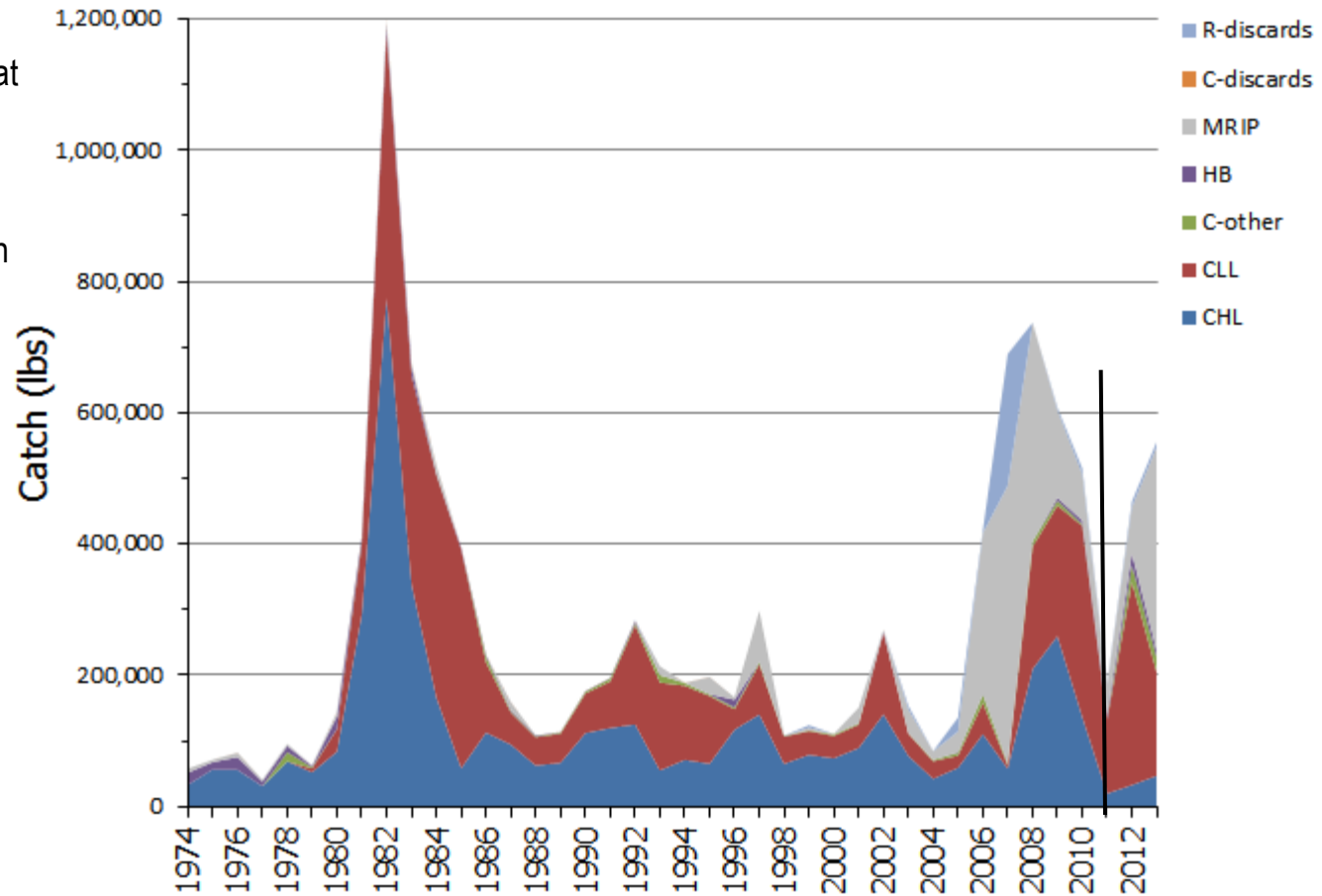
Updated Landings Data

Commercial catch:
- average 56% handline
- average 43% longline
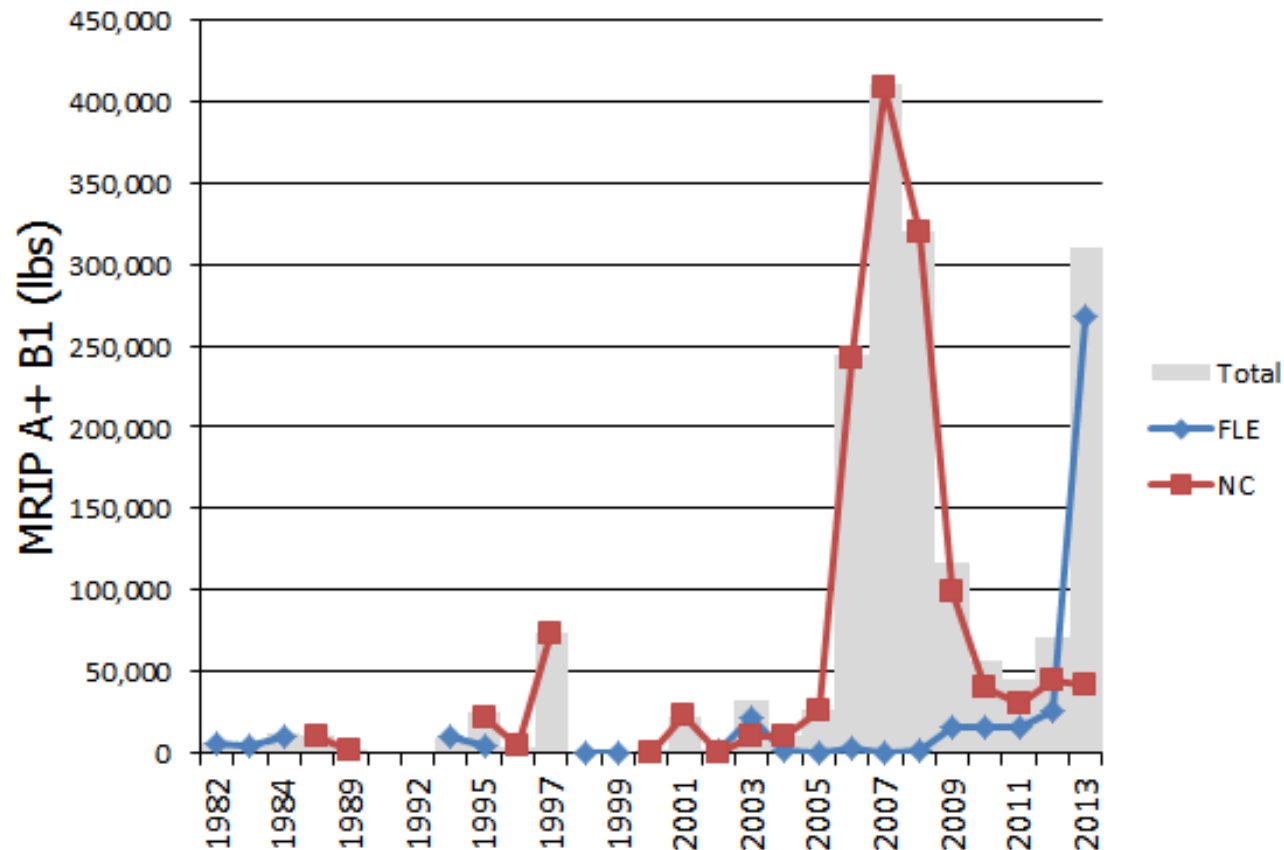
Recreational catch:
- avg 1/3 total since 2006
- mostly private, charterboat

2011 Deepwater closure

2013 Rec landings ~1.2 total but high uncertainty (PSE > 0.7)

Recreational Landings

- 2013 data still preliminary
- 2013 data uncertain (PSE ~ 0.7)
- Rapid increase in 2013 recreational landings
- Shift in the spatial distribution of 2013 landings

Ran projections with (1) observed MRIP landings and (2) an imputed value for 2013 (avg of 2010 and 2012 MRIP landings)

Recreational Landings

Table 1. 2012 and 2013 removals (pounds whole weight) of South Atlantic blueline tilefish. The "Alternative" column re-computes total 2013 landings using the average of MRIP landings in 2010 and 2012 for 2013.

| Fishery	2012 Removals	2013 Removals	2013 Removals (Alternate)
Com Handline landings	32,726	46,969	46,969
Com Longline landings	309,320	157,195	157,195
Com 'Other' landings	25,197	22,195	22,195
Com Discards	197	121	121
MRIP landings	70,394	310,368	71,466
MRIP discards	7,418	6,107	6,107
Headboat landings	18,462	11,014	11,014
Headboat discards	1,260	2,049	2,049
Total:	**464,974**	**556,018**	**317,116**

Projections run in duplicate with observed and imputed 2013 MRIP landings
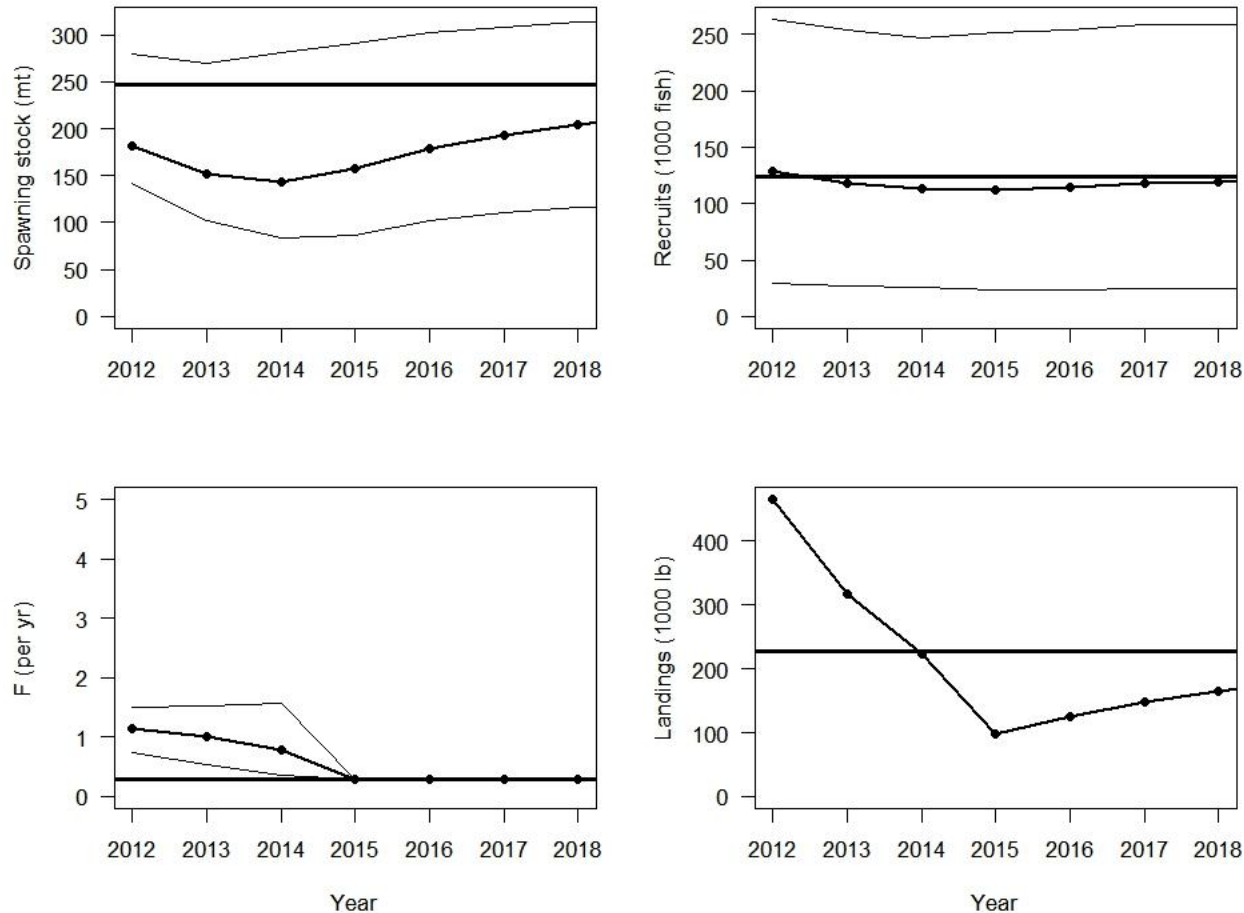
Recreational Landings
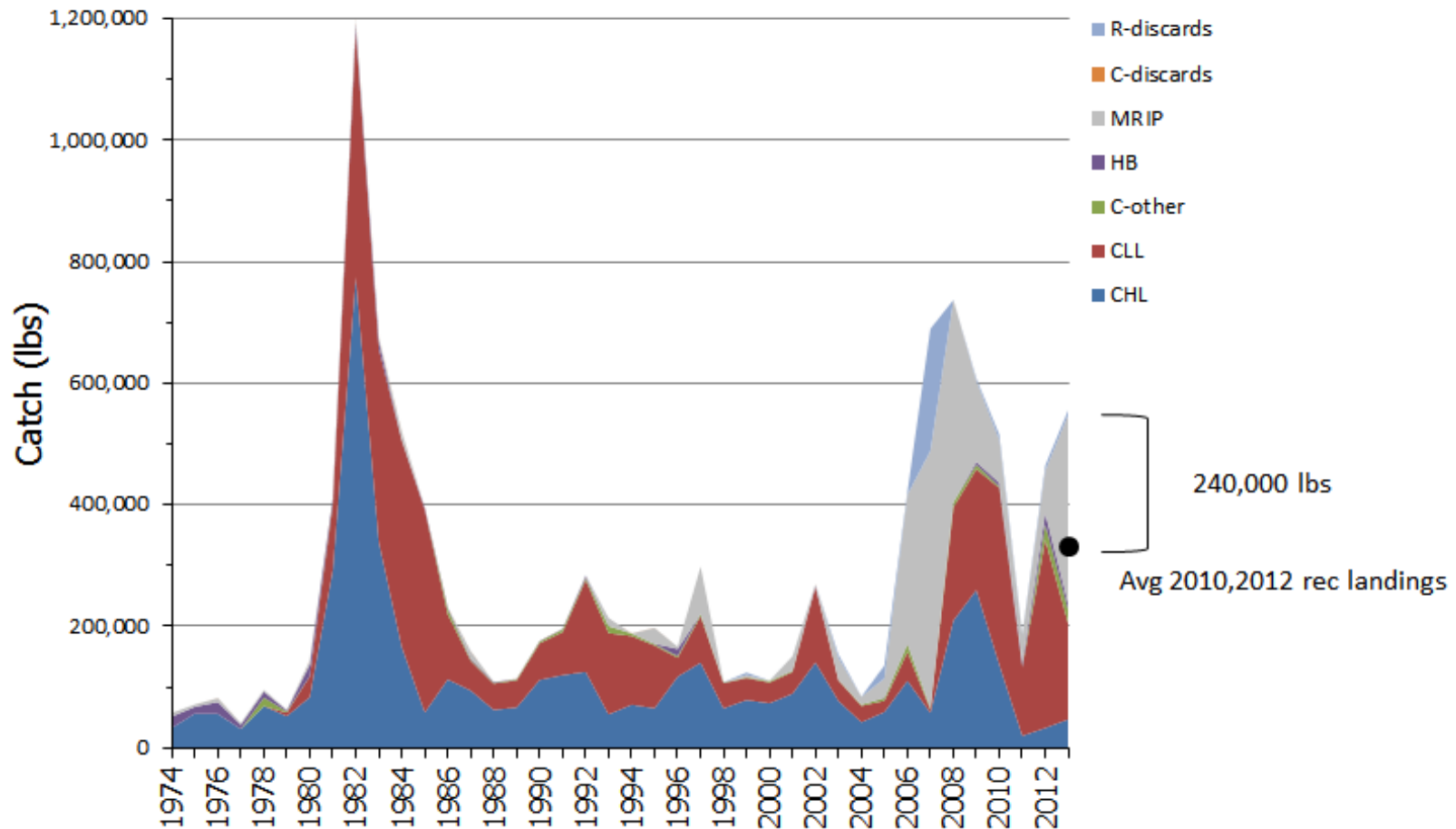
P* = 0.3 Projection

Figure 7. P* = 0.3 projection results. For this assessment, discards were combined with landings so the ABC reflects both landings and dead discards (i.e., Landings = Catch). Annual ABCs (panel E) are a single quantity while other values presented are medians. Error bars represent the 5th and 95th percentiles of the 10,000 projection runs. Observed MRIP estimate used for 2013 (556,018 lbs).
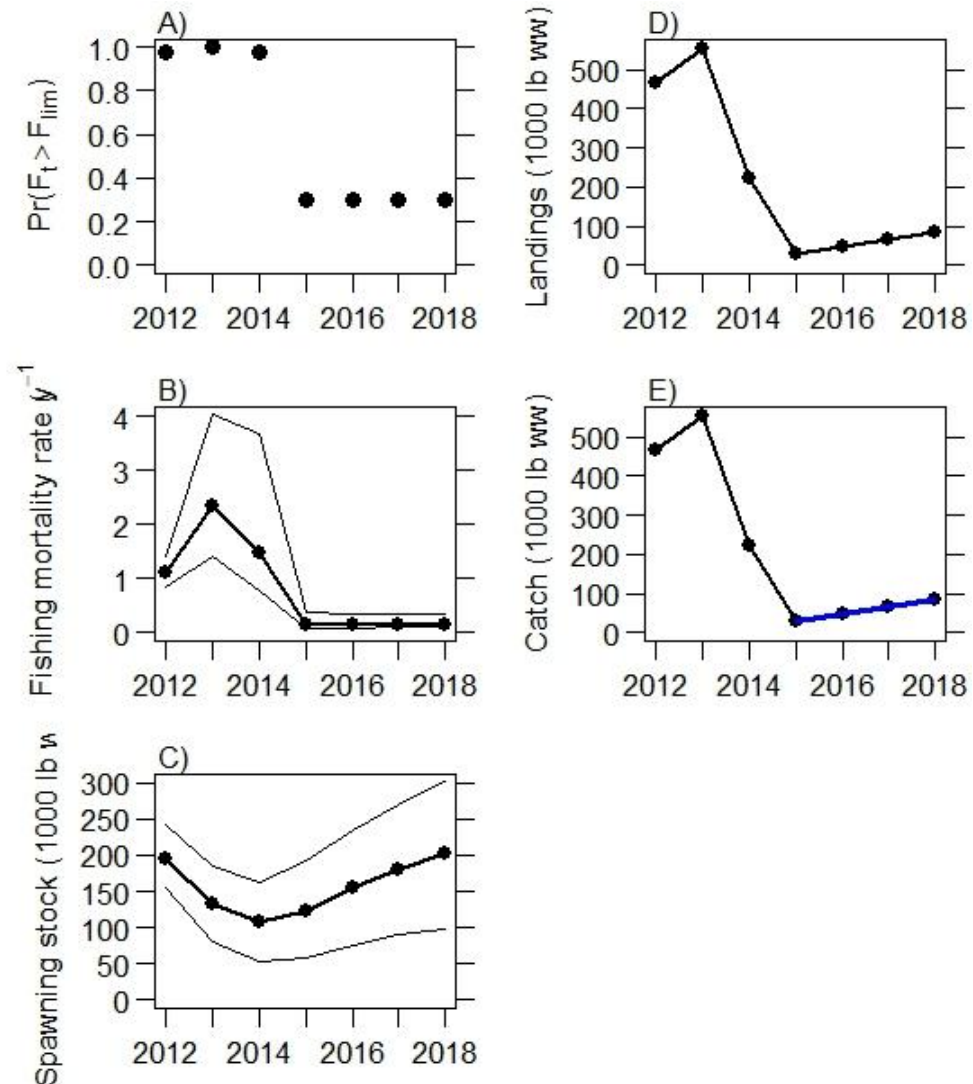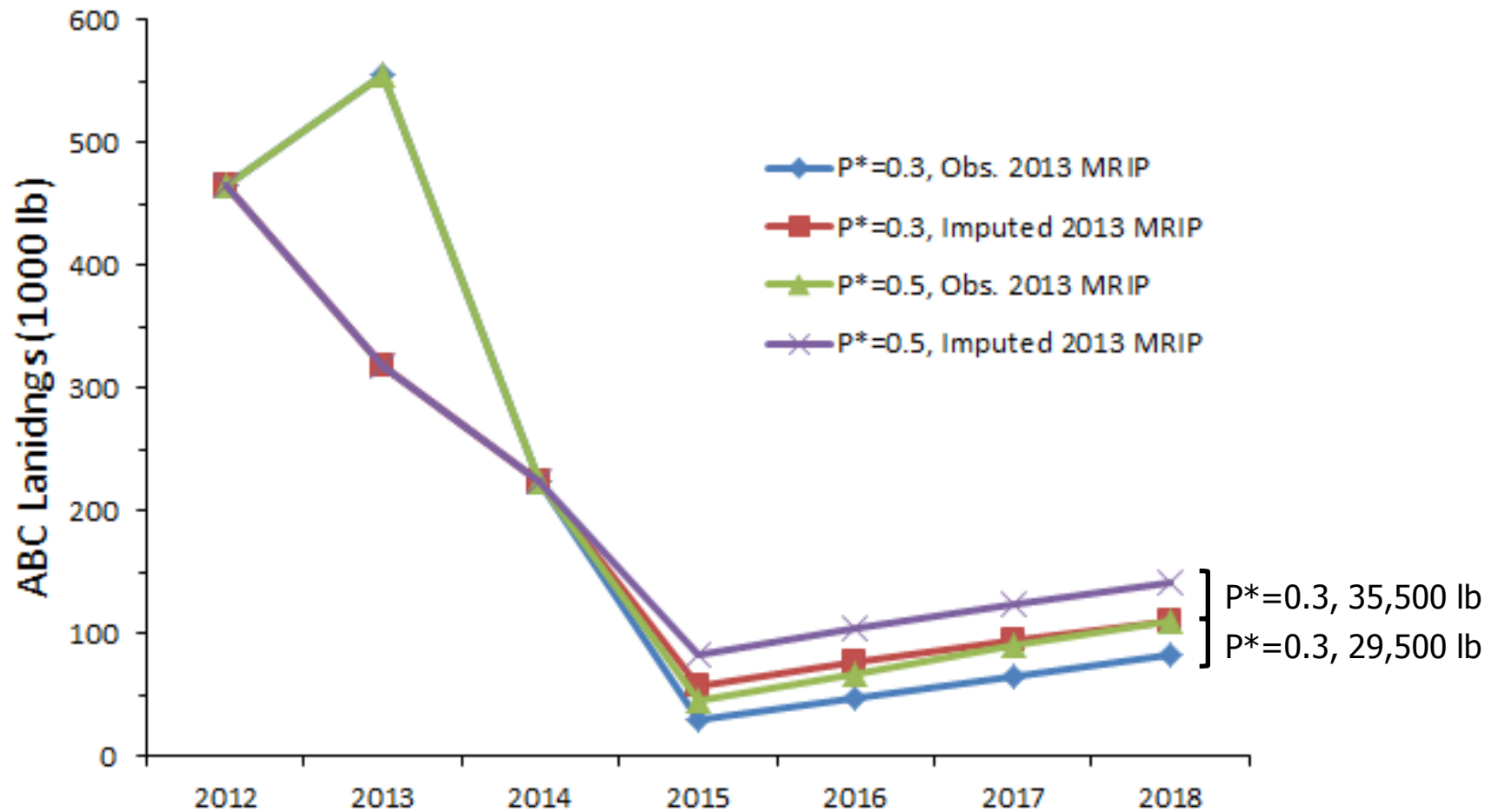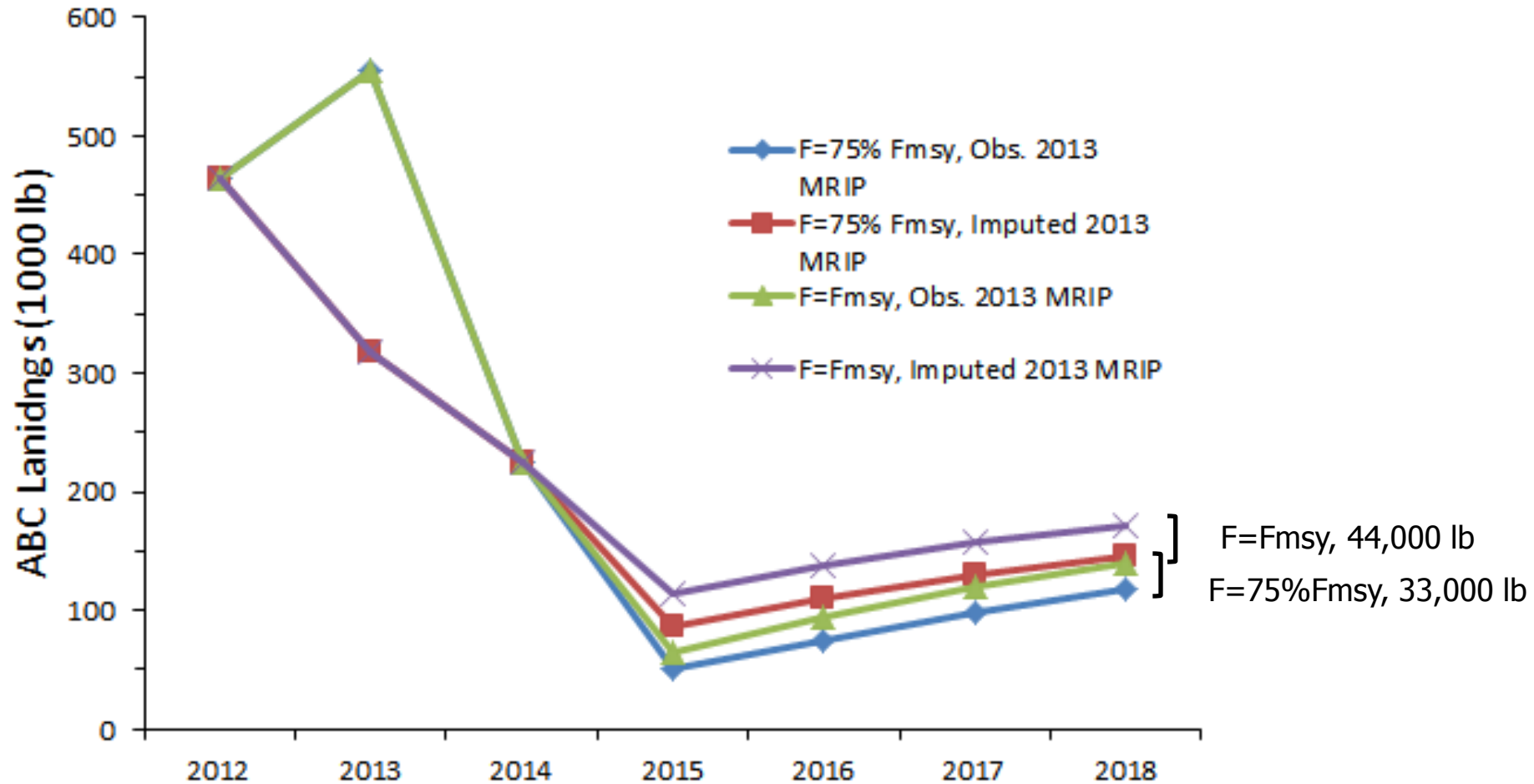
Constant F Projection

Figure 7. Constant F projection at F=F$_{msy}$. For this assessment, discards were combined with landings so the ABC reflects both landings and dead discards (landings and dead discards are separated in the associated Tables). Expected values represented by dotted solid lines and uncertainty represented by thin lines corresponding to the 5th and 95th percentiles of the 10,000 projection runs. Imputed MRIP estimate used for 2013 (317,116 lbs).

P* Projections

Legend:
- P*=0.3, Obs. 2013 MRIP
- P*=0.3, Imputed 2013 MRIP
- P*=0.5, Obs. 2013 MRIP
- P*=0.5, Imputed 2013 MRIP

Y-axis: ABC Lanidngs (1000 lb)

X-axis years: 2012, 2013, 2014, 2015, 2016, 2017, 2018

Annotations:
P*=0.3, 35,500 lb
P*=0.3, 29,500 lb

Constant F Projections

Tables Available in April 28, 2014 Report

P*=0.3
2013 MRIP
landings=556,018 lb

Year	F	Pr(F > Fmsy)	SSB	Pr(SSB > SSBmsy)	R	ABC-L (1000 lb)	ABC-D (1000 lb)	ABC-L (1000 fish)	ABC-D (1000 fish)
2012	1.11	0.97	195.979	0.09	107.814	NA	NA	NA	NA
2013	2.33	1.00	132.292	0.02	105.751	NA	NA	NA	NA
2014	1.49	0.97	107.838	0.02	92.853	NA	NA	NA	NA
2015	0.144	0.30	123.144	0.03	85.277	**28.546**	**0.031**	**6.355**	**0.007**
2016	0.147	0.30	155.085	0.08	89.260	**46.238**	**0.050**	**9.530**	**0.010**
2017	0.148	0.30	180.977	0.17	95.148	**64.768**	**0.070**	**12.593**	**0.014**
2018	0.149	0.30	201.827	0.27	99.421	**82.189**	**0.089**	**15.249**	**0.016**

P*=0.3
2013 MRIP
landings=317,116 lb

Year	F	Pr(F > Fmsy)	SSB	Pr(SSB > SSBmsy)	R	ABC-L (1000 lb)	ABC-D (1000 lb)	ABC-L (1000 fish)	ABC-D (1000 fish)
2012	1.11	0.97	195.979	0.09	107.814	NA	NA	NA	NA
2013	0.935	1.00	164.447	0.02	105.751	NA	NA	NA	NA
2014	0.732	0.97	154.986	0.02	100.128	NA	NA	NA	NA
2015	0.160	0.30	168.162	0.03	97.929	**57.541**	**0.062**	**11.474**	**0.012**
2016	0.161	0.30	195.579	0.08	100.196	**77.075**	**0.083**	**14.698**	**0.016**
2017	0.160	0.30	217.639	0.17	102.753	**95.051**	**0.102**	**17.419**	**0.019**
2018	0.159	0.30	235.903	0.27	106.246	**110.317**	**0.119**	**19.576**	**0.021**

Is there a recent strong year class support recent high landings?

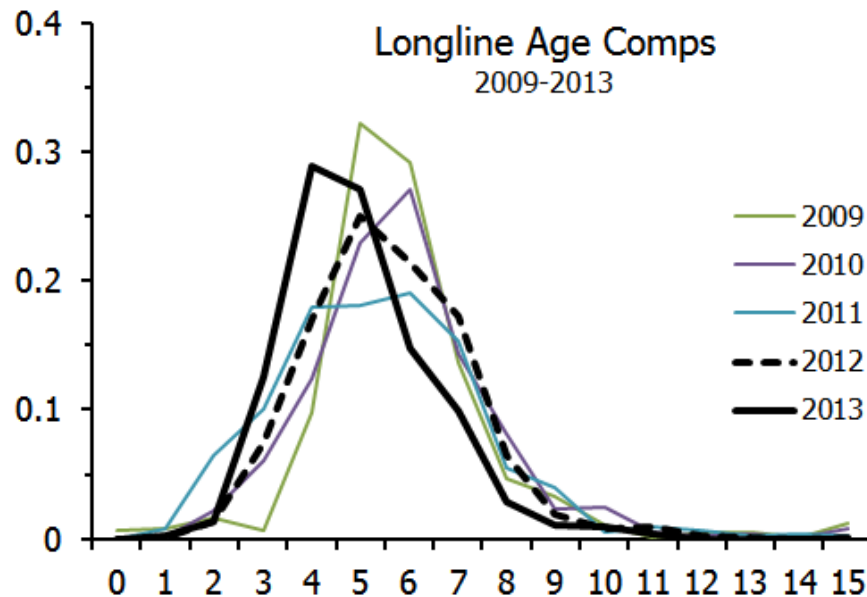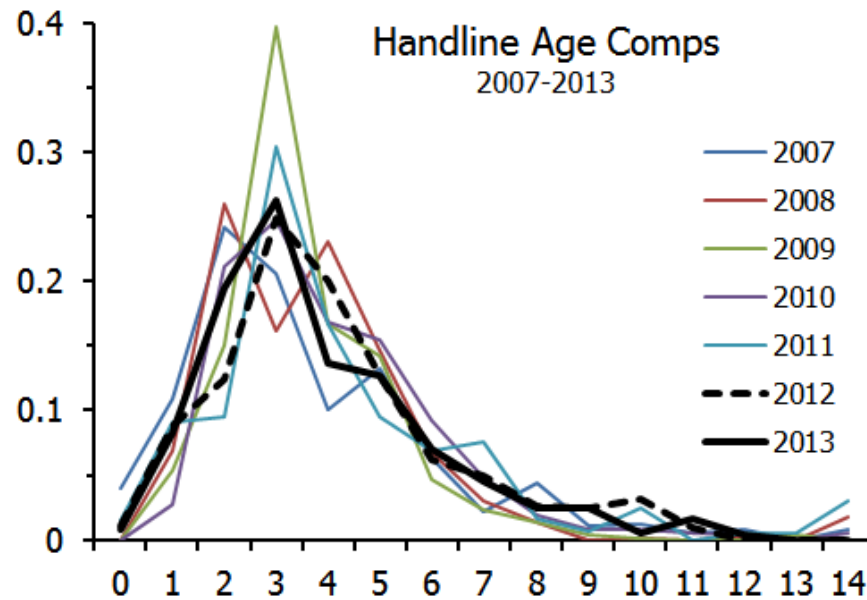Investigate 2012 and 2013 age compositions

Caveats

- Age composition data is limited (5-7 years)

- Very few age-0 or 1 fish in the catch

- Age comps are from fishery-dependent sources; Reflect the combined effects of multiple processes related to both the fishery and the population (e.g., selectivity, natural mortality, etc.)

- In the assessment, recruitment deviations appear to track landings and indices more so than age compositions

Blueline Age Composition Sample Sizes

Yellow: used in the assessment

Year	Comm Handline		Comm Longline		Recreational	
	No. Fish	No. Trips	No. Fish	No. Trips	No. Fish	No. Trips
2003	1	1	5	1	20	4
2004			7	1		
2005	30	11	21	2		
2006	16	8	30	8		
2007	87	30	24	5		
2008	107	48	35	5	1	1
2009	122	53	516	48	10	5
2010	180	68	771	53	7	3
2011	105	32	571	38	58	7
2012	134	44	949	43	70	8
2013	138	49	392	25	68	8
Average:	125	46	640	41	65	8

Commercial Age Compositions

Recreational Age Compositions

Recreational Age Comps
2011-2013

- pooled (2003-2011, n=96)
- 2011, n=58
- 2012, n=70
- 2013, n=68
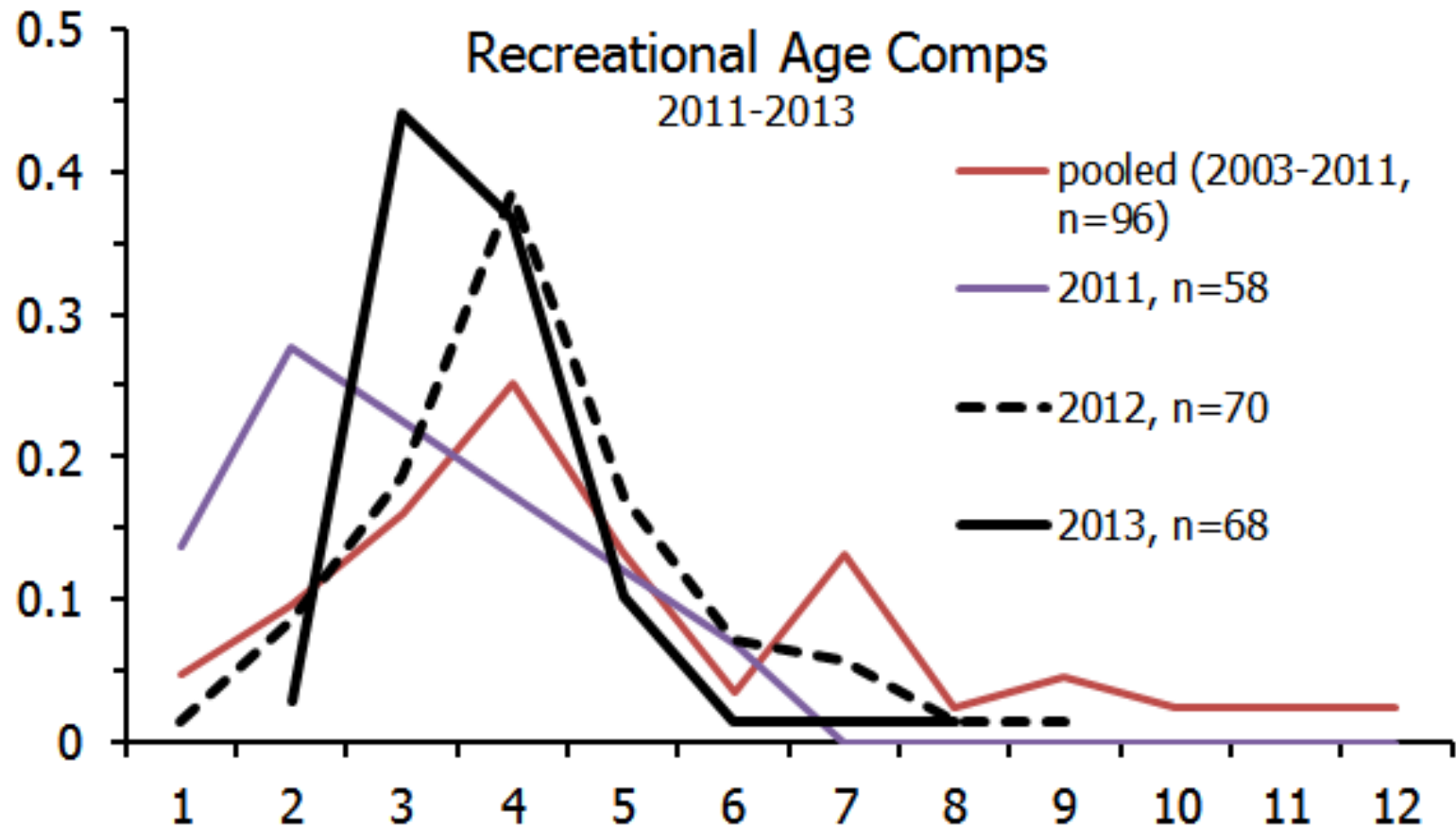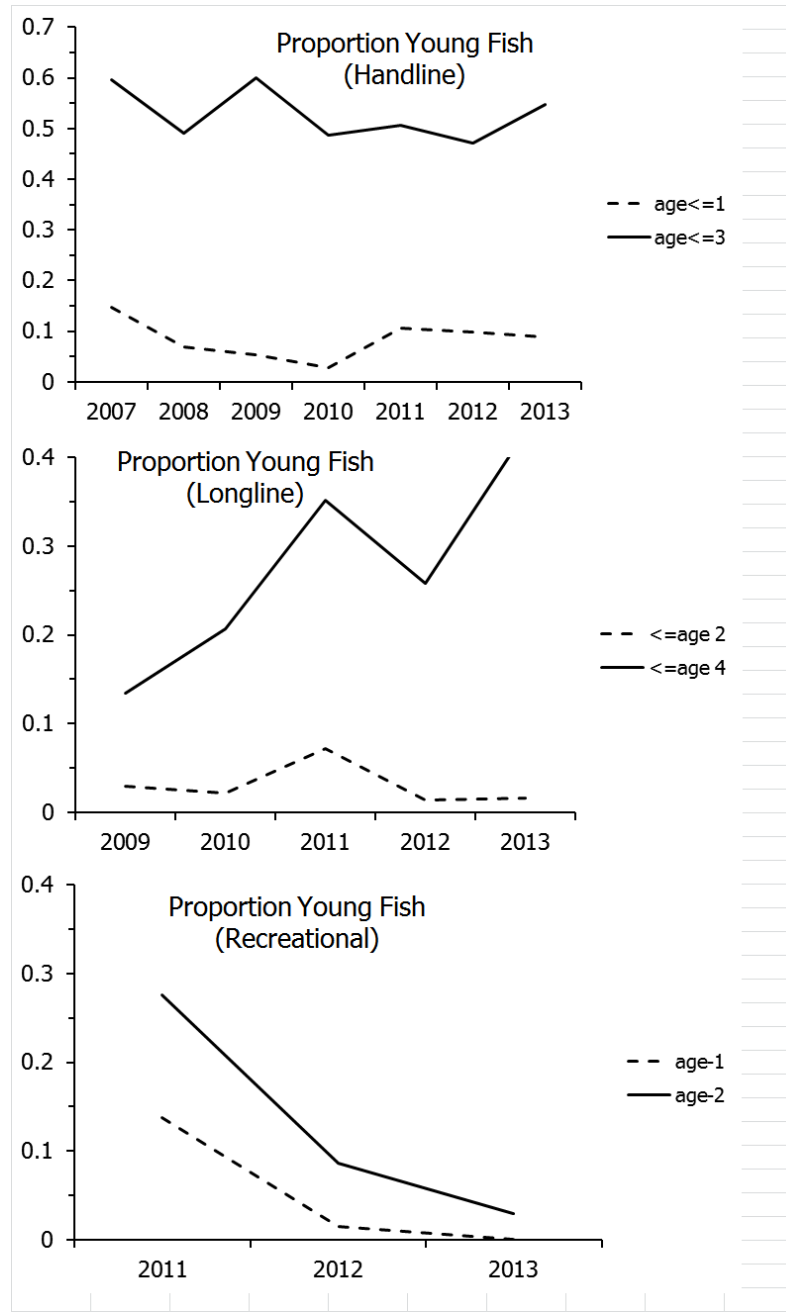
Handline Age Compositions
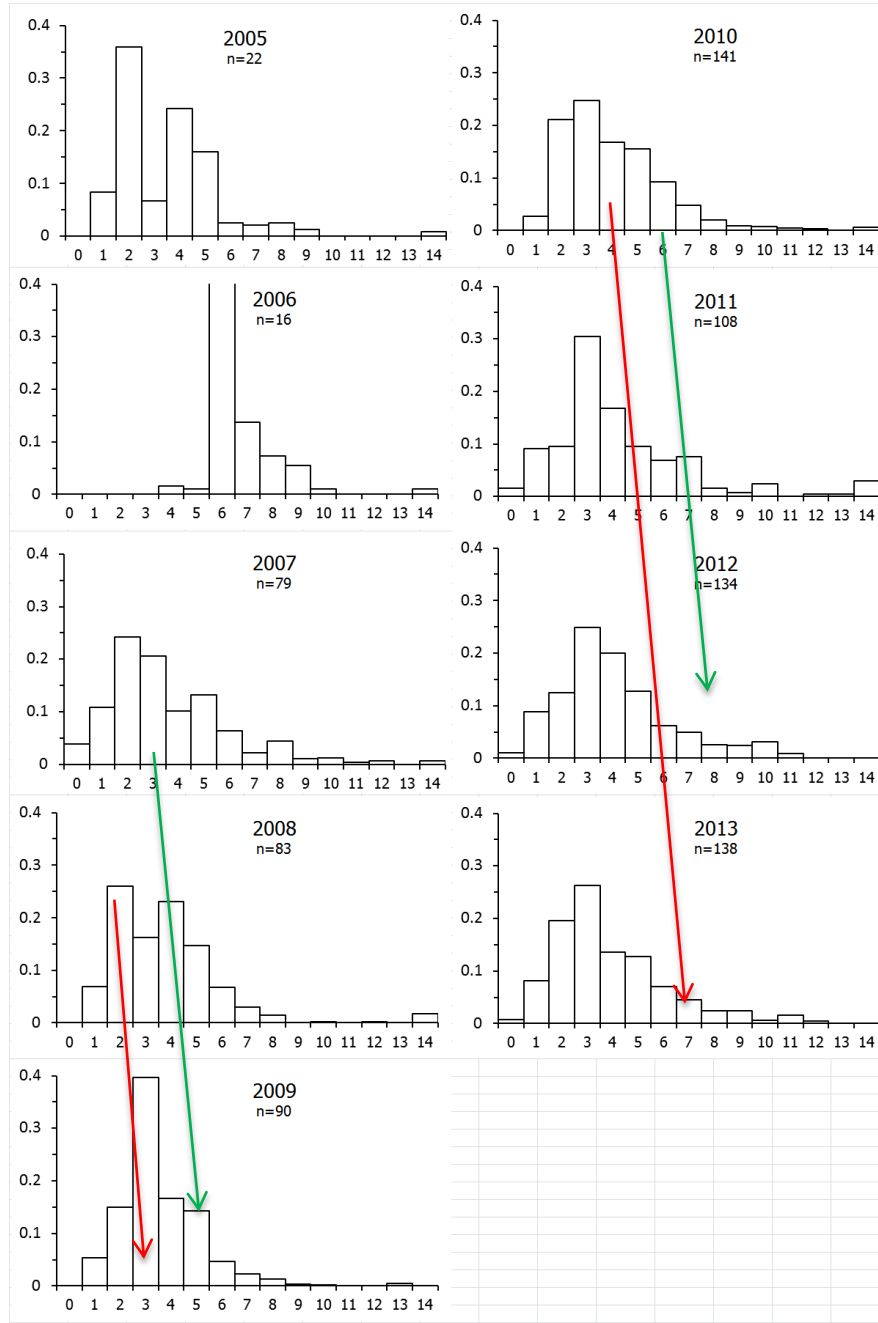
Longline Age Compositions
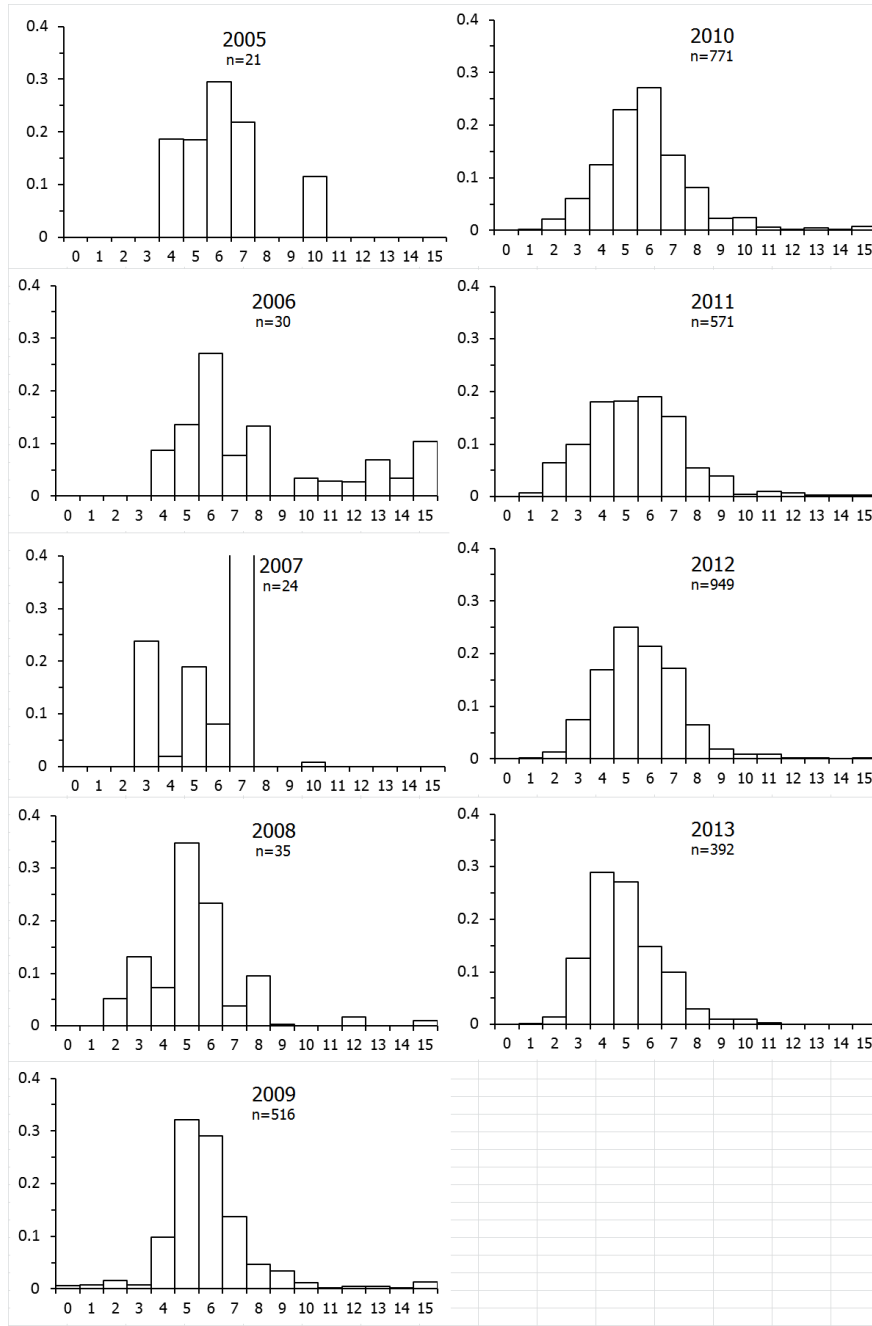
Recreational Age Compositions
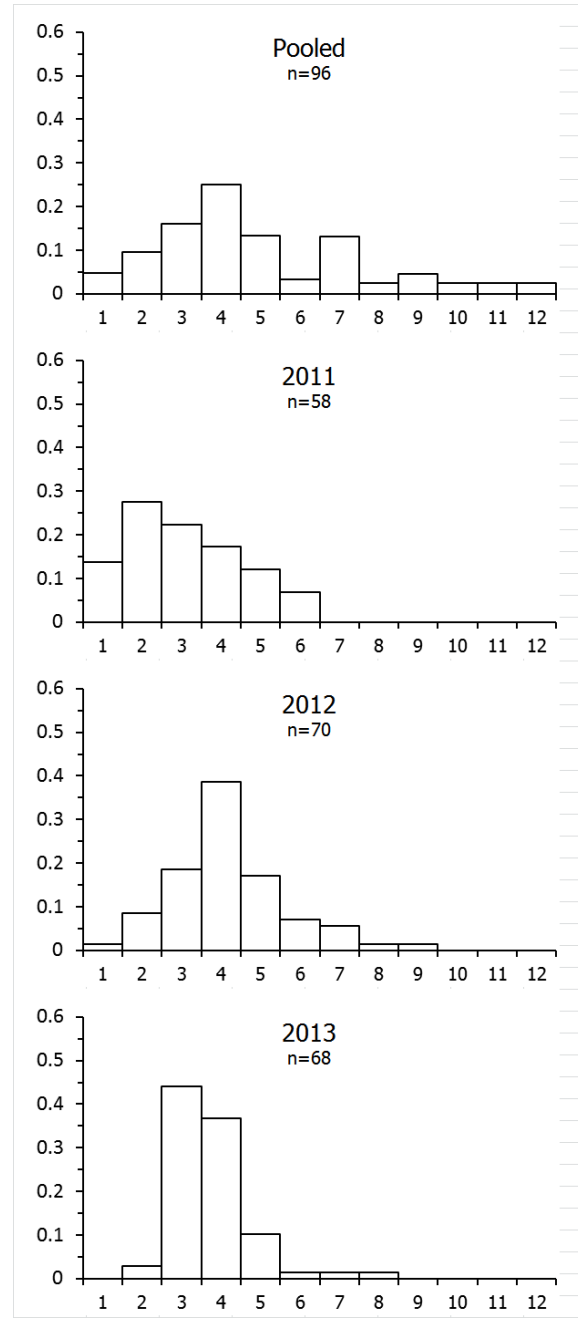
Recreational Age Compositions

Conclusions

- Visual inspection of age compositions does not provide strong evidence for a recent strong year class

- Low sample sizes for some gears (i.e., handline, recreational)

- Increase proportion of younger fish in 2013 could result from variation in age-based selectivity, natural mortality, recruitment or some combination

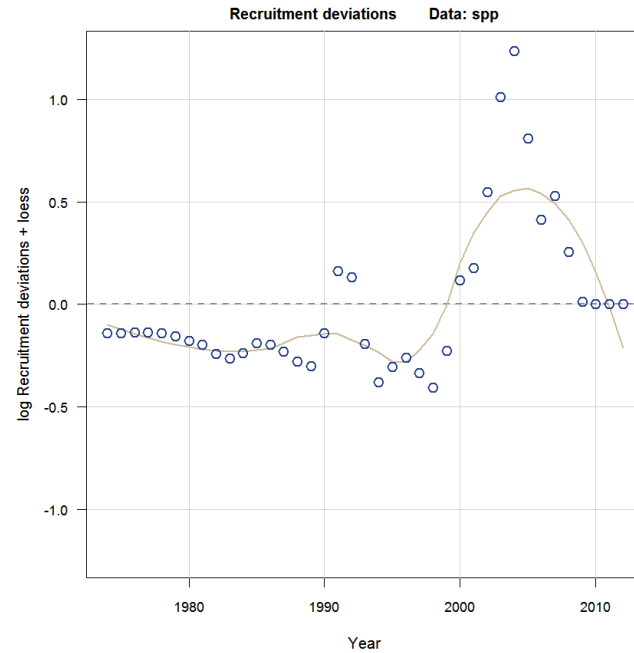- Other mechanisms underlying recent high landings (e.g., increase in fishing effort and/or catchability)
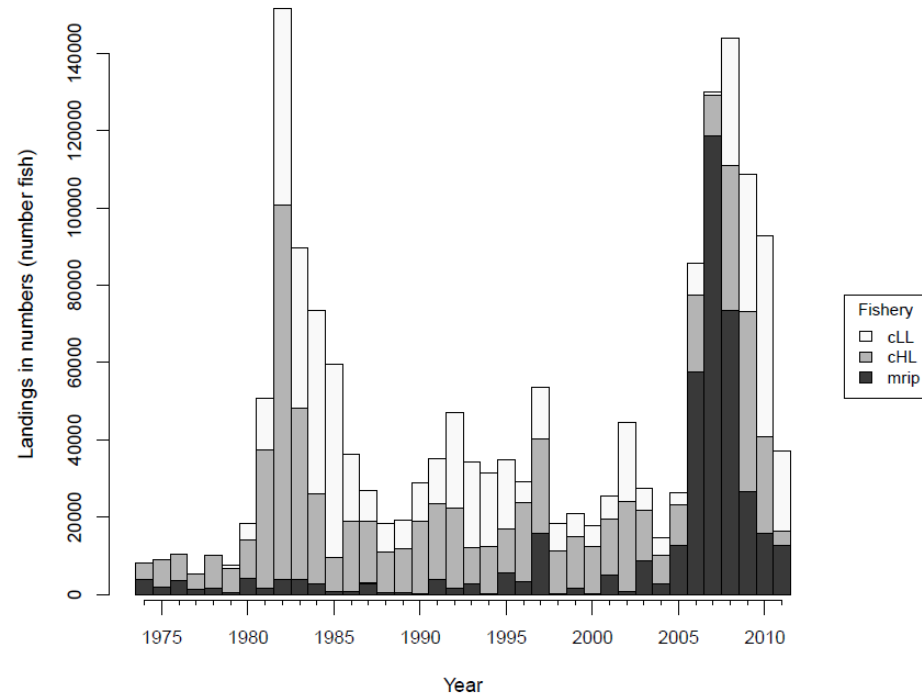
Key Feature
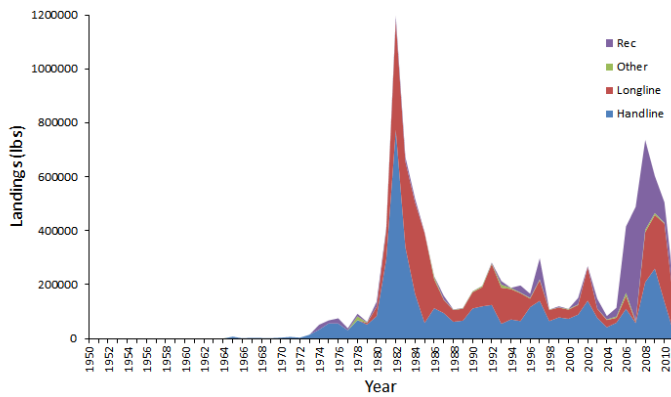
Model estimating high recruitments in the early 2000s to explain the increase in landings and the index in the mid to late 2000s
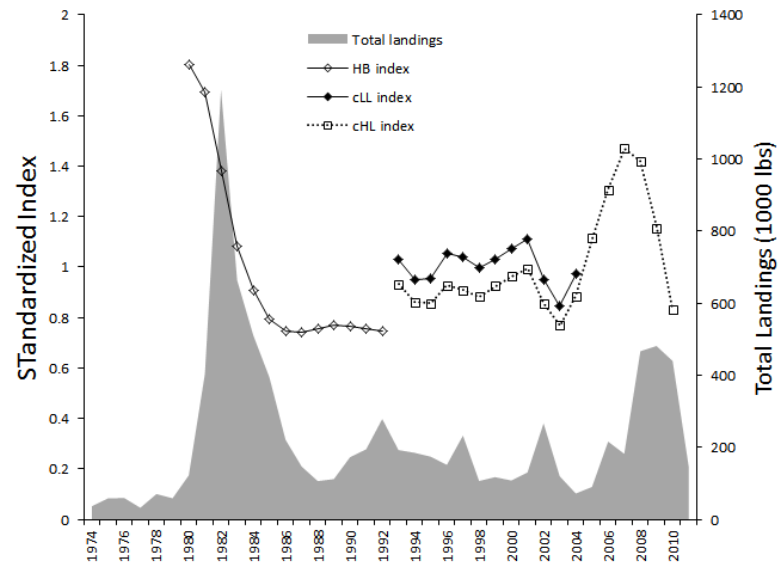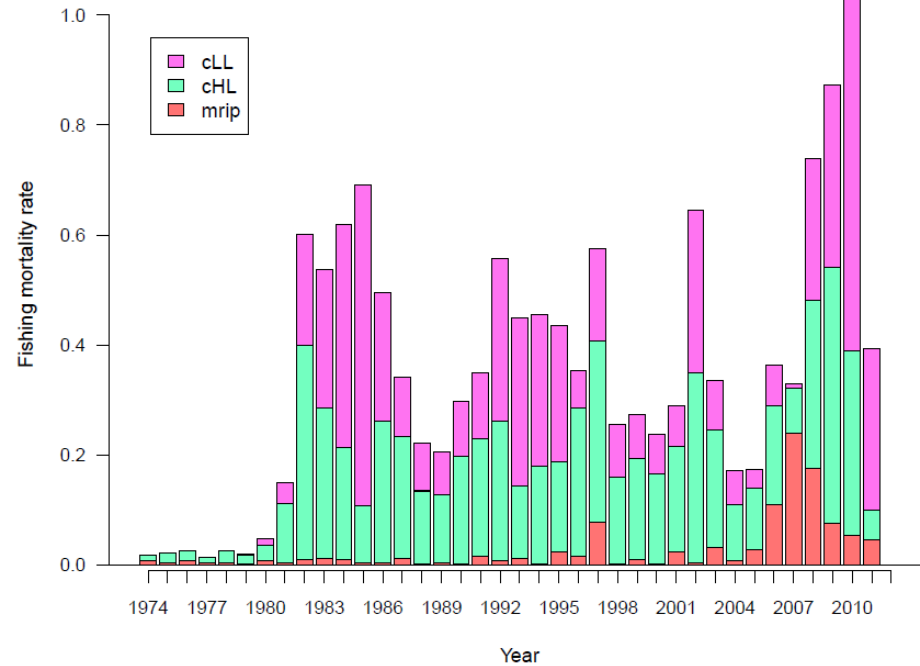
Model Outputs: Landings & Fishing Mortality BAM Base Run

Avg: 41% longline
Avg: 59% handline
Avg: 5% recreational

Recreational Landings