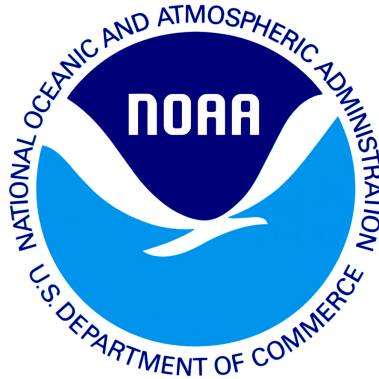*Draft Working Paper for Peer Review Only*

Generic fish species

2012 Assessment Update Report

U.S. Department of Commerce
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Northeast Fisheries Science Center
Woods Hole, Massachusetts

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This assessment of the generic fish species (Pseudopisces examplus) stock is an operational update of the existing 2008 benchmark VPA assessment (NEFSC 2008). Based on the previous assessment the stock was overfished, but overfishing was not ocurring. This assessment updates commercial fishery catch data, research survey indices of abundance, and the analytical VPA assessment models and reference points through 2010. Additionally, stock projections have been updated through 2016

State of Stock: Based on this updated assessment, generic fish species (*Pseudopisces examplus*) stock is overfished and overfishing is occurring (Figures 1-2). Spawning stock biomass (SSB) in 2010 was estimated to be 4,099 (mt) which is 41% of the biomass threshold for an overfished stock (SSB_{MSY} *proxy* = 10,051; Figure 1). The 2010 fully selected fishing mortality was estimated to be 0.47 which is 174% of the overfishing threshold proxy (F_{MSY} *proxy* = 0.27; Figure 2).

Table 1: Catch and status table for generic fish species. All weights are in (mt) recruitment is in (000s) and F_{Full} is the fishing mortality on fully selected ages (ages 8 and 9). Model results are from the current updated VPA assessment.

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Data										
Commercial landings	3,020	3,188	3,124	2,917	2,652	1,863	1,076	1,009	954	759
Commercial discards	307	225	334	309	150	87	97	63	104	89
Recreational landings	54	37	41	68	76	77	93	95	79	101
Recreational discards	87	109	60	50	51	38	106	44	97	71
CA landings	552	810	808	735	888	807	289	919	633	397
CA discards	15	18	13	50	30	11	42	15	40	36
Catch for Assessment	4,035	4,386	4,380	4,128	3,848	2,884	1,703	2,145	1,908	1,454
Model Results										
Spawning Stock Biomass	6,688	6,168	5,504	4,221	3,756	2,757	2,710	3,194	3,900	4,099
F_{Full}	0.91	0.54	0.75	0.93	0.84	0.85	0.52	0.55	0.41	0.47
Recruits (age 3)	12,134	11,213	8,476	5,106	3,702	4,521	12,438	7,277	3,962	5,119

Table 2: Comparison of reference points estimated in an earlier assessment and from the current assessment update. An $F_{40\%}$ proxy was used for the overfishing threshold and was based on long-term stochastic projections.

	2008	Current
F_{MSY} *proxy*	0.20	0.27 (0.24 - 0.31)
SSB_{MSY} (mt)	11,447	10,051 (8,092 - 12,187)
MSY (mt)	2,352	2,075 (1,785 - 2,362)
OFL (mt)	2,100	1,900 (1,657 - 2,292)
Median recruits (age 3) (000s)	11,947	9,301
Overfishing	No	Yes
Overfished	Yes	Yes

Projections: Short term projections of biomass were derived by sampling from a cumulative distribution function of biomass estimates from ADAPT VPA (with split time series between 1994 and 1995). The annual recruitment, maturity ogive, and mean weights at age used in projection are the most recent 5 year averages; retrospective adjustments were applied in the projections.

Table 3: Short term projections of total fishery catch and spawning stock biomass for generic fish species based on a harvest scenario of fishing at F_{MSY} proxy between 2013 and 2016. Catch in 2012 has been estimated at 1,207 (mt).

Year	Catch (mt)	SSB (mt)	F_{Full}
2011	848	5212 (4952 - 5561)	0.47
2012	1207	5995 (5123 - 6745)	0.27
2013	1273	6819 (5880 - 7732)	0.27
2014	1465	7741 (6741 - 8754)	0.27
2015	1660	8719 (7700 - 9791)	0.27
2016	1909	9343 (8210 - 10542)	0.27

Special Comments:

- What are the most important sources of uncertainty in this stock assessment? Explain, and describe qualitatively how they affect the assessment results (such as estimates of biomass, F, recruitment, and population projections).

    The largest source of uncertainty is the estimate of natural mortality based on longevity, which is not well studied in generic fish species, and assumed constant over time. Natural mortality affects the scale of the biomass and fishing mortality estimates. Other sources of uncertainty include possible changes in growth parameters over time and unreported recreational discarding, niether of which had a substantial affect on model outcomes in sensitivity runs.

- Does this assessment model have a retrospective pattern? If so, is the pattern strong, moderate, or mild?

    This assessment has a mild retrospective pattern and relatively low value of Mhon's rho (0.13).

- Based on this stock assessment, are population projections well determined or uncertain?

    Population projections for generic fish species, are reasonably well determined and projected boimass from the last assessment was within the confidence bounds of the biomass estimated in the current assessment.

- Describe any changes that were made to the current stock assessment, beyond incorporating additional years of data and the affect these changes had on the assessment and stock status.

    No changes, other than the incorporation of new data were made to the generic fish species assessment for this update. However, commercial discards were increased over the last ten years due to an adjustment in NEFSC discard estimation methodology.

- If the stock status has changed a lot since the previous assessment, explain why this occurred.

The overfishing status of generic fish species changed due to the increase in estimated commercial discards, which increased catch relative to estimated biomass.

- Indicate what data or studies are currently lacking and which would be needed most to improve this stock assessment in the future.
  The generic fish species assessment could be improved with additional studies on growth and maximum age, as well more precise estimates of recreational landings and discards.

- Are there other important issues?
  None.

References:
Smith, A. and S. Jones. 2008. In. Northeast Fisheries Science Center. 2008. Assessment of 19 Northeast Groundfish Stocks through 2007: Report of the 3rd Groundfish Assessment Review Meeting (GARM III), Northeast Fisheries Science Center, Woods Hole, Massachusetts, August 4-8, 2008. US Dep Commer, NOAA Fisheries, Northeast
Fish Sci Cent Ref Doc. 08-15; 884 p + xvii. http://www.nefsc.noaa.gov/publications/crd/crd0815/
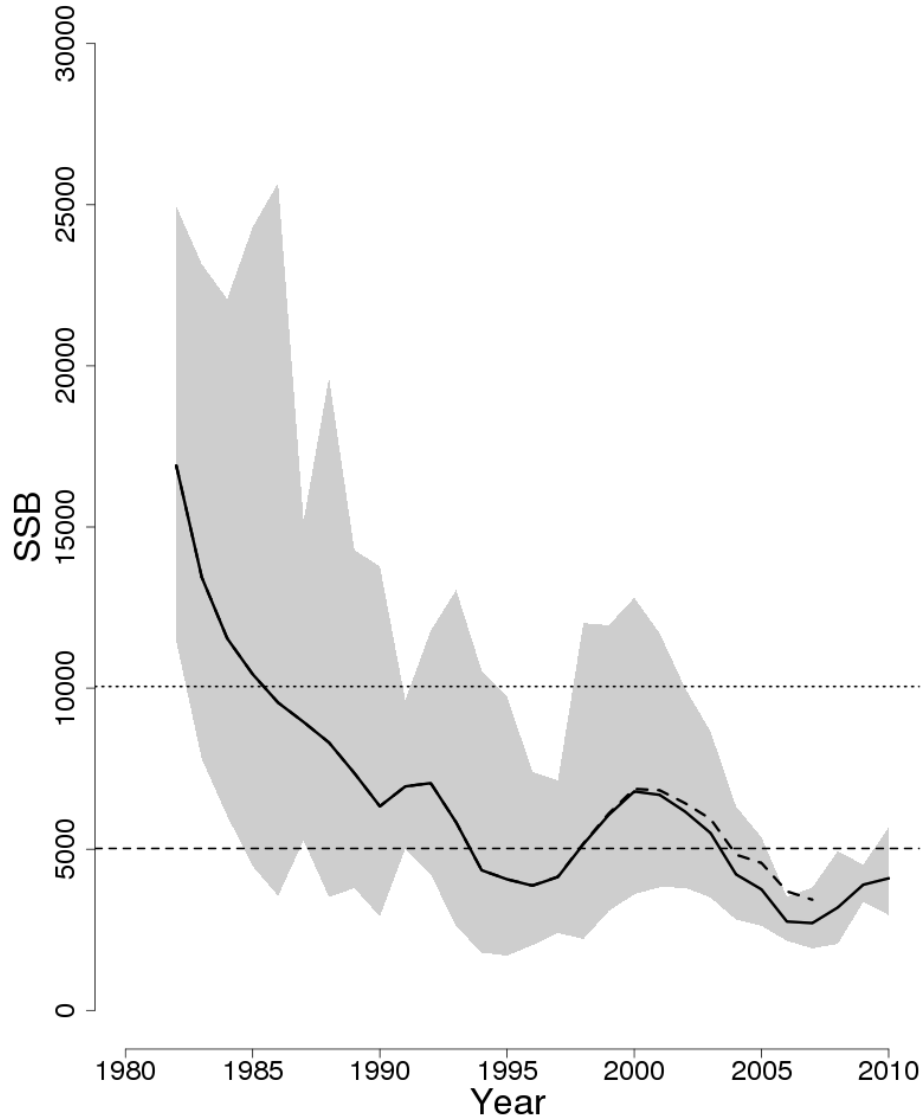
Figure 1: Trends in spawning stock biomass of generic fish species between 1982 and 2010 from the current (solid line) and previous (dashed line) assessment and the corresponding $SSB_{Threshold}$ ($\frac{1}{2} \ SSB_{MSY} \ proxy$; horizontal dashed line) as well as SSB_{Target} ($SSB_{MSY} \ proxy$; horizontal dotted line) based on the 2010 assessment. The 90% lognormal confidence intervals are shown.
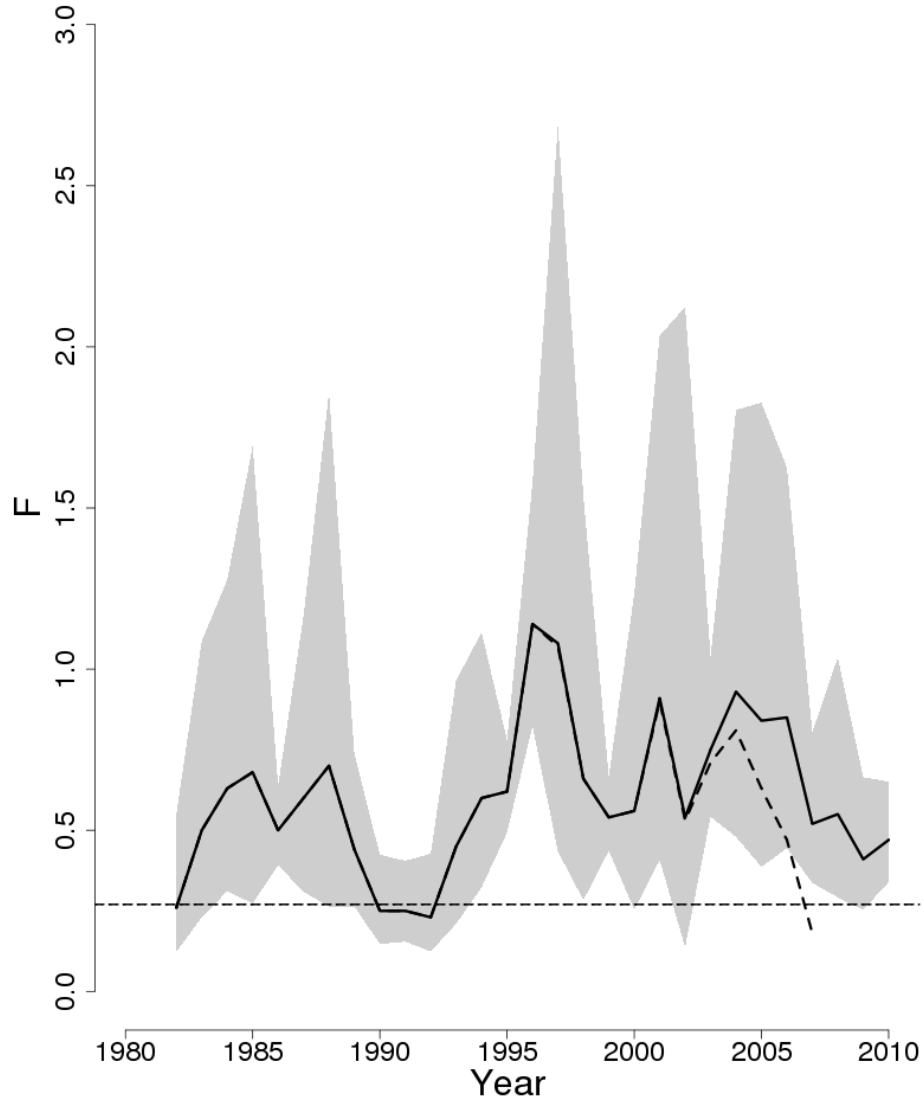
Figure 2: Trends in the fully selected fishing mortality (F_{Full}) of generic fish species between 1982 and 2010 from the current (solid line) and previous (dashed line) assessment and the corresponding $F_{Threshold}$ (F_{MSY} *proxy*=0.27; horizontal dashed line) based on the 2010 assessment. The 90% lognormal confidence intervals are shown.
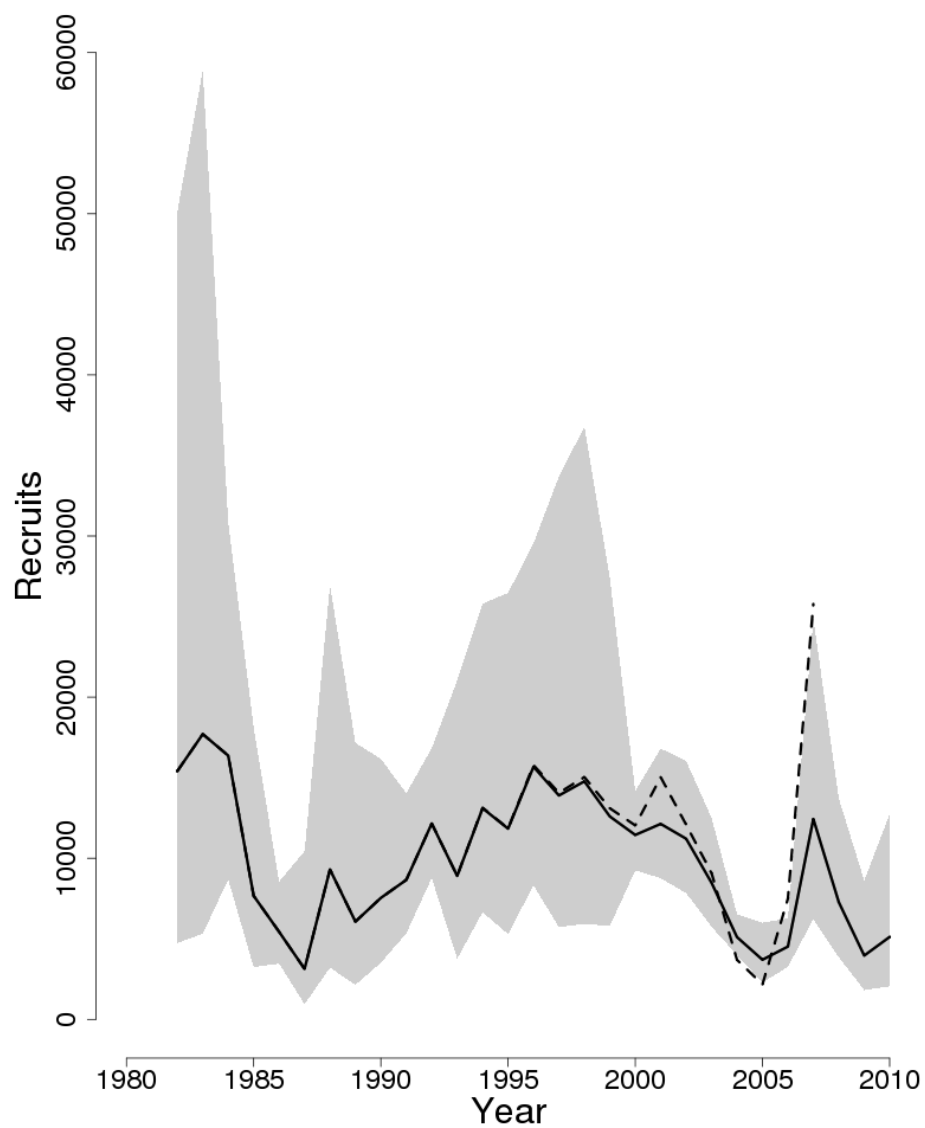
Figure 3: Trends in Recruits (age 3) (000s) of generic fish species between 1982 and 2010 from the current (solid line) and previous (dashed line) assessment. The 90% lognormal confidence intervals are shown.
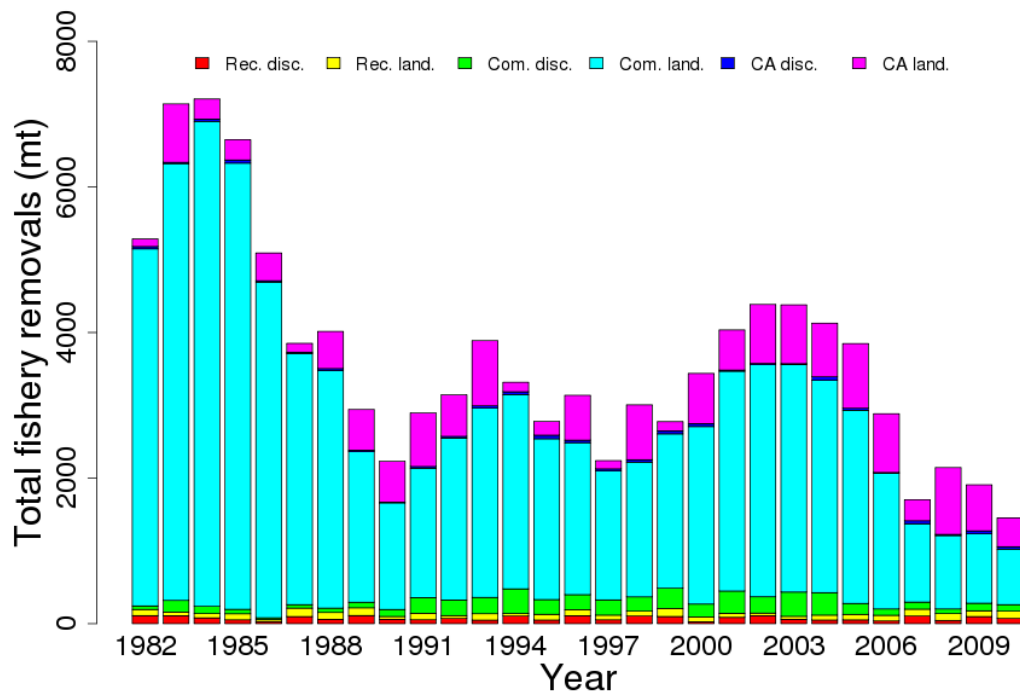
Figure 4: Total catch of generic fish species between 1982 and 2010 by fleet (commercial, recreational, or Canadian) and disposition (landings and discards).
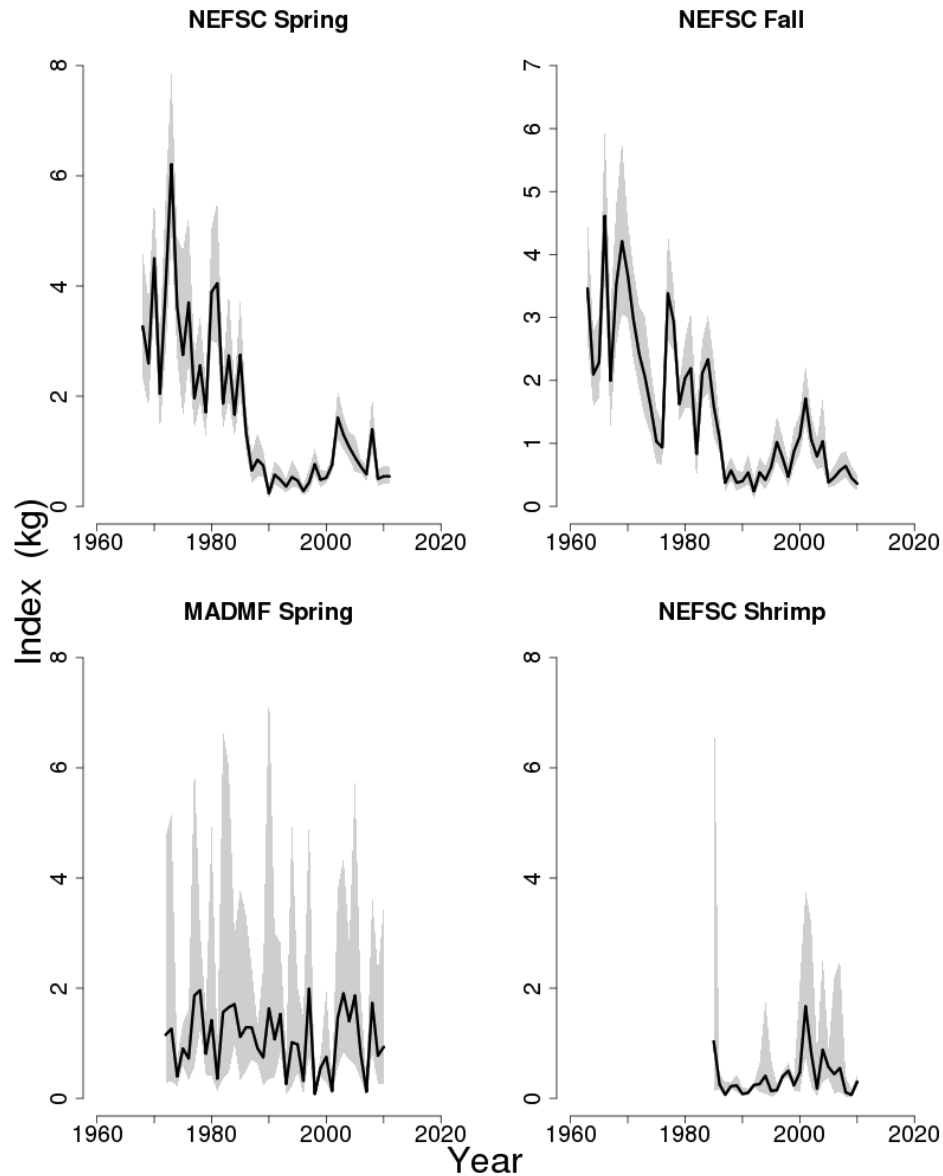
Figure 5: Indices of biomass for the generic fish species between 1963 and 2011 for the Northeast Fisheries Science Center (NEFSC) spring and fall bottom trawl surveys. The 90% lognormal confidence intervals are shown.