

## Summer flounder Data and Projection Update for 2018

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Reported 2017 landings in the commercial fishery were 2,644 mt = 5.829 million lbs, about 103% of the commercial quota (2,567 mt = 5.659 million lbs). Estimated 2017 landings in the recreational fishery were 1,447 mt = 3.190 million lbs, about 85% of the recreational harvest limit (1,711 mt = 3.772 million lbs). Total commercial and recreational landings in 2017 were 4,091 mt = 9.019 million lbs and total commercial and recreational discards were 1,280 mt = 2.822 million lbs, for a total catch in 2017 of 5,371 mt = 11.841 million lbs (Table 1, Figure 1), about 5% above the 2017 ABC of 5,125 mt = 11.299 million lbs. The total catch in 2017 was the lowest in the assessment time series (1982-2017).

State and Federal survey abundance and biomass indices generally have decreased from their most recent peaks during 2009-2012 to 2017 (Figures 2-11), with the exception of the Massachusetts and Delaware indices. Massachusetts indices decreased in 2017 from their time series peaks in 2016. The Delaware index peaked in 2017. Indices of recruitment (age 0 fish) were generally lower over the last 6-7 years than in the previous decade; recruitment indices in 2017 were highly variable (Figures 12-18). The Massachusetts and one of the Delaware recruitment indices were high in 2017. Note that the NEFSC Fall survey was unable to sample the summer flounder strata in 2017 so no indices are available (Figures 2 & 4). The NEFSC Spring biomass index increased by 87% from 2017 to 2018 (Figures 2-3).

Projections using the existing 2016 updated assessment model (data through 2015) were made to estimate the 2019 OFL and ABC catches. The projections use the reported/estimated catches for 2016 and 2017 and assume that 100% of the 2018 ABC (5,999 mt = 13.226 million lbs) will be caught. The OFL projection uses  $F_{2019} = F_{MSY} = 0.309$  and so the total catch in 2019 is the projected OFL = 9,343 mt (20.598 million lbs). The ABC projection sets the CV of the OFL at 60% (MAFMC SSC assumption for summer flounder in 2016) and so the total catch in 2019 is the projected ABC = 6,988 mt (15.406 million lbs), about 75% of the projected OFL (Table 2).

Table 1. Commercial (comm) and recreational (recr) fishery landings, estimated commercial and recreational dead discard, and total catch (metric tons) as used in the assessment of summer flounder, Maine to North Carolina. Includes MRIP 2004-2017 estimates of recreational catch, and 1982-2003 recreational catch adjusted by the 2004-2011 MRIP to MRFSS ratio for each catch type.

Year	Comm Landings	Comm Discard	Comm Catch	Recr Landings	Recr Discard	Recr Catch	Total Landings	Total Discard	Total Catch
1982	10,400	n/a	10,400	8,163	284	8,447	18,563	284	18,847
1983	13,403	n/a	13,403	12,527	361	12,888	25,930	361	26,291
1984	17,130	n/a	17,130	8,405	399	8,804	25,535	399	25,934
1985	14,675	n/a	14,675	5,594	88	5,682	20,269	88	20,357
1986	12,186	n/a	12,186	8,000	555	8,555	20,186	555	20,741
1987	12,271	n/a	12,271	5,450	502	5,951	17,721	502	18,222
1988	14,686	n/a	14,686	6,550	328	6,878	21,236	328	21,564
1989	8,125	456	8,581	1,417	43	1,460	9,542	499	10,041
1990	4,199	898	5,097	2,300	225	2,525	6,499	1,122	7,621
1991	6,224	219	6,443	3,566	412	3,978	9,790	631	10,420
1992	7,529	2,151	9,680	3,201	332	3,533	10,730	2,483	13,213
1993	5,715	701	6,416	3,956	874	4,830	9,671	1,575	11,246
1994	6,588	1,535	8,123	4,178	660	4,838	10,766	2,195	12,961
1995	6,977	821	7,798	2,428	723	3,152	9,405	1,545	10,950
1996	5,861	1,436	7,297	4,398	656	5,054	10,259	2,092	12,351
1997	3,994	806	4,800	5,314	535	5,849	9,308	1,341	10,649
1998	5,076	634	5,710	5,588	705	6,293	10,664	1,339	12,003
1999	4,820	1,660	6,480	3,747	683	4,430	8,567	2,343	10,910
2000	5,085	1,617	6,702	7,376	915	8,291	12,461	2,532	14,993
2001	4,970	405	5,375	5,213	1,225	6,438	10,183	1,630	11,813
2002	6,573	922	7,495	3,586	746	4,332	10,159	1,668	11,827
2003	6,450	1,144	7,594	5,213	847	6,060	11,663	1,991	13,653
2004	7,880	1,606	9,486	4,974	1,013	5,987	12,854	2,619	15,473
2005	7,671	1,484	9,155	4,929	950	5,879	12,600	2,434	15,034
2006	6,316	1,482	7,798	4,804	768	5,572	11,120	2,250	13,370
2007	4,544	2,110	6,654	4,199	1,002	5,201	8,743	3,112	11,855
2008	4,179	1,162	5,341	3,689	1,154	4,843	7,868	2,316	10,184
2009	5,013	1,446	6,459	2,716	1,140	3,856	7,729	2,586	10,316
2010	6,078	1,466	7,544	2,317	1,066	3,383	8,395	2,532	10,927
2011	7,515	1,096	8,611	2,645	1,093	3,738	10,160	2,189	12,349
2012	5,916	718	6,634	2,853	815	3,668	8,769	1,533	10,302
2013	5,643	712	6,355	3,351	758	4,109	8,994	1,470	10,464
2014	4,991	785	5,776	3,356	932	4,288	8,347	1,717	10,064
2015	4,843	670	5,513	2,209	563	2,772	7,052	1,233	8,285
2016	3,542	738	4,280	2,804	671	3,475	6,346	1,409	7,755
2017	2,644	854	3,498	1,447	426	1,873	4,091	1,280	5,371

Table 2. Summer flounder 2019 OFL and ABC Projections.

**OFL Projection:** Projection assumes that 100% of the 2018 ABC (5,999 mt = 13.226 million lbs) will be caught. Total catch in 2019 is the projected OFL.

Total Catch, Landings, Discards, Fishing Mortality (F),  
and Spawning Stock Biomass (SSB)  
Catches and SSB in metric tons

Year	Total Catch	Landings	Discards	F	SSB
2016	7,750	6,341	1,409	0.327	39,428
2017	5,371	4,091	1,280	0.214	43,107
2018	5,999	5,010	989	0.215	48,389
2019	9,343	7,780	1,563	0.309	51,225

**ABC Projection:** Projection assumes that 100% of the 2018 ABC (5,999 mt = 13.226 million lbs) will be caught. Total catch in 2019 is the projected ABC. Projection sets the CV of the OFL at 60% (MAFMC SSC assumption for summer flounder in 2016).

Total Catch, Landings, Discards, Fishing Mortality (F),  
and Spawning Stock Biomass (SSB)  
Catches and SSB in metric tons

Year	Total Catch	Existing ABC	Landings	Discards	F	P* value	SSB
2016	7,750	7,375	6,341	1,409	0.327	0.641	39,248
2017	5,371	5,125	4,091	1,280	0.214	0.010	43,107
2018	5,999	5,999	5,010	989	0.215	0.100	48,389
2019	6,988	n/a	5,834	1,154	0.225	0.300	53,198

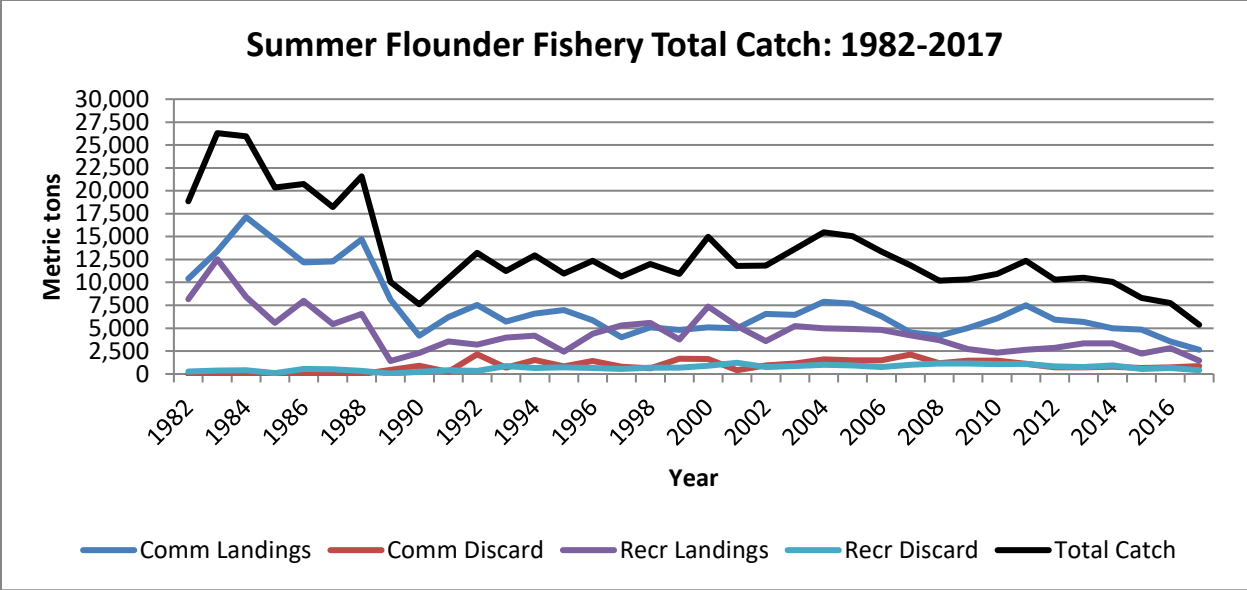


Figure 1. Summer flounder fishery total catch.

## NEFSC Trawl Surveys

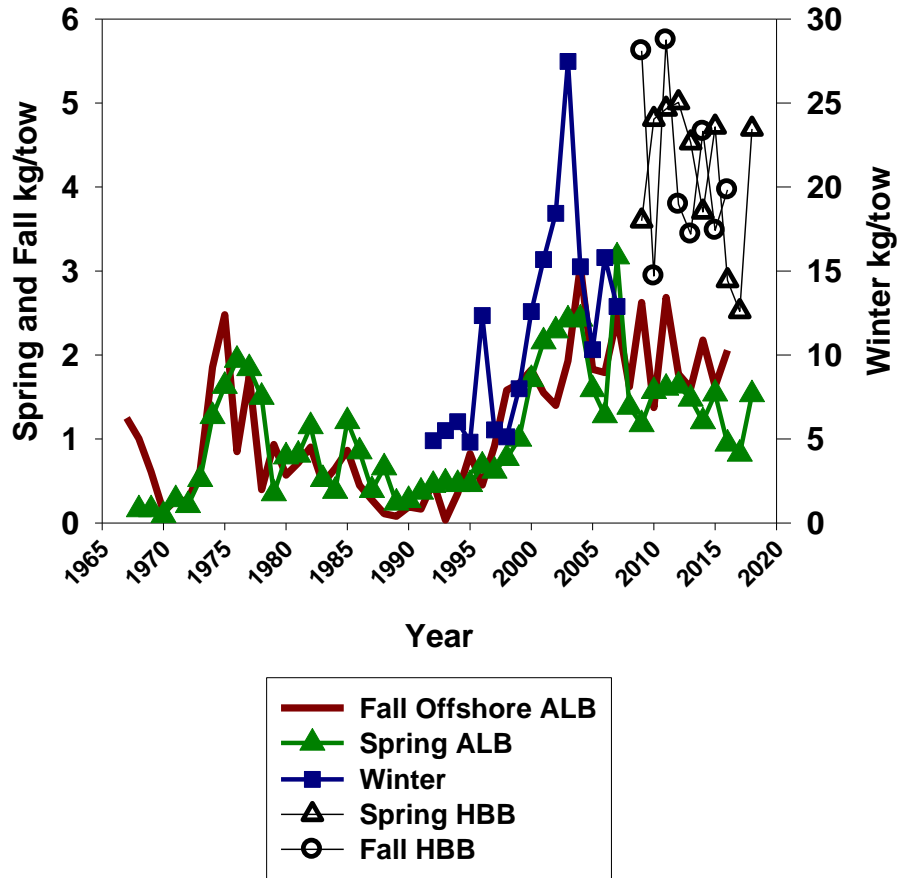


Figure 2. NEFSC trawl survey biomass indices for summer flounder. ‘ALB’ indices are calibrated FSV Albatross IV indices; ‘HBB’ indices are uncalibrated FSV Bigelow indices.

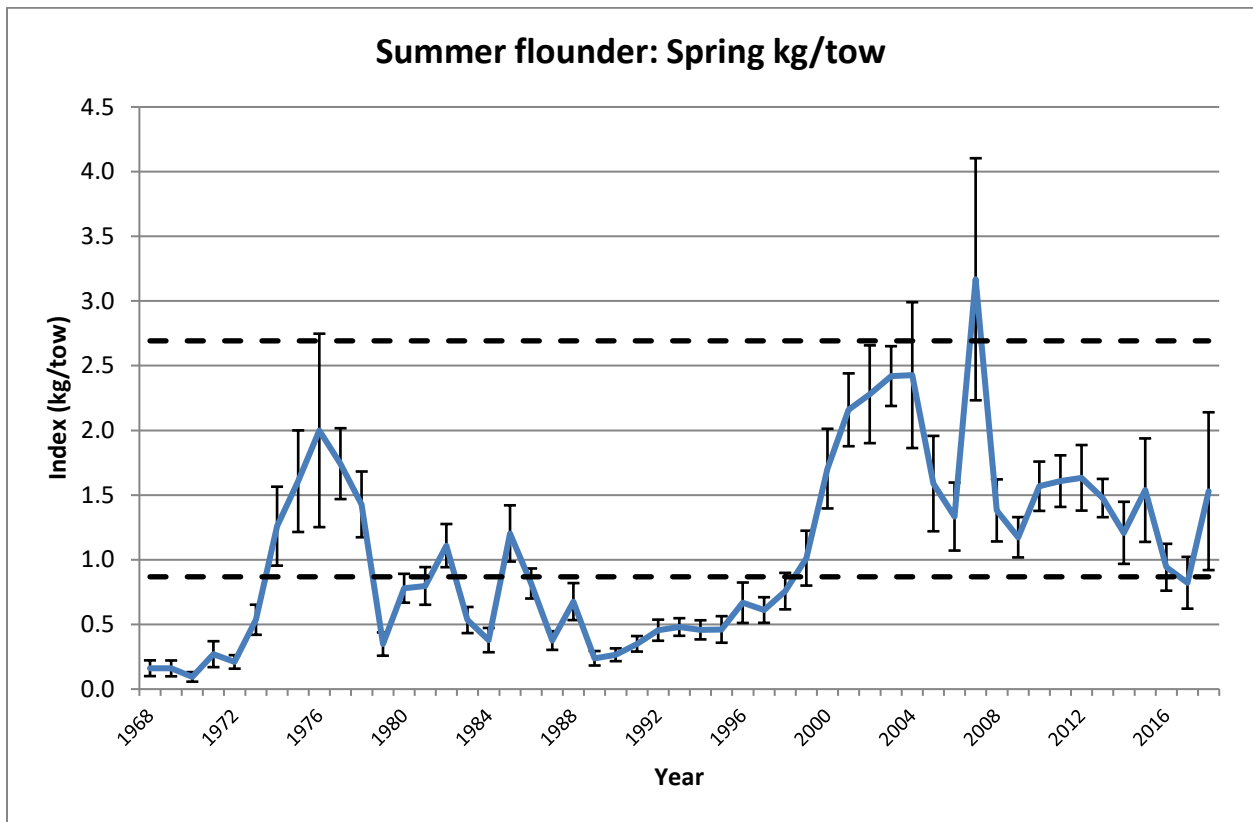


Figure 3. NEFSC spring trawl survey indices of summer flounder biomass. Whiskers around each annual index represent +/- one standard deviation. Dashed lines represent 80% confidence intervals around the 2007-2011 mean, a period when the stock was estimated to be at or above SSBMSY and not experiencing overfishing.

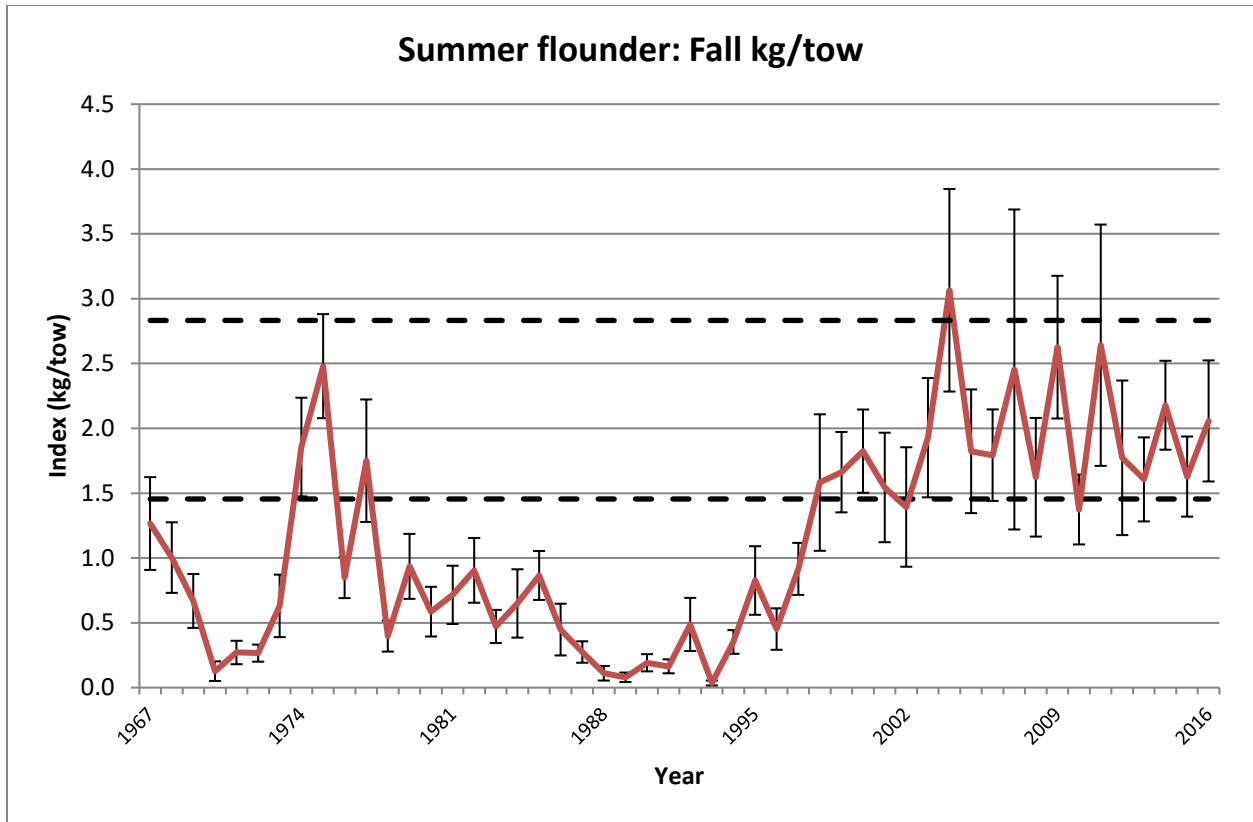


Figure 4. NEFSC fall trawl survey indices of summer flounder biomass. Whiskers around each annual index represent +/- one standard deviation. Dashed lines represent 80% confidence intervals around the 2007-2011 mean, a period when the stock was estimated to be at or above SSBMSY and not experiencing overfishing.

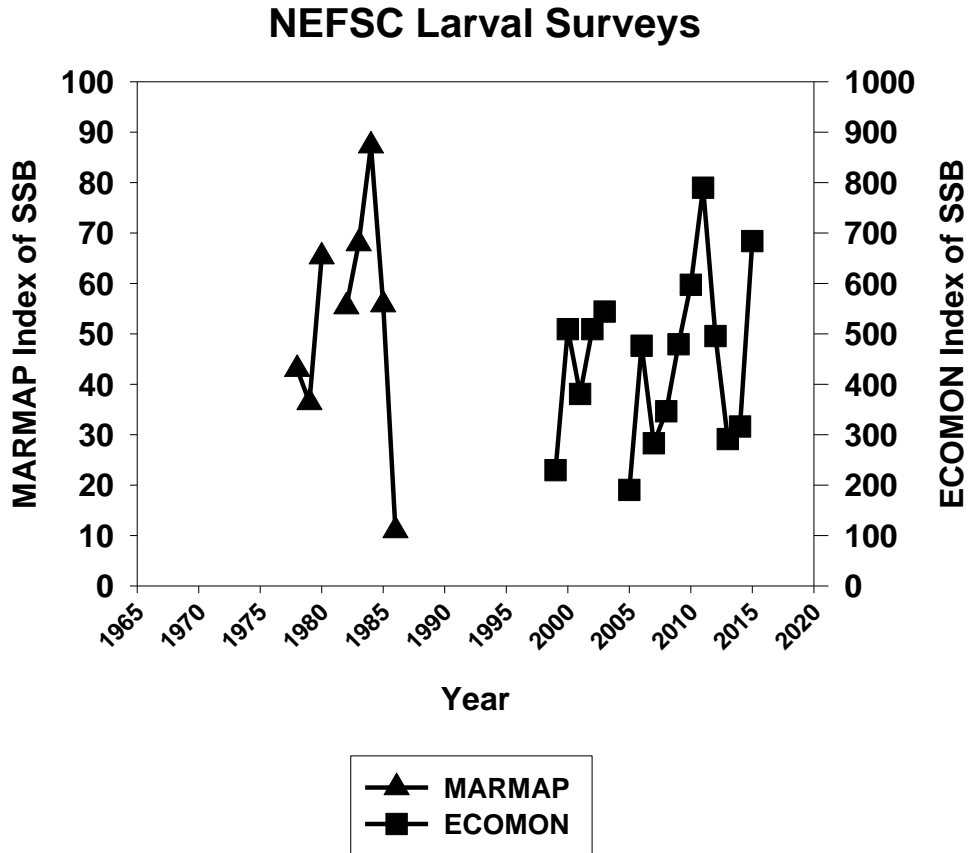


Figure 5. NEFSC larval survey indices of summer flounder spawning stock biomass (SSB).



### MA Trawl Surveys

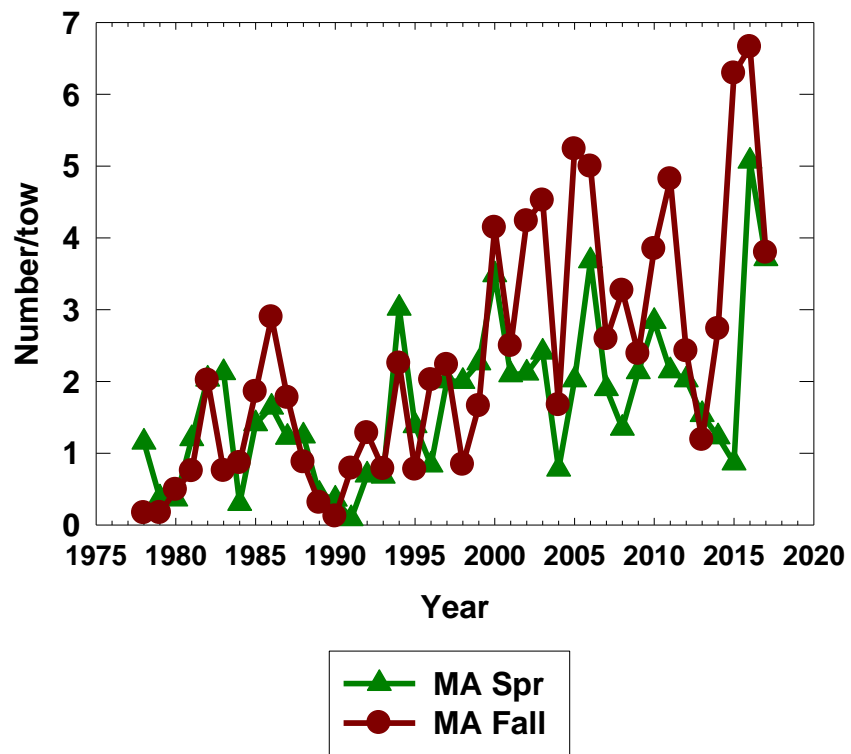


Figure 6. MADMF trawl survey indices for summer flounder.

# RI Trawl Surveys

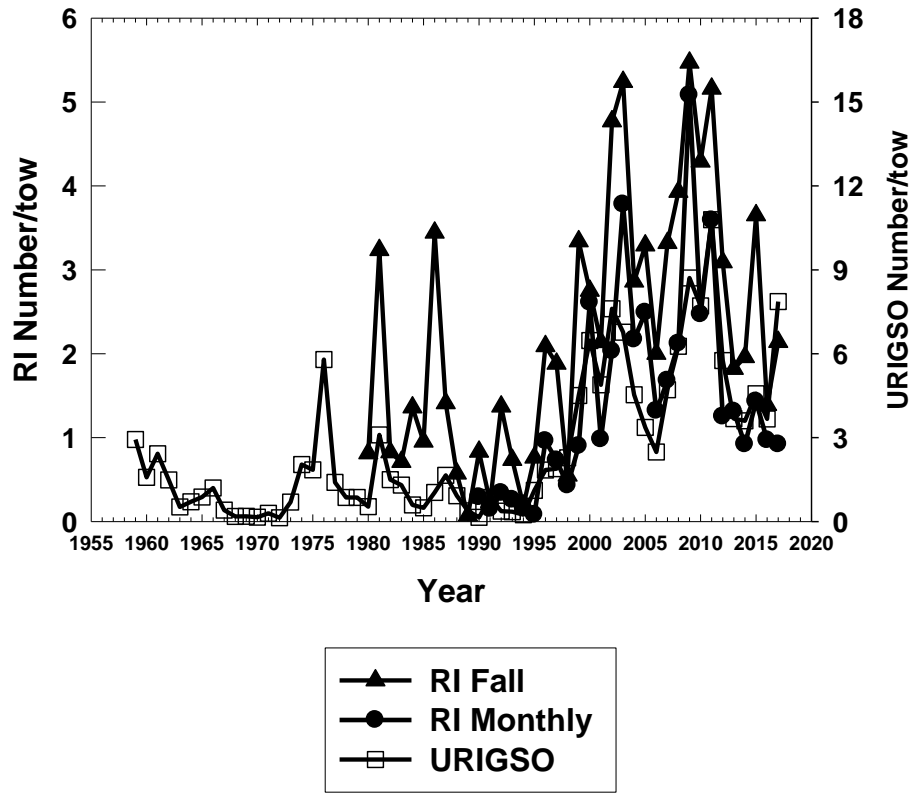


Figure 7. RIDFW and URIGSO trawl survey indices for summer flounder.

# CT and NY Trawl Surveys

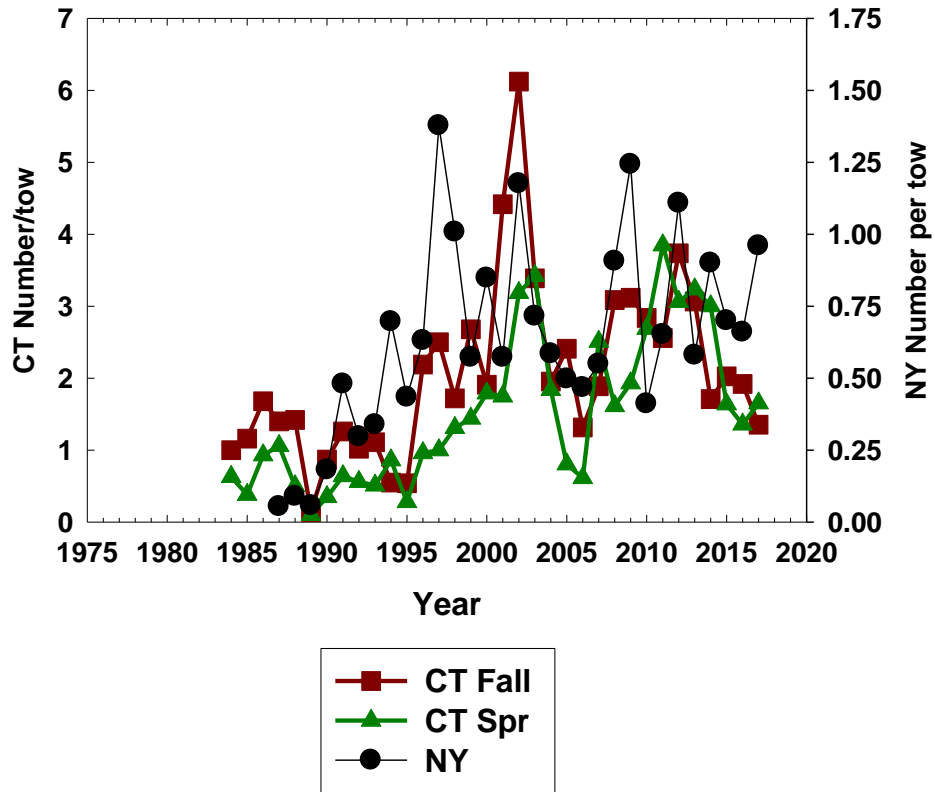


Figure 8. CTDEP and NYDEC trawl survey indices for summer flounder.

### NJ and DE Trawl Surveys

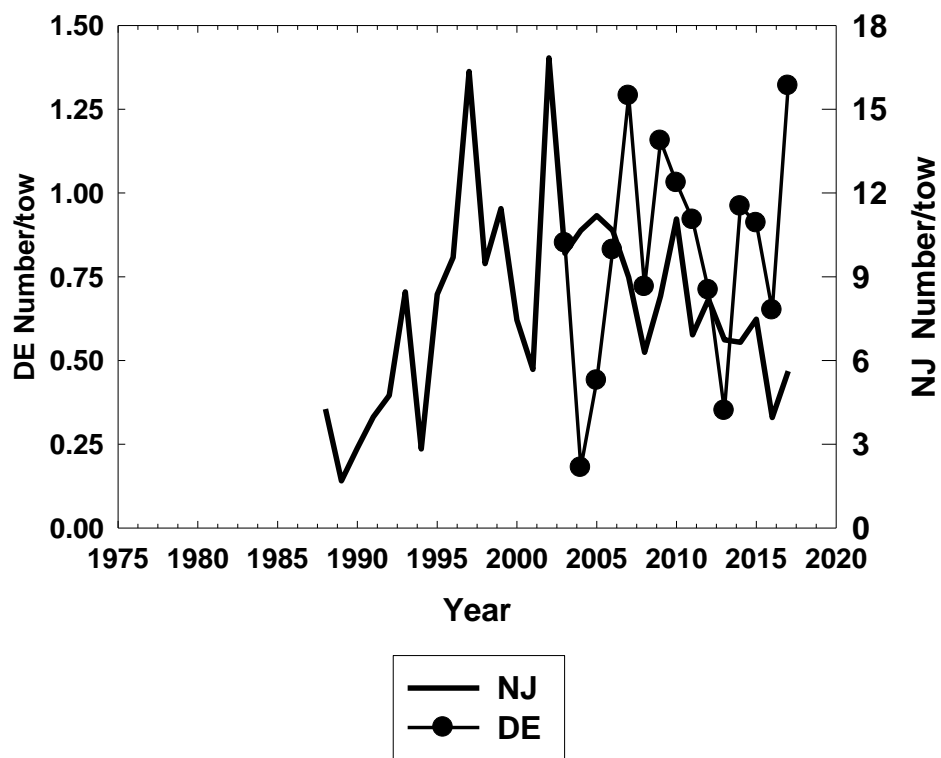


Figure 9. NJDMF and DEDFW trawl survey indices for summer flounder.

## ChesMMap and NEAMAP Trawl Surveys

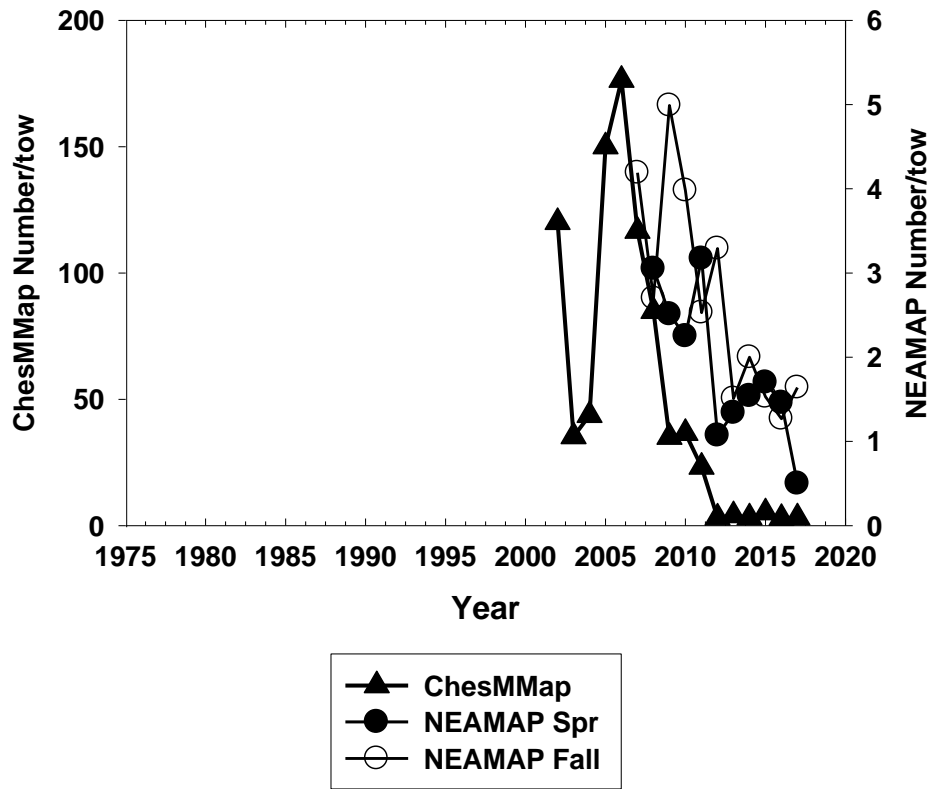


Figure 10. ChesMMap and NEAMAP trawl survey indices for summer flounder.

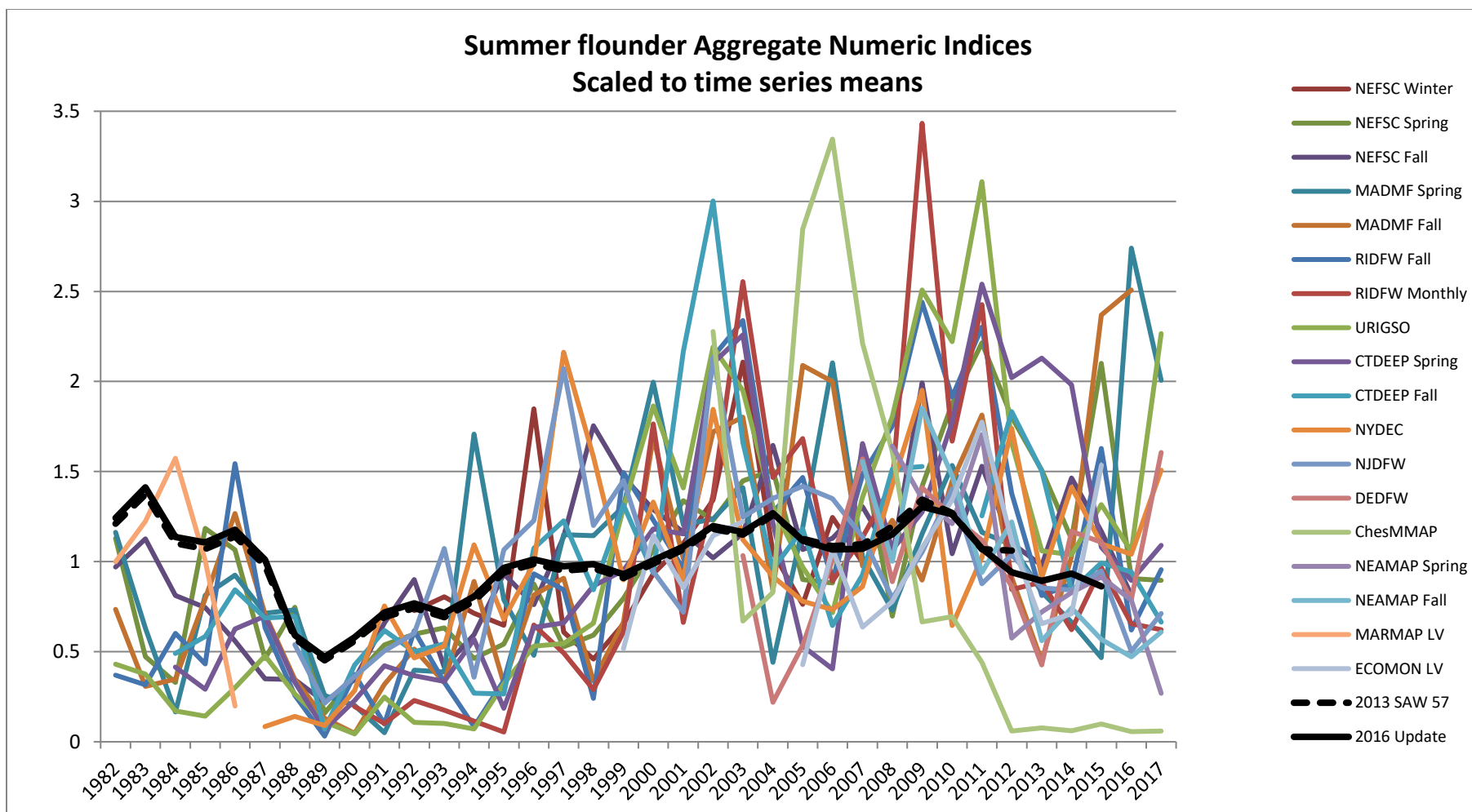


Figure 11. Summer flounder aggregate indices of numeric abundance.

### NEFSC Fall Age 0 Index

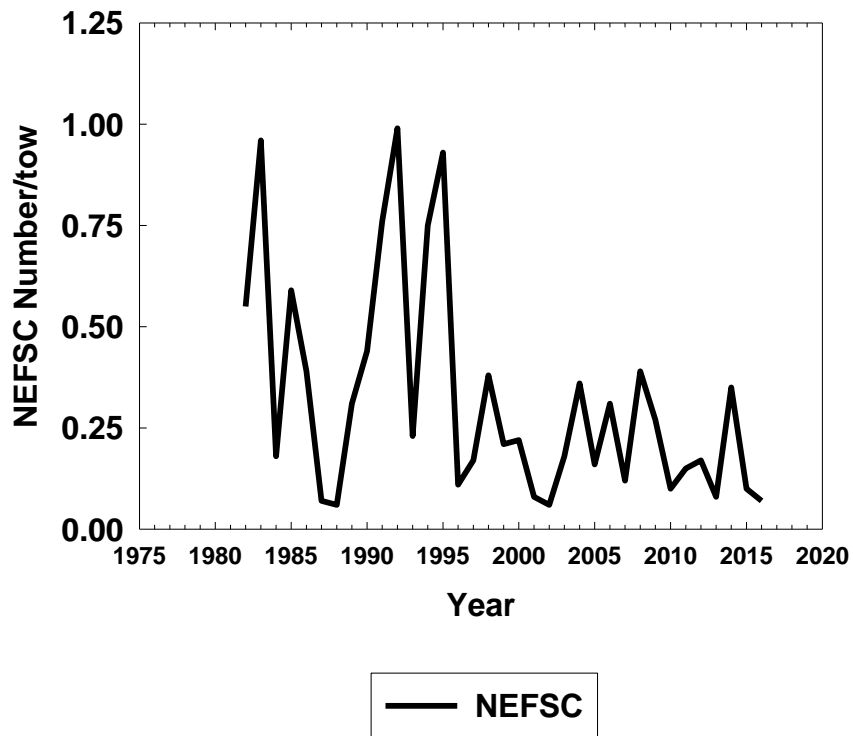


Figure 12. NEFSC age 0 abundance indices for summer flounder.

### MA and RI Age 0 Indices

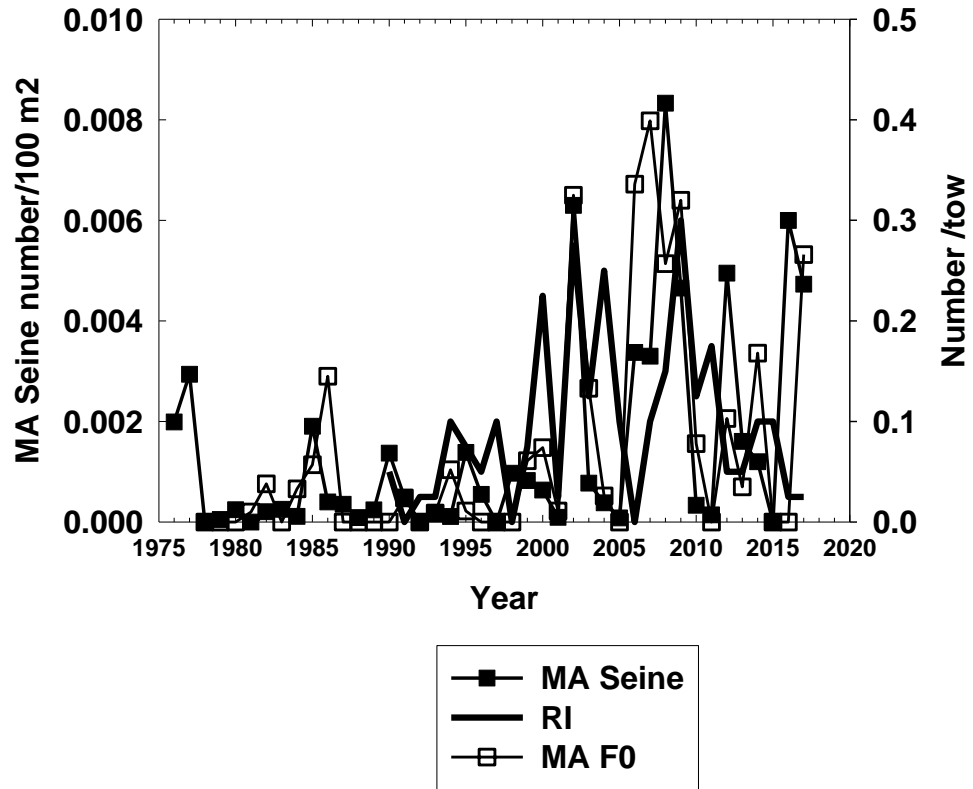


Figure 13. MADMF and RIDFW age 0 abundance indices for summer flounder.



### CT, NY and NJ Age 0 Indices

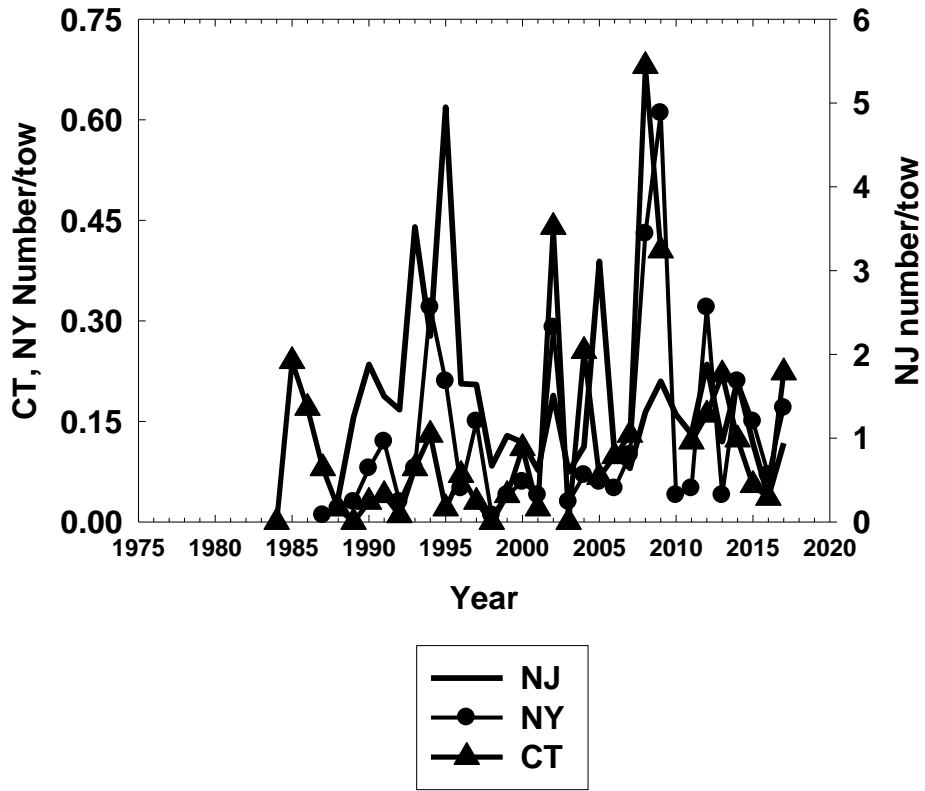


Figure 14. CTDEP, NYDEC, and NJDFW age 0 abundance indices for summer flounder.

### DE Age 0 Indices

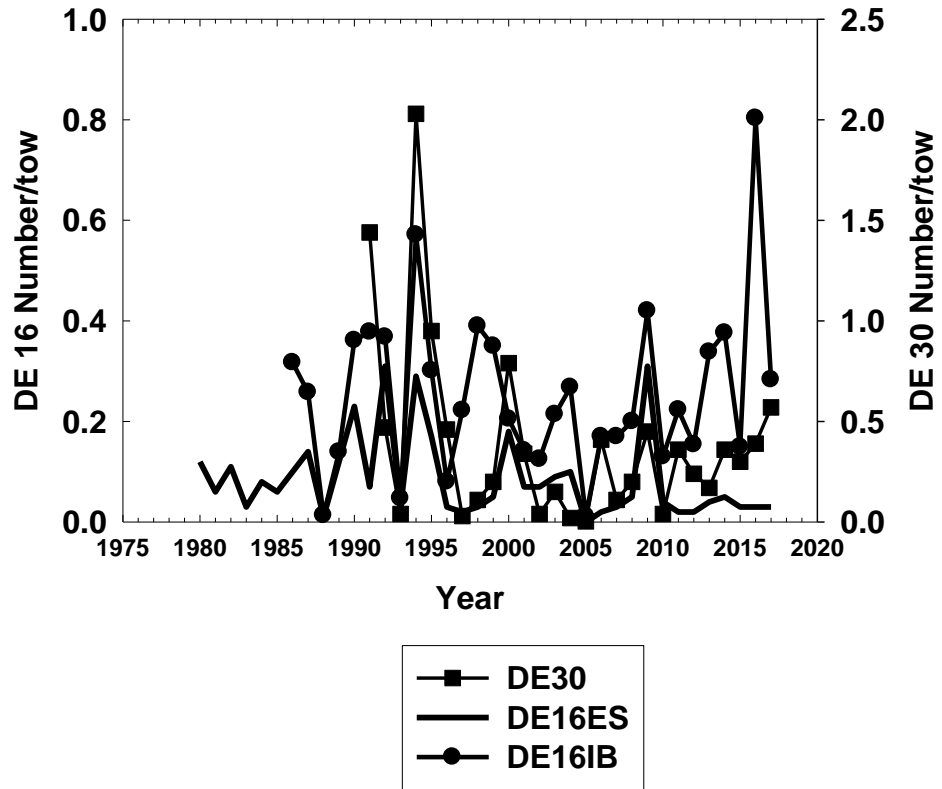


Figure 15. DEDFW age 0 abundance indices for summer flounder.

### MD, VIMS and NC Age 0 Indices

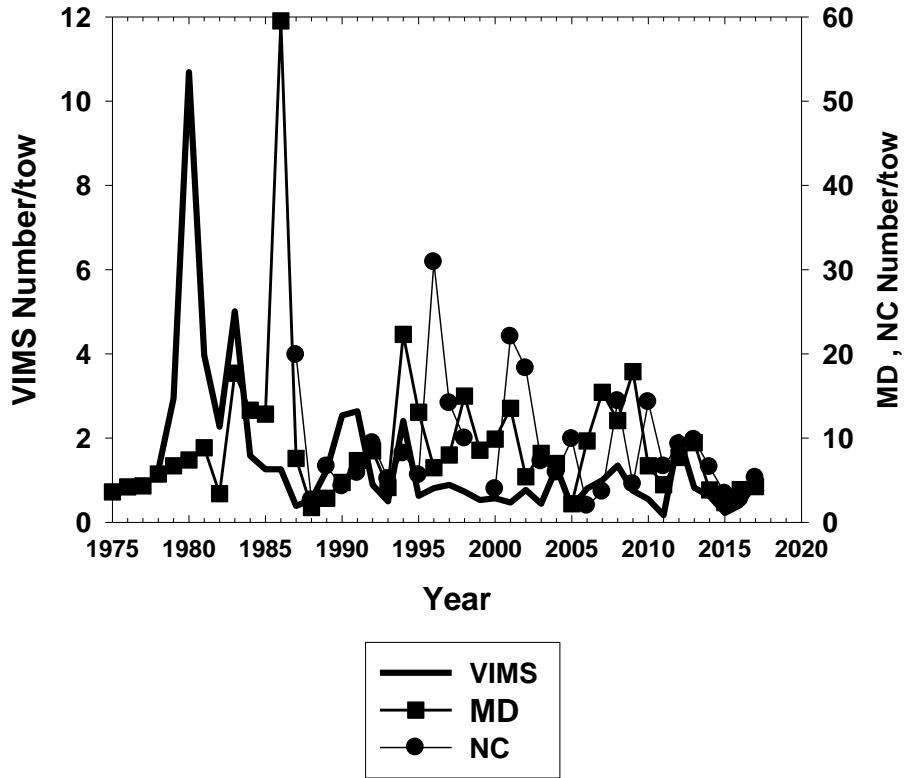


Figure 16. MDDNR, VIMS, and NCDMF age 0 abundance indices for summer flounder.

### ChesMMAP and NEAMAP Age 0 Indices

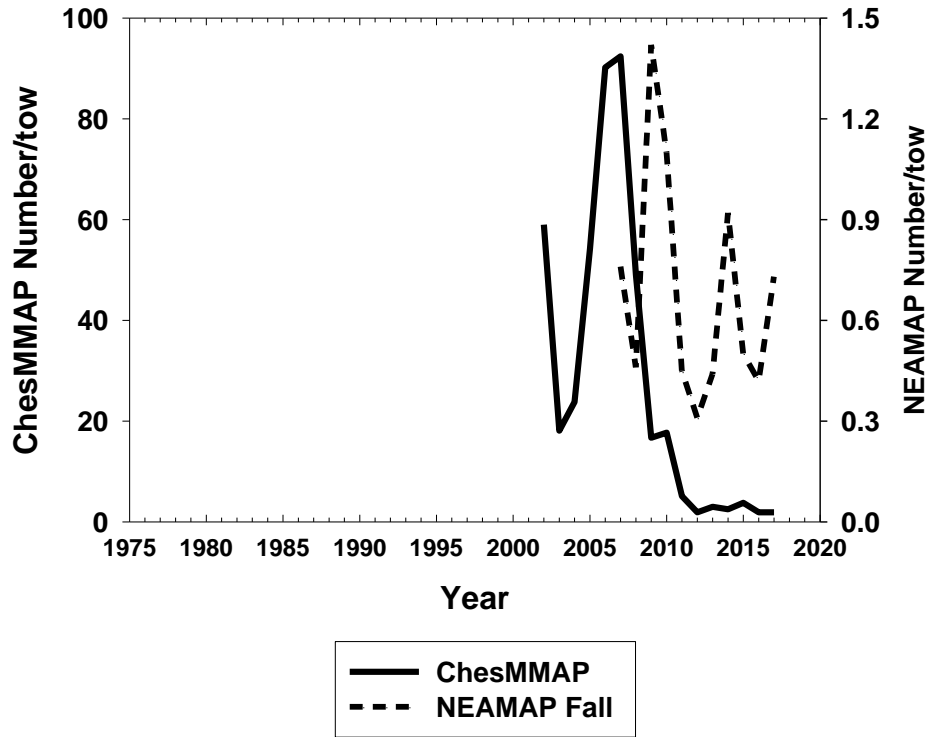


Figure 17. ChesMMAP and NEAMAP age 0 abundance indices for summer flounder.

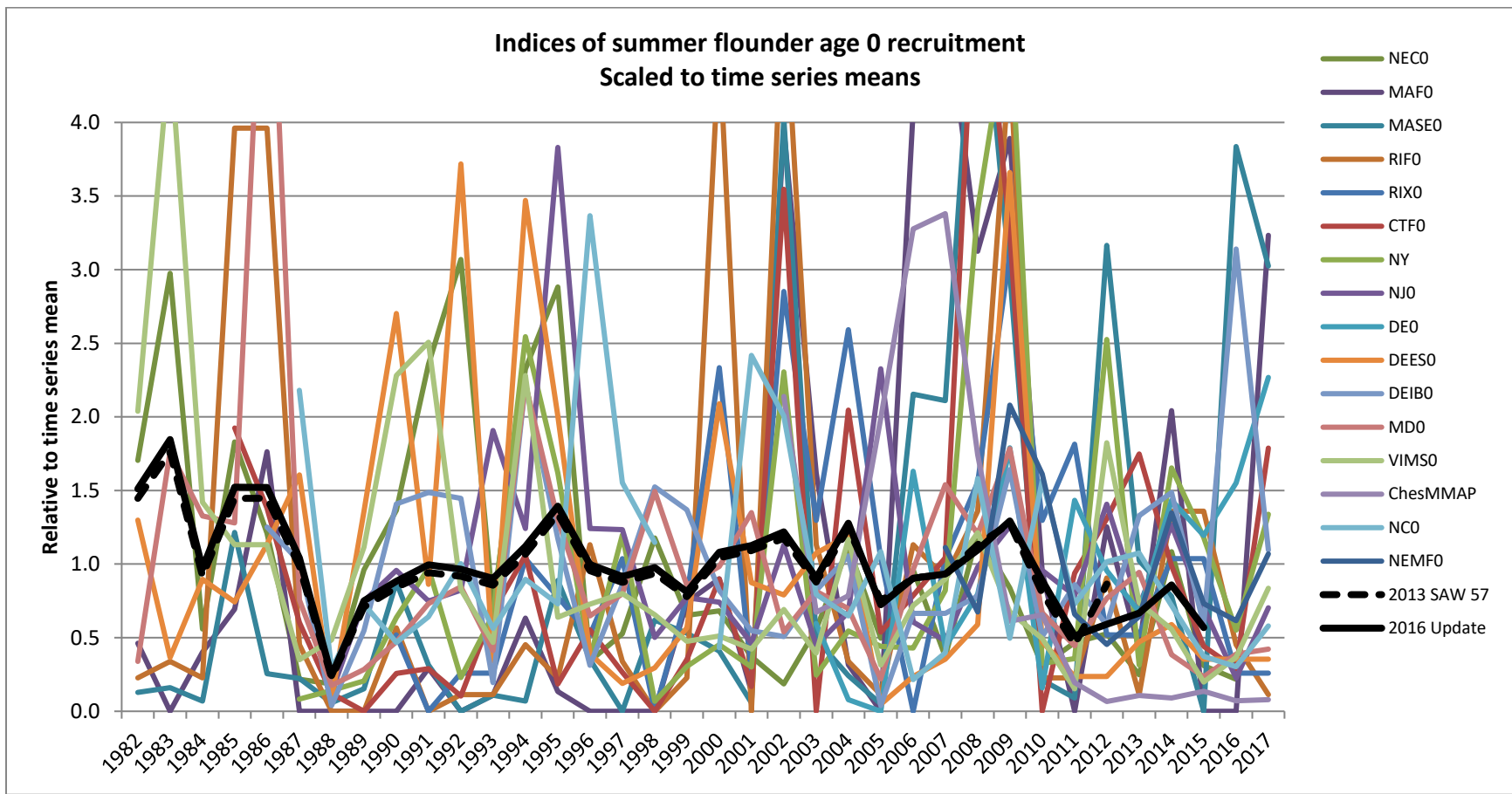


Figure 18. Summer flounder age 0 recruitment indices.