NOAA FISHERIES
NEFSC

Atlantic Bluefish 2021 Operational Assessment

Pomatomus saltatrix

MAFMC SSC
July 23, 2021

Last Benchmark for Bluefish: 2015 SAW 60 (June 2015)
Assessment components

Fishery dependent

- Commercial landings (Fleet 1)
- Recreational landings ⇨ (Fleet 2)
- Recreational discards
- Recreational Catch per Angler Trip

Fishery independent

- Two NEFSC trawl survey series (*Albatross*/*Bigelow* separate series)
- Six State agency surveys
  - CT, NJ (Age 0-2), NC, NEAMAP, SEAMAP (Age 0), Composite YoY seine

Analysis:

- ASAP SCAA
- YPR/SSBR BRP models
- AGEPRO Projection

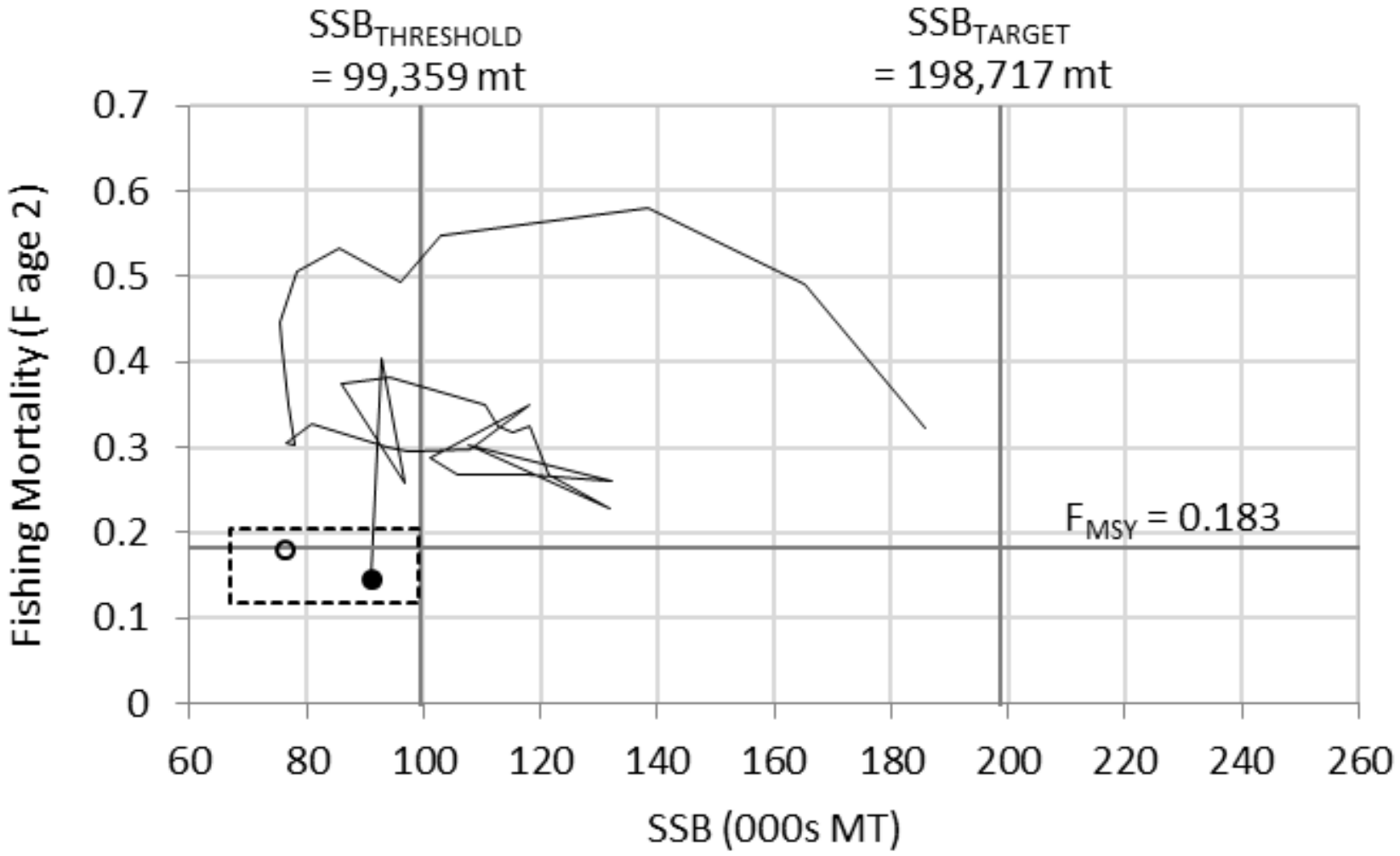
Bluefish Operational Assessment 2019
Data and Modeling overview

- Add 2015-2018 fishery and research survey data to the 2015 SAW 60 update assessment model
- Incorporate Calibrated ('New') MRIP 1985-2018 recreational catch estimates, including recompiled catch-at-age
- Update BRPs
- Evaluate stock status relative to updated BRPs
- Conduct projections for 2020-2021 to determine OFLs
  - Cumulative distribution of recruitment 1985-2018
  - 5 year averages of weight at age
  - Assume 2019 ABC for interim year

2019 OA Bluefish Assessment Results

- SSB in 2018 91,041 MT, 46% SSB_{MSY} target, 92% $SSB_{THRESHOLD}$
- F in 2018 0.146, 80% of F_{MSY} threshold
- Minor internal retrospective for SSB (0.19), F (-0.18)
  - No retro adjustment
- Overfished and No Overfishing

2019 OA Bluefish Assessment Stock Status plot



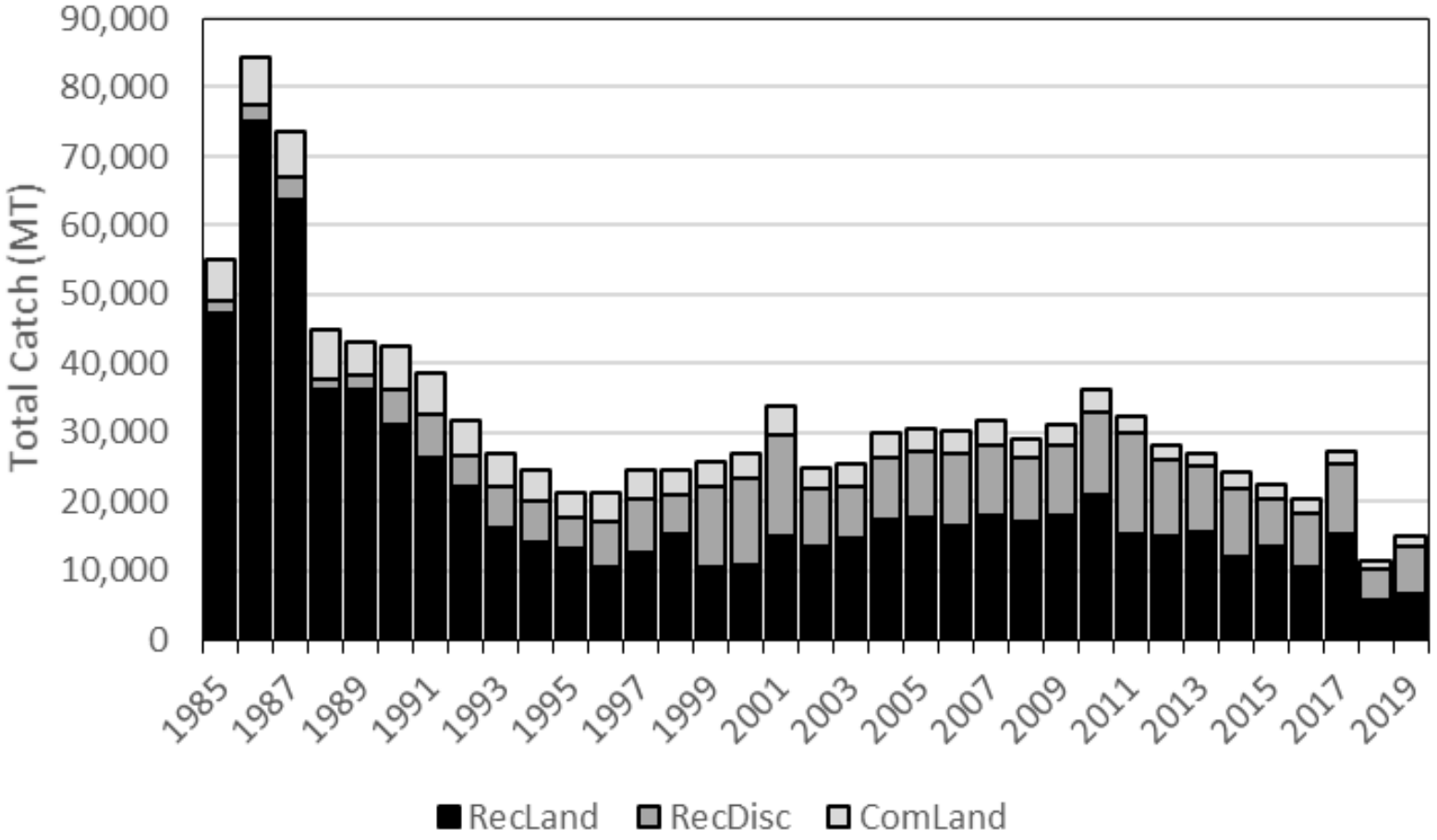
- Overfished and <u>No</u> Overfishing

Bluefish Operational Assessment 2021
Data and Modeling overview

- Add 2019 fishery and research survey data to the 2015 SAW 60 assessment model
- Update BRPs
- Evaluate stock status relative to updated BRPs
- Conduct projections for 2022-2024 to determine OFLs
  - Cumulative distribution of recruitment 1985-2019
  - 5 year averages of weight at age
  - Assume 2020 ABC (7,385 MT) for 2020, 2021

TOR 1: Estimate catch from all sources including landings and discards.

Total Bluefish Catch (MT) 1985-2019



- 2019 Com Land = 1,353 MT (Avg: 3,737 MT), Rec Land = 6,612 MT (Avg: 20,600 MT), Rec Disc = 6,992 MT (Avg: 7,697 MT)
- Commercial Landings ~9% (Avg: 11.7%), Rec Landings ~44% (Avg: 64.3%), Rec Discards ~47% (Avg: 24.0%)

Total Bluefish Catch (MT) 2020

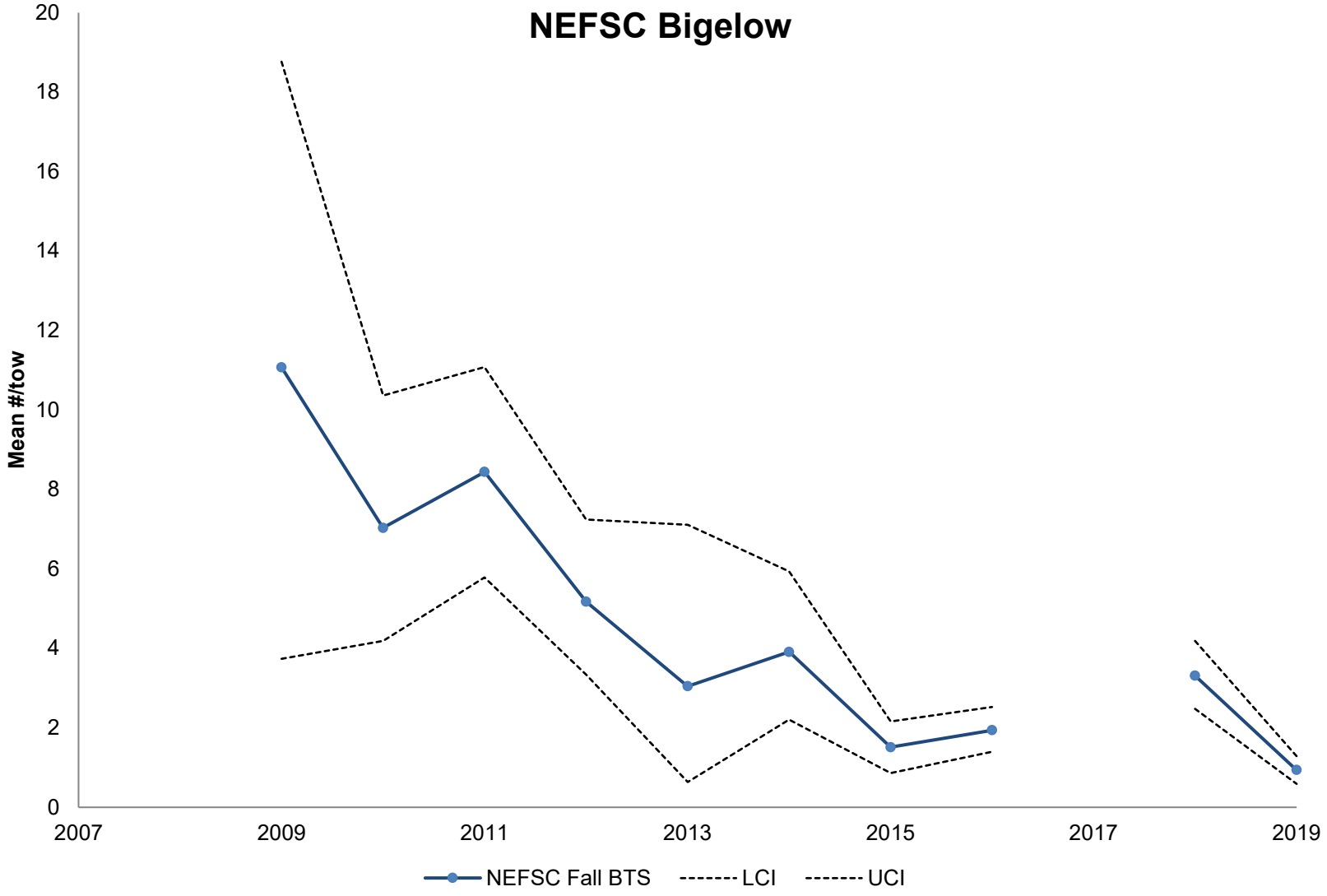
FY2020 Atlantic bluefish Annual Catch Limit Accounting			
	Pounds	Metric tons	Percent of ACL (7,385 mt)
Atlantic bluefish commercial landings	837,881	380	5.1%
Atlantic bluefish state-permitted only vessel commercial landings	1,320,197	599	8.1%
Atlantic bluefish estimated dead commercial discards	41,335	19	0.3%
Atlantic bluefish recreational landings	13,581,219	6,160	83.4%
Atlantic bluefish recreational dead discards	4,191,779	1,901	25.7%
Atlantic bluefish total catch	19,972,411	9,059	122.7%
Source: commercial fisheries dealer and observer reports, accessed May 12, 2021, and MRIP website, accessed May 14, 2021.			

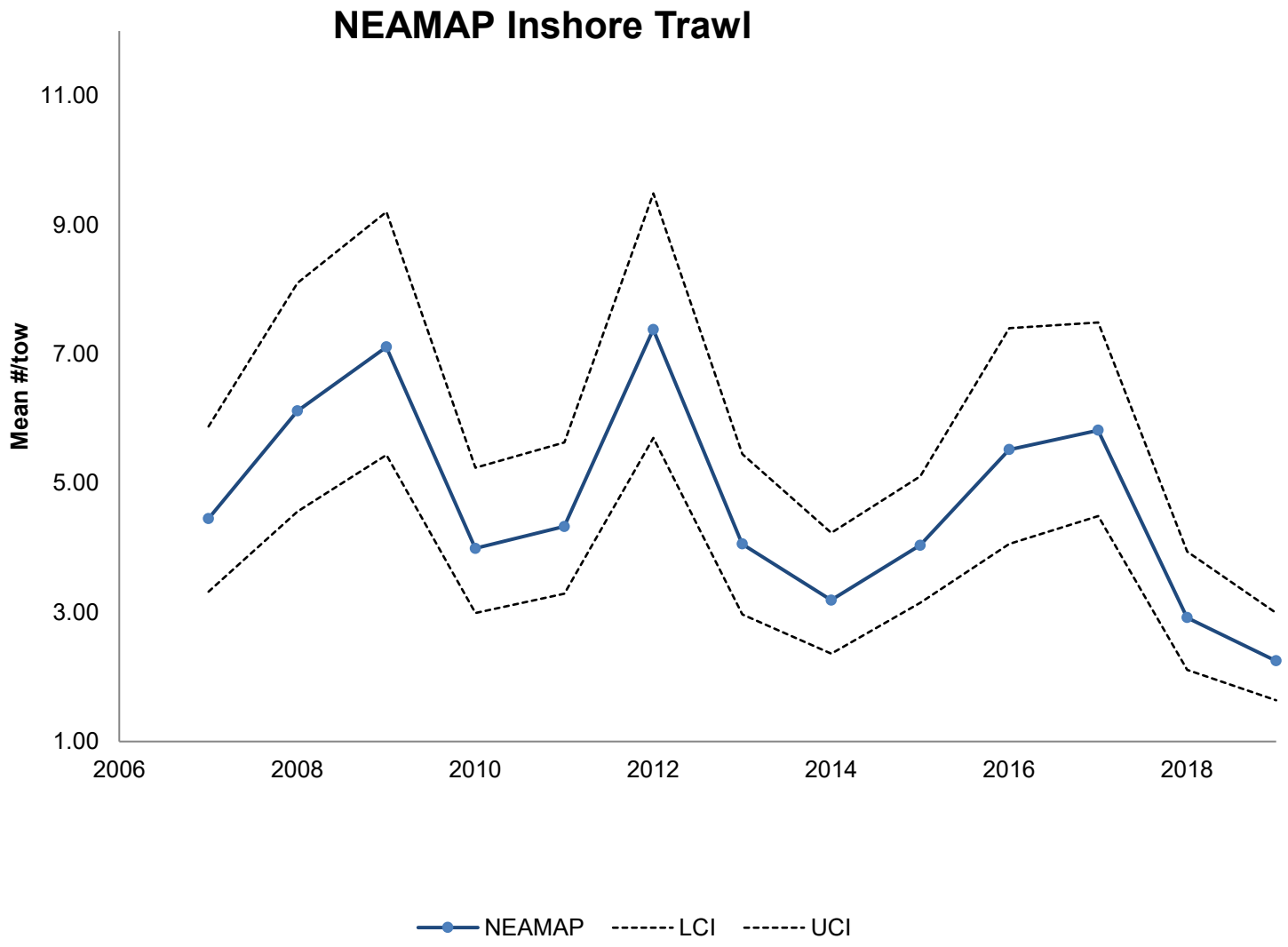
*Uses GARFO methodology for estimating recreational discard weight.

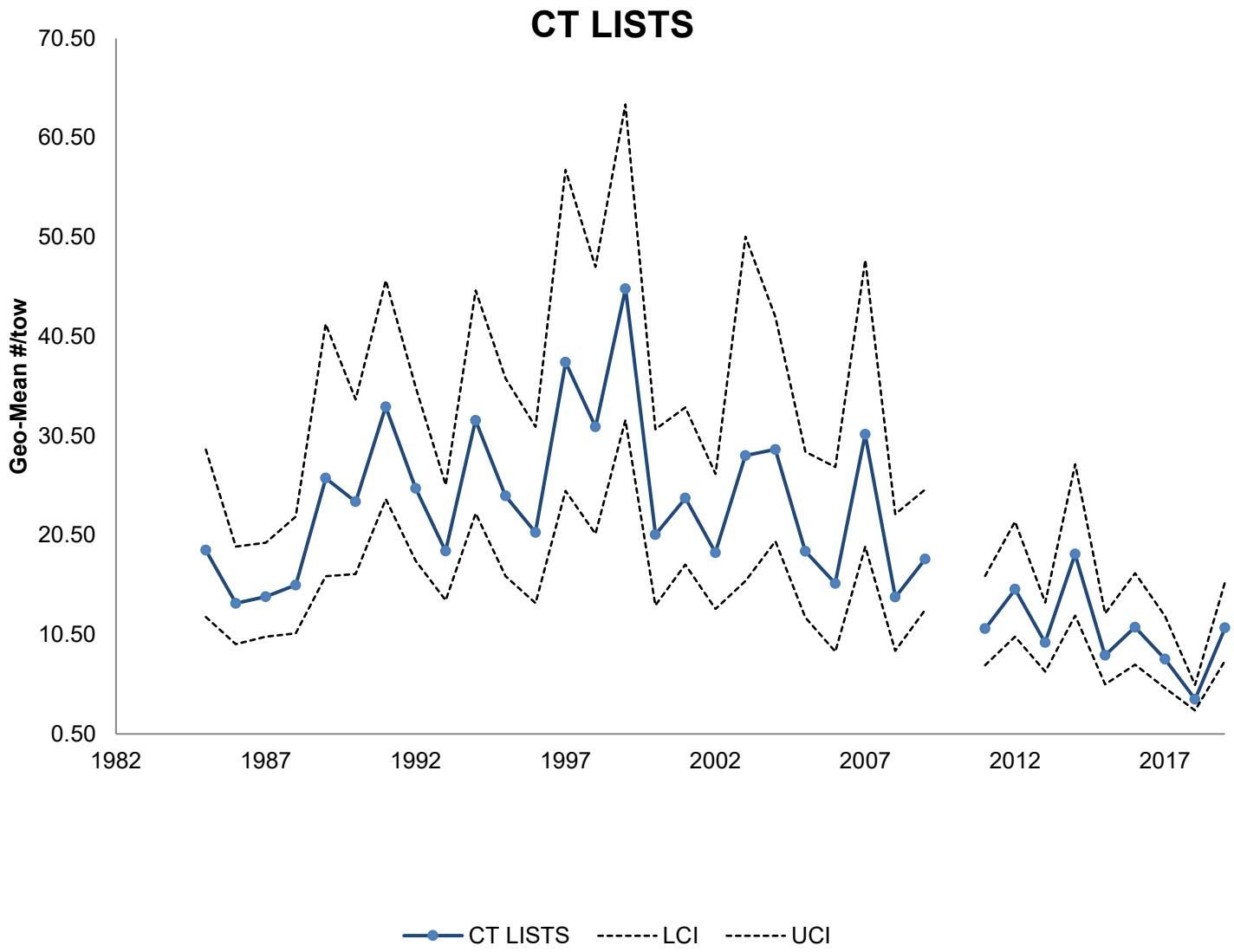
TOR 2: Evaluate indices used in the assessment (e.g., indices of relative or absolute abundance, recruitment, state surveys, age-length data, etc.).

Bluefish Survey Indices of Abundance

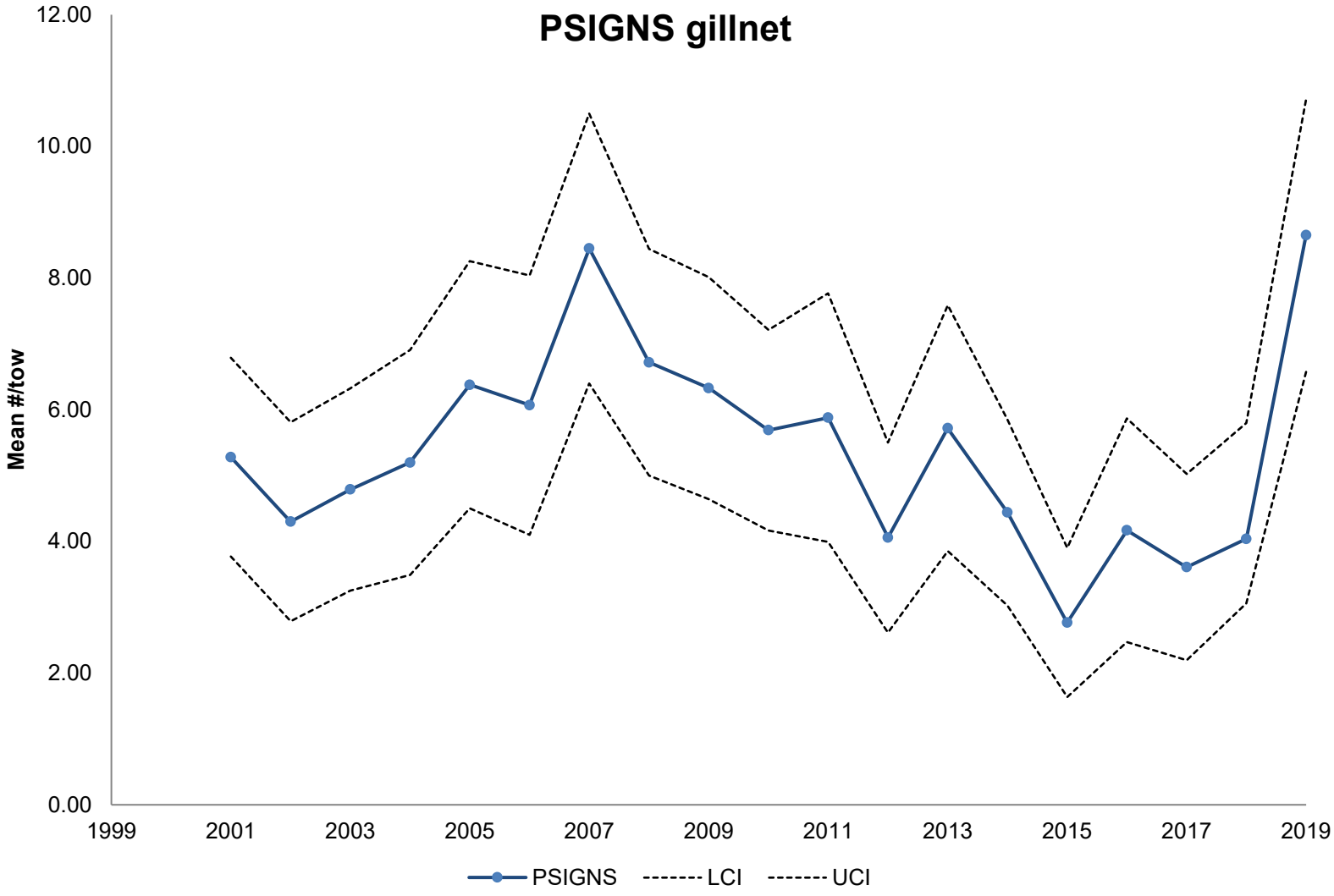
- NEFSC Fall trawl survey Albatross 1985- 2008: age 0-6+
- NEFSC Fall trawl survey Bigelow 2009-2019: age 0-6+
- NEAMAP trawl survey 2007-2019: ages 0-6+
- CT LIS trawl survey 1985-2019: age 0-6+
- NJ Ocean trawl survey 1990-2019: age 0-2
- NC PSIGN 2001-2019: ages 0-6+
- SEAMAP juvenile survey 1989-2019: age 0
- Composite state agency seine survey 1985-2019: age 0
- MRIP CPA 1985-2019: age 0-6+

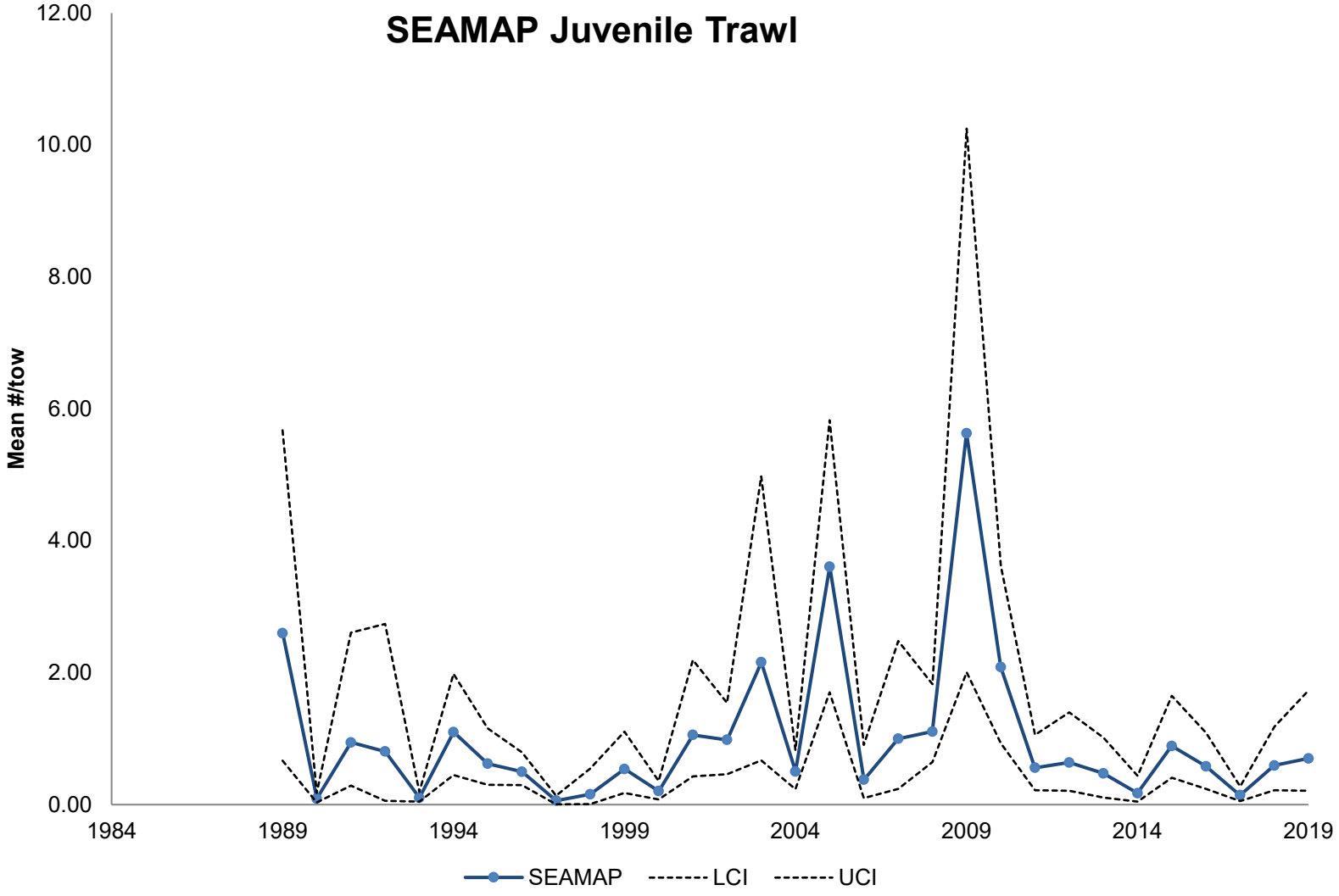

NEFSC Bigelow
Mean #/tow
20
18
16
14
12
10
8
6
4
2
0
2007
2009
2011
2013
2015
2017
2019
NEFSC Fall BTS
LCI
UCI

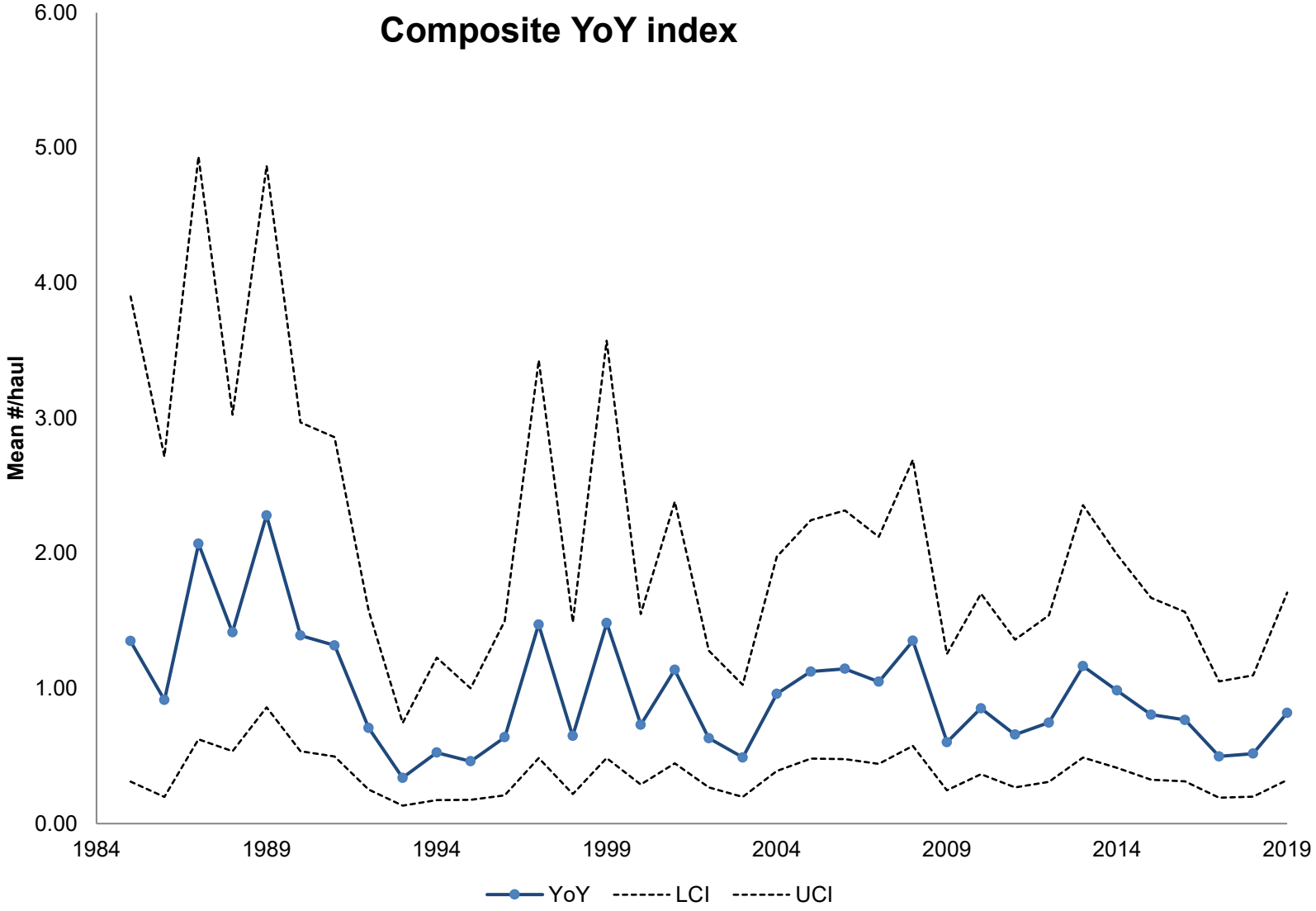

NEAMAP Inshore Trawl
Mean #/tow
11.00
9.00
7.00
5.00
3.00
1.00
2006
2008
2010
2012
2014
2016
2018
NEAMAP
LCI
UCI

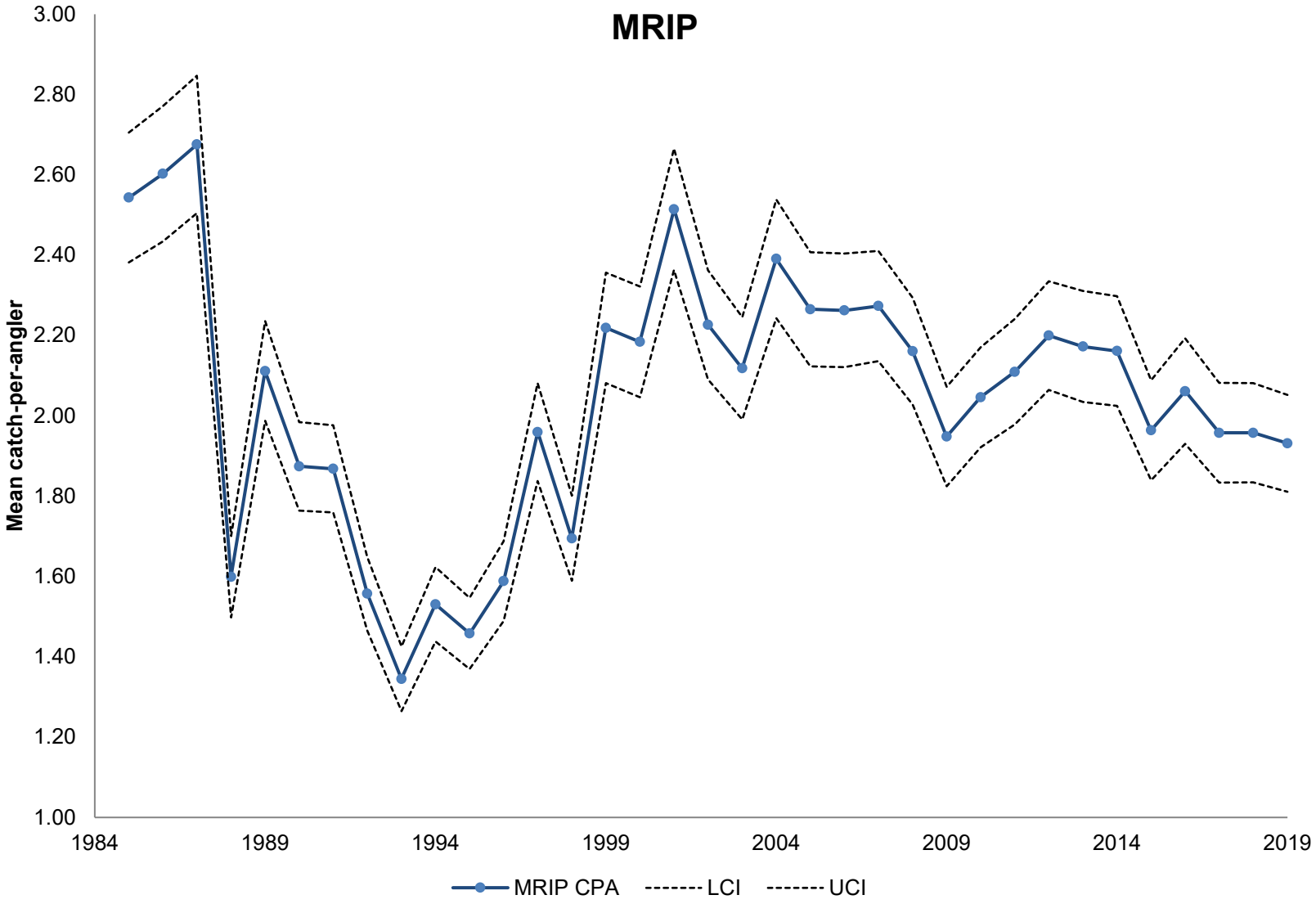

CT LISTS
70.50
60.50
50.50
40.50
30.50
20.50
10.50
0.50
Geo-Mean #/tow
1982
1987
1992
1997
2002
2007
2012
2017
CT LISTS
LCI
UCI

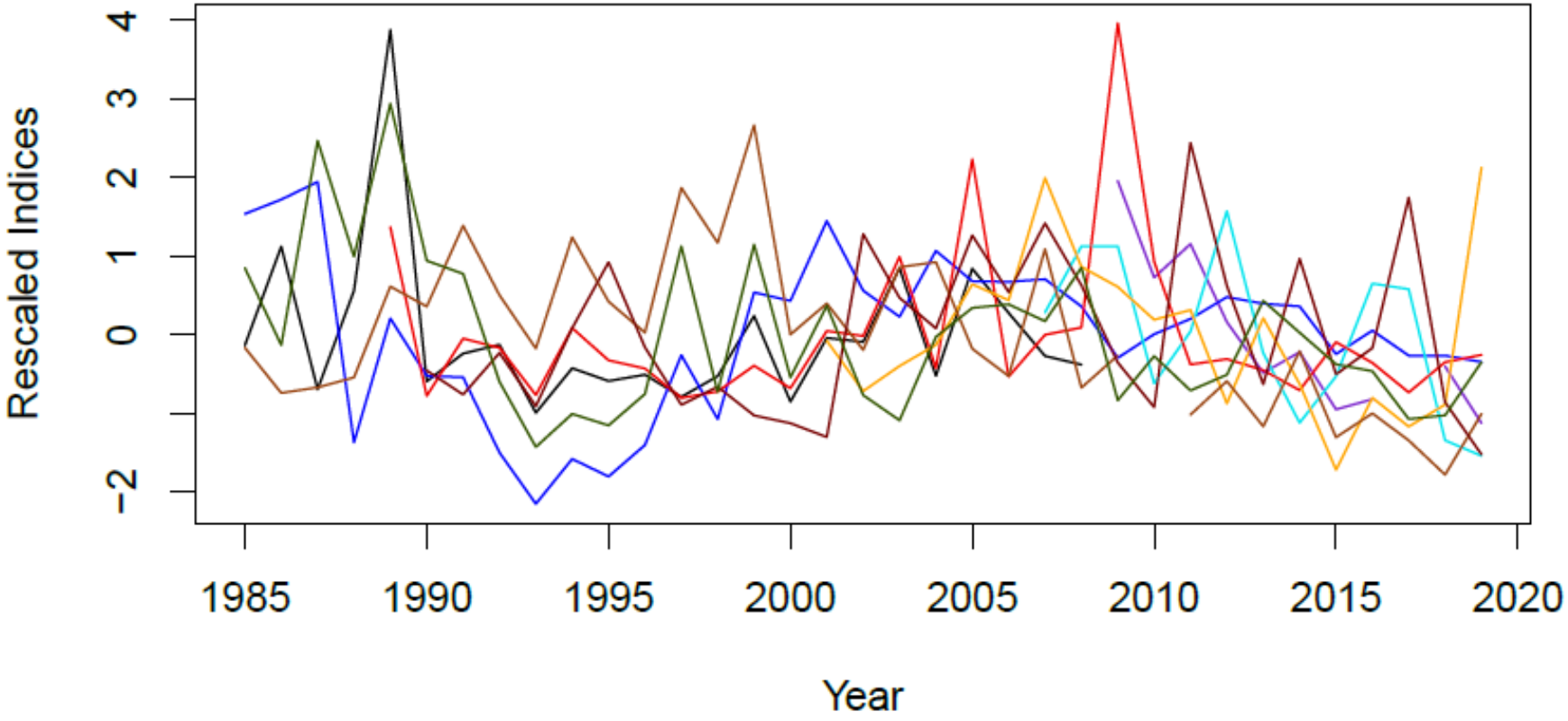

NJ Trawl
Geo-Mean #/tow
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1989
1992
1995
1998
2001
2004
2007
2010
2013
2016
2019
NJ Trawl
LCI
UCI


PSIGNS gillnet
Mean #/tow
12.00
10.00
8.00
6.00
4.00
2.00
0.00
1999
2001
2003
2005
2007
2009
2011
2013
2015
2017
2019
PSIGNS
LCI
UCI


SEAMAP Juvenile Trawl
Mean #/tow
12.00
10.00
8.00
6.00
4.00
2.00
0.00
1984
1989
1994
1999
2004
2009
2014
2019
SEAMAP
LCI
UCI


Composite YoY index
Mean #/haul
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1984
1989
1994
1999
2004
2009
2014
2019
YoY
LCI
UCI


MRIP
Mean catch-per-angler
3.00
2.80
2.60
2.40
2.20
2.00
1.80
1.60
1.40
1.20
1.00
1984
1989
1994
1999
2004
2009
2014
2019
MRIP CPA
LCI
UCI


Rescaled Indices
4
3
2
1
0
−2
1985
1990
1995
2000
2005
2010
2015
2020
Year

TOR 3: Estimate annual fishing mortality, recruitment and stock biomass (both total and spawning stock) as possible (depending on the assessment method) for the time series using the approved assessment method and estimate their uncertainty. Include retrospective analyses if possible (both historical and within-model) to allow a comparison with previous assessment results and projections, and to examine model fit.

Include bridge runs to sequentially document each change from the previously accepted model to the updated model proposed for this peer review.

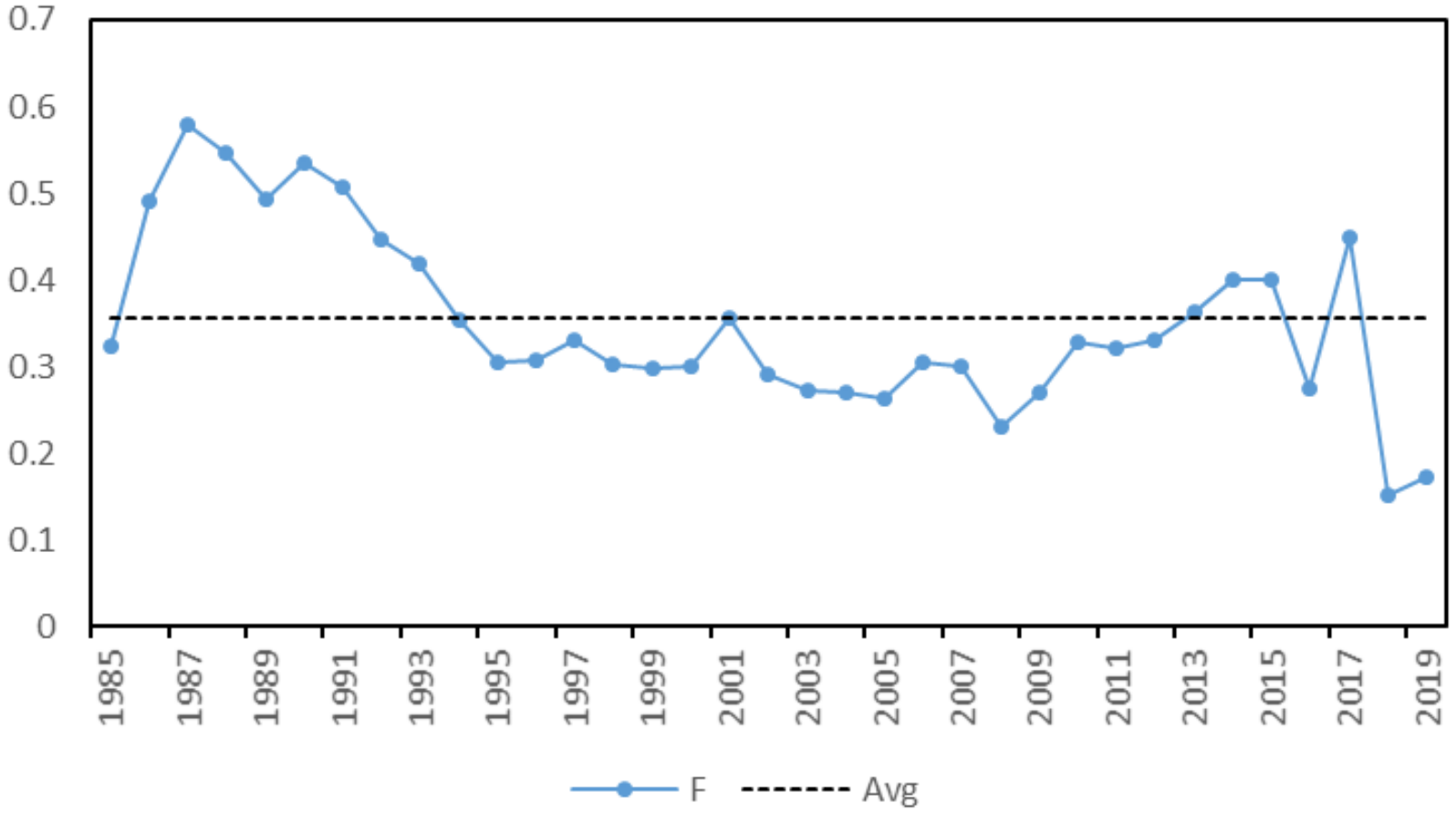
Prepare a backup assessment approach that would serve as an alternative for providing scientific advice to management if the analytical assessment were to not pass review.

Bluefish Operational Assessment 2021
Data and Modeling overview

- Add 2019 fishery and research survey data to the 2015 SAW 60 update assessment model
- Re-estimate BRPs using FMSY=F35% proxy and projected SSB at FMSY for SSB BRP
- Conduct projections for 2022-2023 to determine OFLs
  - Cumulative distribution of recruitment 1985-2019
  - 5 year averages of weight at age
  - Assume 2020 and 2021 ABC of 7,385 MT

Bluefish Operational Assessment 2021 Final Model Results

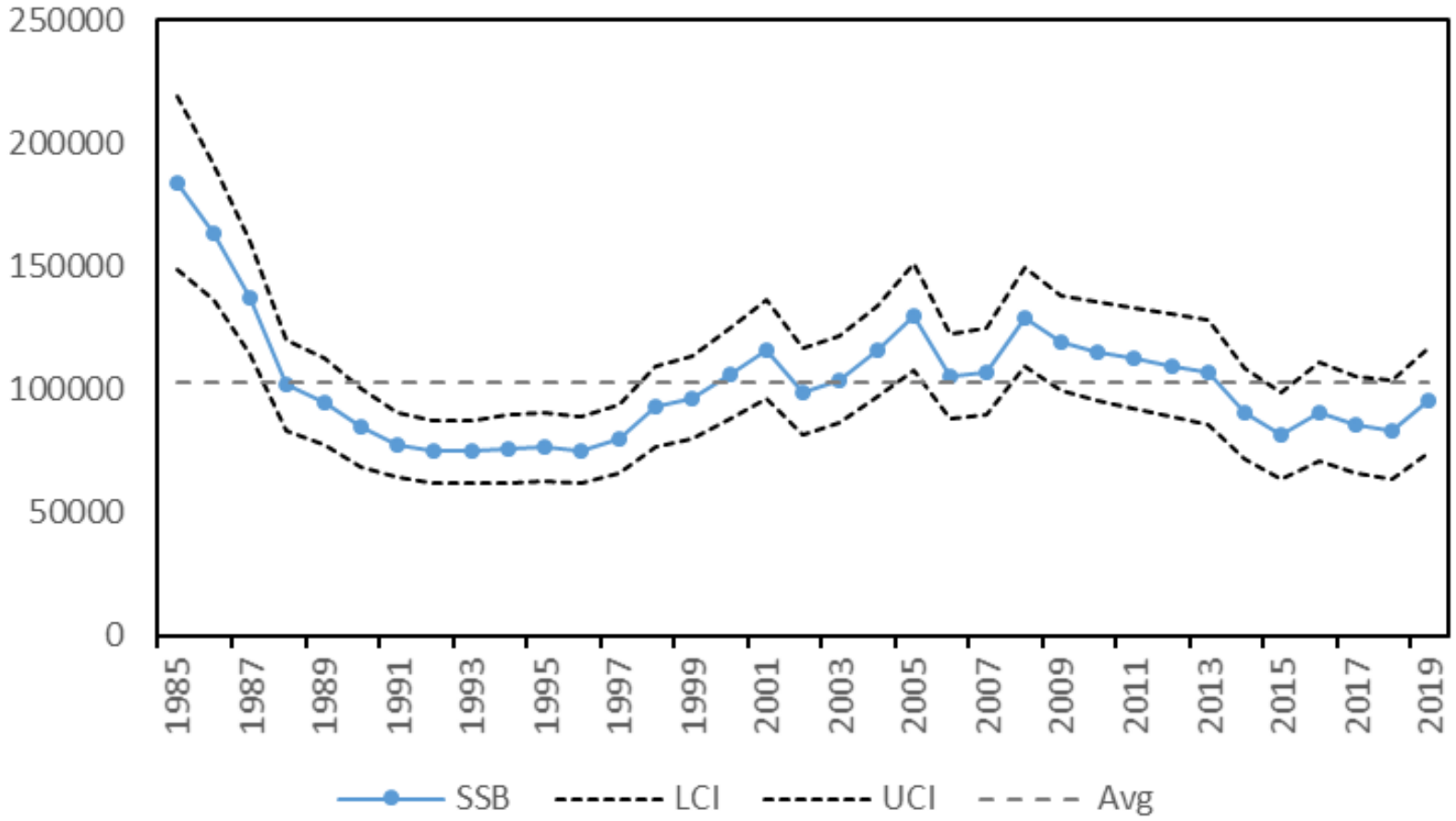
Fishing Mortality



Fishing mortality in 2018 = 0.146, the lowest estimate in the time series, increased to 0.172 in 2019

Bluefish Operational Assessment 2021 Final Model Results

Spawning Stock Biomass (MT)

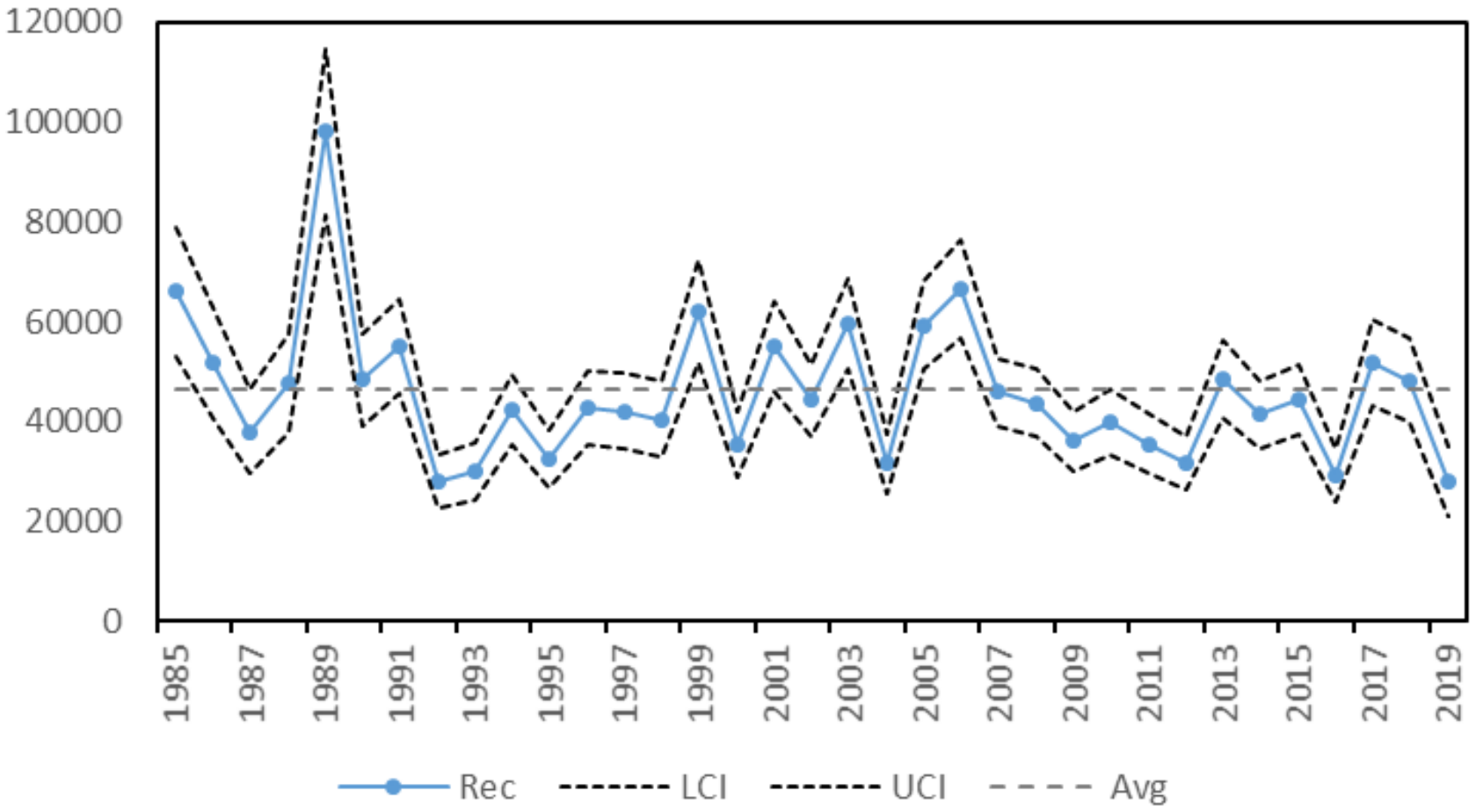


SSB in 2019 = 95,742 MT

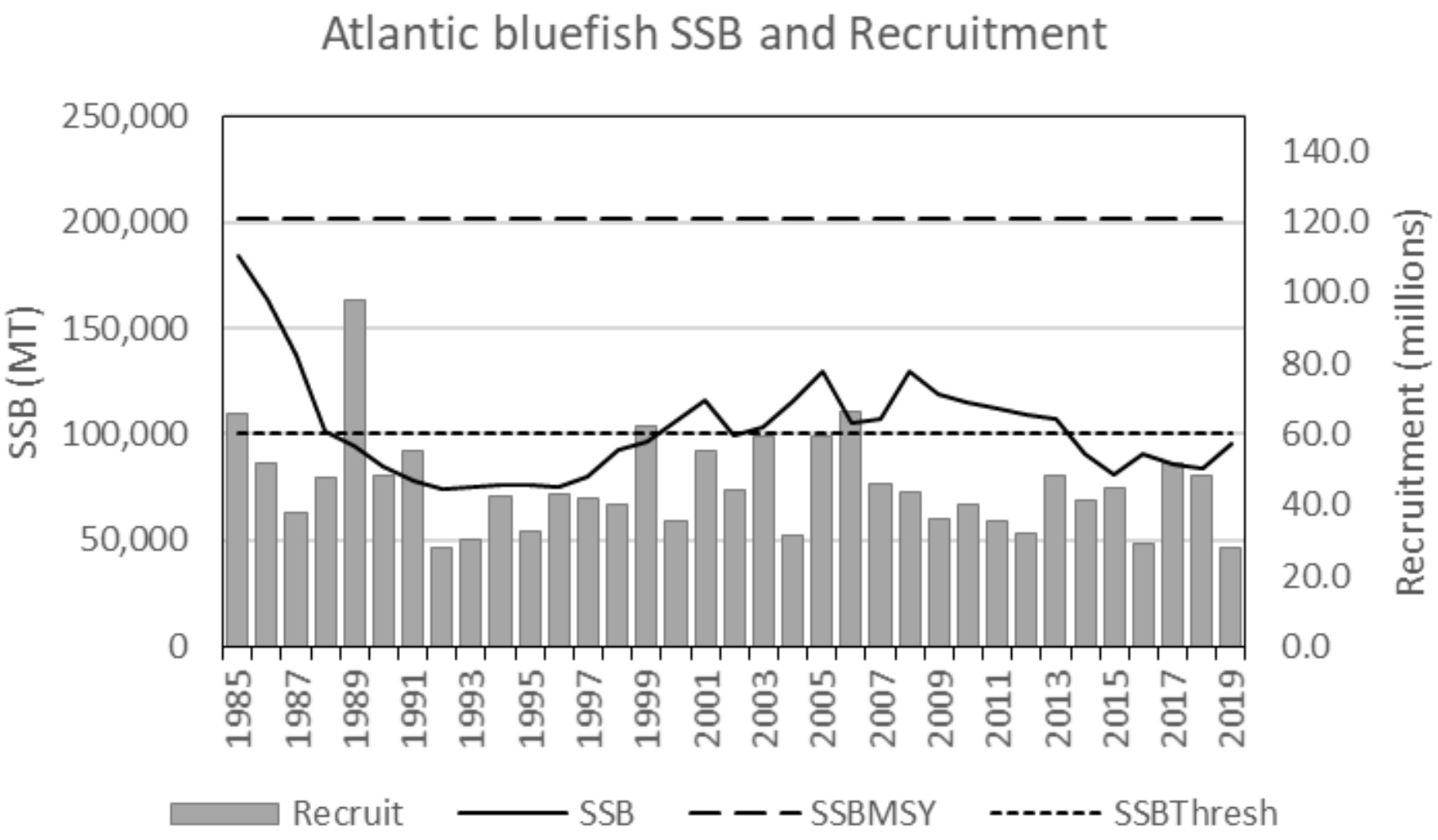
Last 6 years estimates below the time series average.

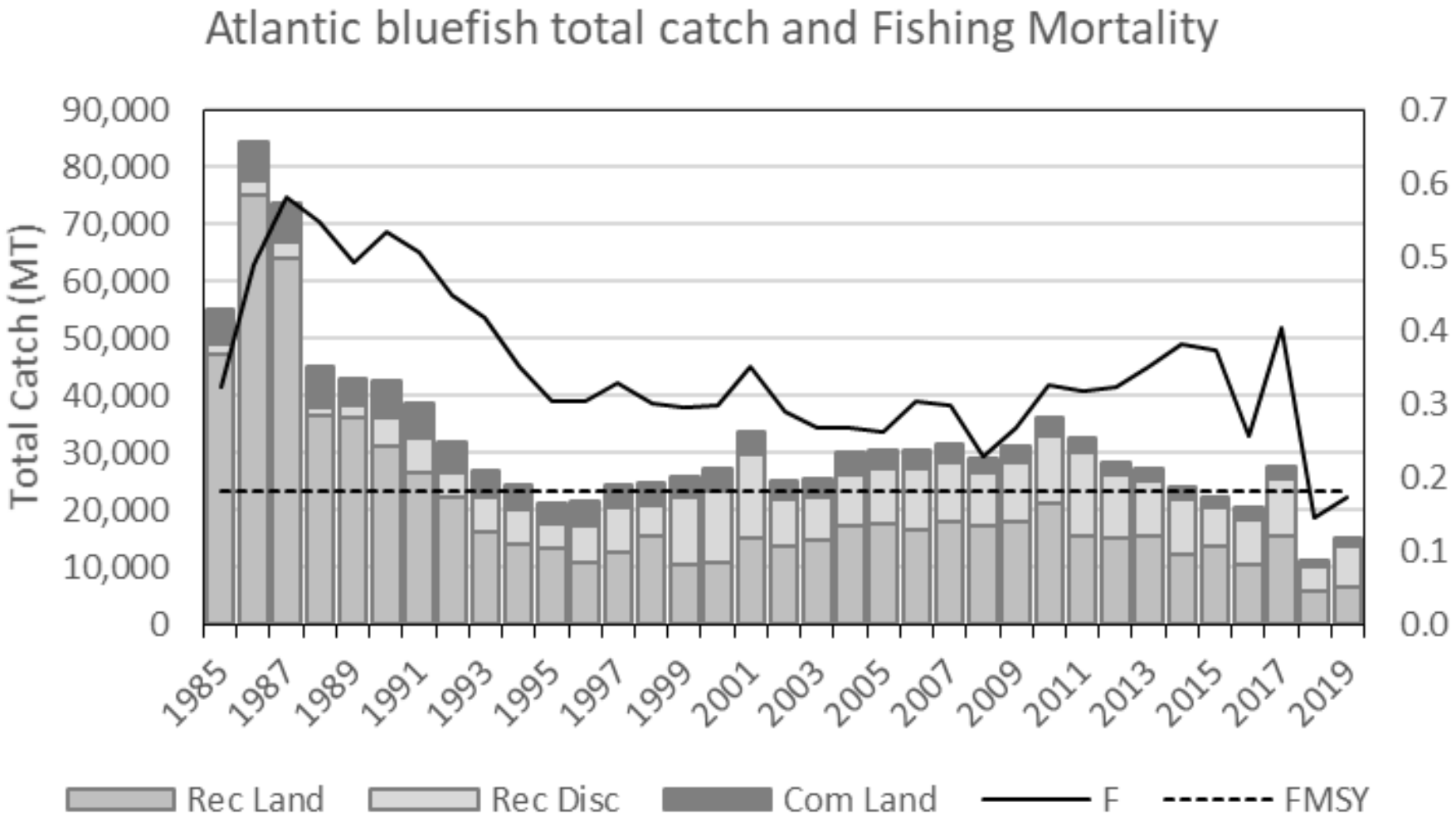
Bluefish Operational Assessment 2021 Final Model Results

Recruitment (000s)

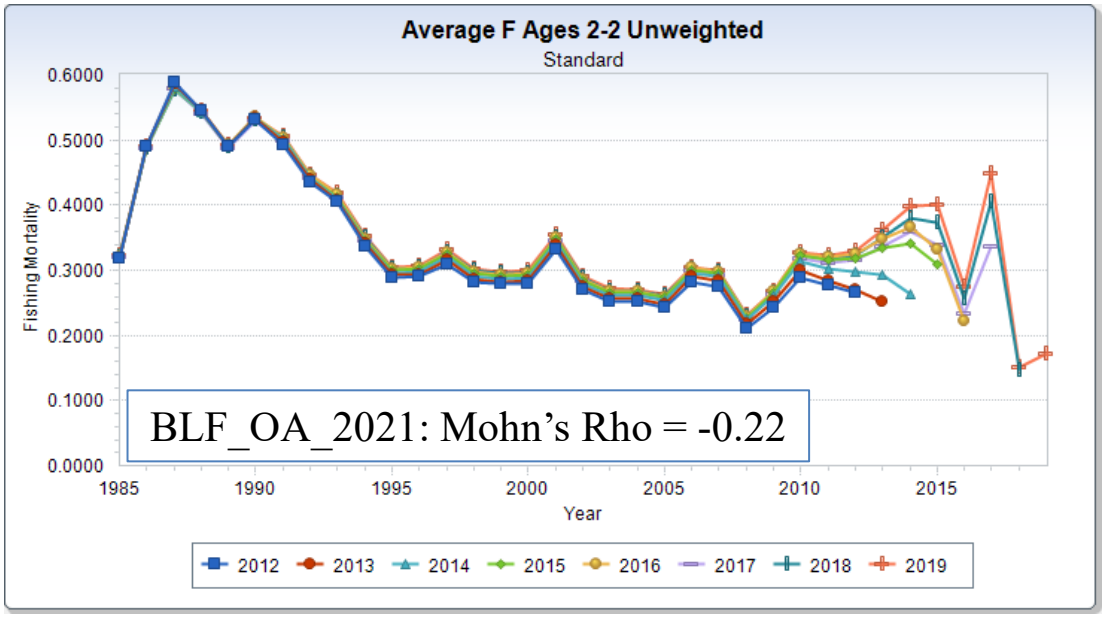


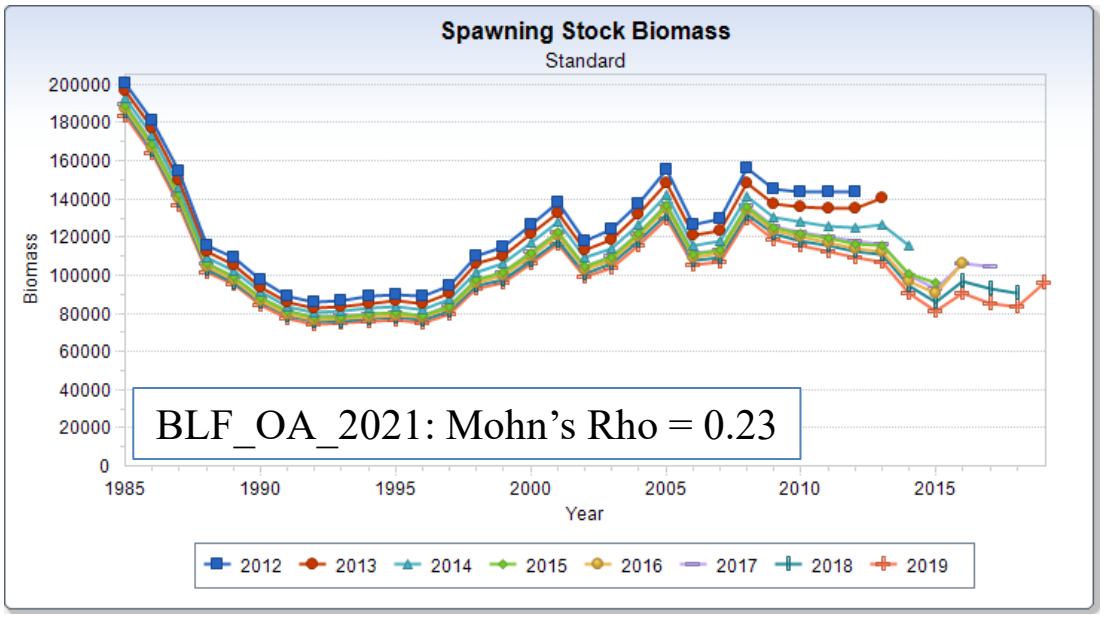
Recruitment in 2019 = 27.9 million
Lowest estimate in time-series

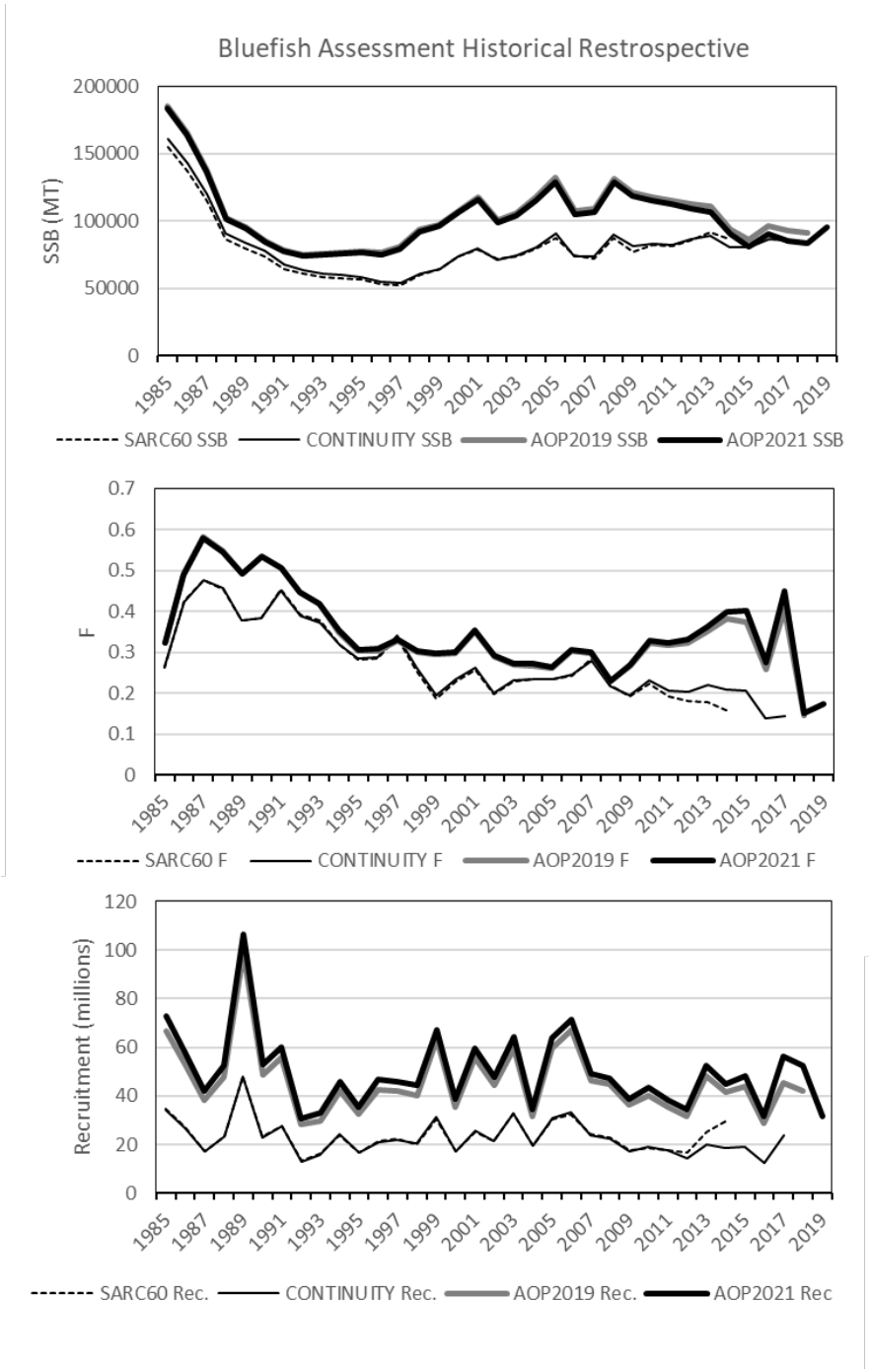

Atlantic bluefish SSB and Recruitment
SSB (MT)
250,000
200,000
150,000
100,000
50,000
0
Recruitment (millions)
140.0
120.0
100.0
80.0
60.0
40.0
20.0
0.0
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
2015
2017
2019
Recruit
SSB
SSBMSY
SSBThresh


Atlantic bluefish total catch and Fishing Mortality
Total Catch (MT)
90,000
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
2015
2017
2019
Rec Land
Rec Disc
Com Land
F
FMSY

Internal Retrospective comparison: F and SSB

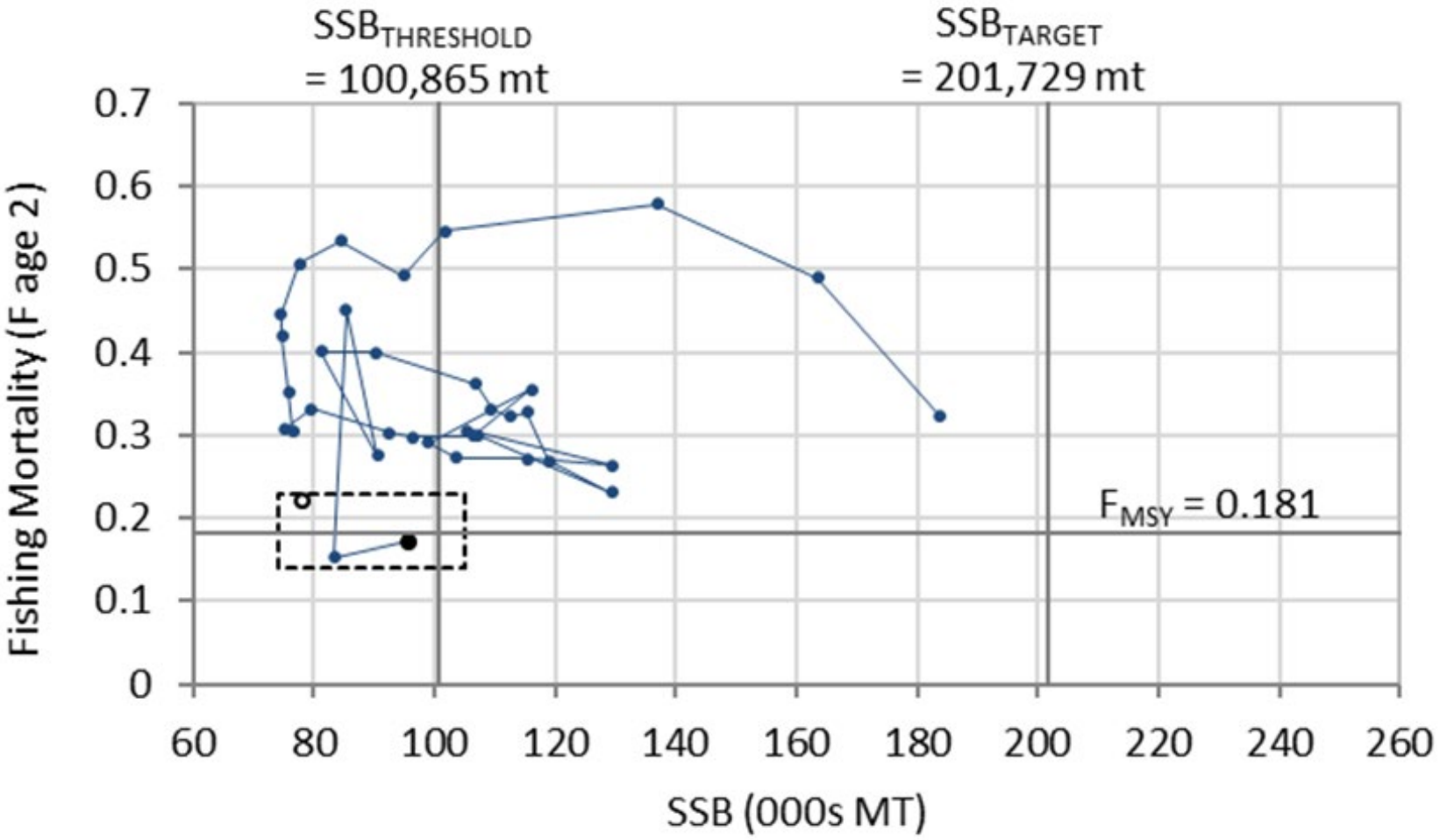





Bluefish Assessment Historical Restrospective
SSB (MT)
200000
150000
100000
50000
0
1985 1987 1989 1991 1993 1995 1997 1999 2001 2003 2005 2007 2009 2011 2013 2015 2017 2019
SARC60 SSB
CONTINUITY SSB
AOP2019 SSB
AOP2021 SSB
F
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
SARC60 F
CONTINUITY F
AOP2019 F
AOP2021 F
Recruitment (millions)
120
100
80
60
40
20
0
SARC60 Rec.
CONTINUITY Rec.
AOP2019 Rec.
AOP2021 Rec

TOR 4: Re-estimate or update the BRP's as defined by the management track level and recommend stock status. Also, provide qualitative descriptions of stock status based on simple indicators/metrics (e.g., age- and size-structure, temporal trends in population size or recruitment indices, etc.).

Assessment	SARC60	BLF_OA_2019	BLF_OA_2021
Model	ASAP SCAA	ASAP SCAA	ASAP SCAA
Final Run	Benchmark	New_MRIP_update	Data through 2019
Natural Mortality	M=0.20	M=0.20	M=0.20
Mean R (millions)	24	46	46
FMSY Proxy	F35%	F35%	F35%
FMSY	0.19	0.183	0.181
MSY (mt)	14,443	29,571	29,549
SSBMSY(mt)	101,343	198,717	201,729
Fterm	0.157	0.146	0.172
Yterm	10,126	11,288	14,957
SSBterm	86,534	91,041	95,742
Fterm/FMSY	0.83	0.80	0.95
Yterm/MSY	0.7	0.39	0.51
SSBterm/SSBMSY	0.85	0.46	0.48



- Overfished and No Overfishing

Qualitative status description

- Spawning stock biomass has slightly increased over the past 5 years, coinciding with a noticeable drop in F
- Recruitment has remained steady around the mean with a drop from 2018 to 2019
- Lower total catch in recent years, with poor catch in 2016 (20,370 MT), 2018 (11,288 MT), and 2019 (14,957 MT), well below the time series average of 32,034 MT
- Low catch in recent years could be due to lower bluefish availability. Anecdotal evidence suggests larger bluefish stayed offshore and inaccessible to most of the recreational fishery during some of these years.

TOR 5: Conduct short-term stock projections when appropriate.

Bluefish Operational Assessment 2021
OFL Projections (new MRIP equivalents)

Atlantic bluefish OFL for 2022-2023
Catches and SSB in metric tons

Year	Total Catch (MT)	F	SSB (MT)
2020	7,385	0.075	113,672
2021	7,385	0.067	137,162
2022	21,729	0.181	146,890
2023	22,641	0.181	153,066

- OFL Projections for 2022-2023
- Assume 2020 ABC is caught in 2020, 2021 = 7,385 MT