MID-ATLANTIC FISHERY MANAGEMENT COUNCIL

Richard B. Robins, Jr.
Chairman

Lee G. Anderson
Vice Chairman

800 North State Street, Suite 201
Dover, Delaware 19901-3910
Tel: 302-674-2331
Toll Free: 877-446-2362
FAX: 302-674-5399
www.mafmc.org

Christopher M. Moore, Ph.D.
Executive Director

Summer Flounder Recommendation Summary

Materials provided in this tab include the Summer Flounder Monitoring Committee Recommendations for annual catch targets (ACTs) and other commercial fishery management measures, a memo from Jessica Coakley to Chris Moore, the Summer Flounder Projections Update, and projection output files. The Scientific and Statistical Committee (SSC) recommendations for acceptable biological catch (ABC) is the last item contained within this briefing book tab.

A summary of the values associated with the SSC and Monitoring Committee recommendations are given here. The SSC recommended an ABC that is less than the OFL to address scientific uncertainty. The Summer Flounder Monitoring Committee recommended ACTs for each of the fisheries that are set equal to the ACLs. Please see the SSC and Monitoring Committee reports for additional details.

Summer Flounder		
OFL	43.89 mil lb	
ABC	35.55 mil lb	
	Commercial	**Recreational**
ACLs	19.59 mil lb	15.96 mil lb
ACTs	19.59 mil lb	15.96 mil lb
Landings levels*	18.95 mil lb	12.63 mil lb

*After RSA is deducted, these levels would become the harvest limit and commercial quota.

July 29, 2011

Summer Flounder Monitoring Committee Recommendations

Attendees: Jason McNamee (RI-DFW), Tom Baum (NJ-DEP), Rob O'Reilly (VMRC), Rich Wong (DNREC), Steve Doctor (MD-DNR), Mike Ruccio (NERO), Jessica Coakley (Council Staff), Jeff Kaelin (Lund's Fisheries), Lee Anderson (Council vice-chair), Toni Kerns (ASMFC)

Discussion: The Summer Flounder Monitoring Committee was presented with the SSC's OFL and ABC recommendations. The OFL and ABC recommended for 2012 are 43.89 million lb and 35.55 million lb, respectively. The Monitoring Committee discussed the different components of the summer flounder catch.

Consensus Recommendation:

Annual Catch Targets and Basis for Derivation

- The Summer Flounder Monitoring Committee recommended recreational ACT is 15.96 million lb (recreational ACT = recreational ACL). The Commercial ACT recommended is 19.59 million lb (commercial ACT = commercial ACL). This results in a recreational landings level of 12.63 million lb and commercial landings level of 18.95 million lb. After RSA is deducted, these landings levels are the recreational harvest limit and commercial quota.

Relevant Sources of Management Uncertainty

- Past sector-specific landings and catch performance can be used as a basis for quantifying management uncertainty (implementation error), and as an indicator of the future ability to achieve 2012 ACTs.

- The commercial fishery landings performance has been in line with expectations and the Monitoring Committee recommends that an adjustment to address this aspect of management uncertainty is not necessary. The projected discard estimate appears to be in line with the expected discards for 2012, and is in line with discards observed in recent years (2006-2010). Therefore, this group does not recommend the commercial ACL be reduced to address management uncertainty in the commercial fishery. There are also state-by-state overage deductions in the commercial fishery that serve as an additional am, which requires repayment.

	2009 Limits (million lb)	2009 Correspondings Catch, Landings, or Discards (million lb)	% overage (+)/underage(-)
ABC	20.90	19.88	-5
comm quota	11.07	10.69	-3
comm discards	0.40	0.26	-35
RHL	7.38	6.30	-15
rec discards	2.05	2.63	28
comm TAC	11.47	10.95	-5
rec TAC	9.43	8.93	-5
	2010 Limits (million lb)	**2010 Correspondings Catch, Landings, or Discards (million lb)**	**% overage (+)/underage(-)**
ABC	25.50	21.48	-16
comm quota	13.28	13.38	1
comm discards	0.55	0.51	-7
RHL	8.85	4.97	-44
rec discards	2.82	2.62	-7
comm TAC	13.83	13.89	0
rec TAC	11.67	7.59	-35

- The Monitoring Committee was unable to fully characterize the performance of the recreational landings relative to harvest limits, and the interactions with management measures at this meeting. However, based on the 2009 and 2010 under-harvest and the confidence of the Committee with the measures in place in state waters and their effects on landings, the group did not feel an adjustment to the ACL for the recreational landings was needed given the proposed 2012 recreational ACL. There is also limited information on fishing effort, fish availability, MRIP intercept sampling support, and any other factors that would also be informative relative to understanding the performance of the 2011 measures. In the most recent year, states were conservative when applying management measures that were more liberal.

- Projected recreational discards are slightly higher than the discards observed in prior years (2006-2010). With lower effective size limits in 2011, discards are not expected to increase. An adjustment on this basis is therefore not recommended.

- An adjustment for recreational catch or commercial discard estimate precision was not applied.

Other Management Measures

- No changes to minimum size, current mesh size, or exemption programs are recommended for 2012.

- The Monitoring Committee recommends up to 3% for RSA in 2012.

- The Monitoring Committee recommends that states should implement commercial measures in a way that reduces discards losses in the commercial fishery. This could include measures such as a 15% bycatch allocation.

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Christopher M. Moore, Ph.D.
Executive Director

MEMORANDUM

DATE: June 27, 2011

TO: Chris Moore, Executive Director

FROM: Jessica Coakley, Staff JMC

SUBJECT: Summer Flounder Management Measures for 2012

Executive Summary

Based on the assessment that was conducted in June 2010, the summer flounder stock is not overfished and overfishing is not occurring. The ASAP model estimated SSB was 117.9 million lbs (53,458 mt) in 2009 (89% of the rebuilding target). Based on updated projections for summer flounder, the staff recommendation for acceptable biological catch (ABC) is 36.89 million lb (16,735 mt) for 2012. This ABC is derived from the same F target that has been used for setting catch limits since 2009. The Omnibus Annual Catch Limit and Accountability Measures Amendment proposed rule has filed (76 FR 35578, June 17, 2011) and National Marine Fisheries Service (NMFS) has indicated their intention to implement the Council preferred alternatives for summer flounder. Based on the process proposed in the Omnibus Amendment, staff recommend a commercial ACL and recreational ACL of 20.34 million lb (9,224 mt) and 16.56 million lb (7,511 mt), respectively. Staff also recommend a commercial annual catch target (ACT) of 18.30 million lb (8,301 mt), a commercial quota of 17.70 million lb (8,029 mt), a recreational ACT of 13.41 million lb (6,084 mt), and a recreational harvest limit of 10.62 million lb (4,817 mt), for 2012. Staff do not recommend any change to the current minimum fish size (14 inch-TL), gear requirements, or exemption programs (small mesh and NC flynet). States that allocate 15% of their commercial quota to bycatch fisheries should continue to do so, and all other states should consider this measure. Staff recommend up to 3% of the total allowable landings (TAL) be made available to the Research Set-Aside Program.

Introduction

The MSA requires each Council's SSC to provide, among other things, ongoing scientific advice for fishery management decisions, including recommendations for ABC, preventing overfishing, and maximum sustainable yield. The Council's catch limit recommendations for the upcoming fishing year(s) cannot exceed the ABC recommendation of the SSC. In addition, the FMP established Monitoring Committees which develop recommendations for management measures designed to achieve the recommended catch limits. The SSC will recommend an ABC for summer flounder that addresses scientific uncertainty and the Monitoring Committee will focus on recommending measures to address management uncertainty (ACTs). Based on the SSC and Monitoring Committee's recommendations, the Council will make a recommendation to the NMFS Northeast Regional Administrator. Because the FMP

is cooperatively managed with the Atlantic States Marine Fisheries Commission, the Commission's Summer Flounder, Scup, and Black Sea Bass Board will meet jointly with the Council to recommend summer flounder management measures. In this memorandum, information is presented to assist the SSC and MC in developing recommendations for the Council and Board to consider the 2012 fishery for summer flounder.

Catch and Landings

Commercial landings from 1940 and recreational landings from 1982 onwards are provided in the 2011 Data and Projection Update for Summer Flounder (Table 1). In 2010, commercial and recreational landings were 13.4 million lb (6,067 mt) and 5.0 million lb (2,253 mt), respectively. The 2011 commercial landings as of the week ending June 4, 2011, indicate that 59% of the coastwide commercial quota has been landed (Table 2).

Regulatory Review

Last year (July 2010), the SSC met to recommend an ABC for summer flounder for fishing year 2011. The overfishing limit (OFL) for 2011 was derived directly from the stock assessment based on an F_{MSY} proxy of $F_{35\%} = 0.31$, and the OFL was specified as 40.4 million pounds (18,144 mt) for 2011 (derived as the 50th percentile of yield at $F_{35\%} = 0.31$). The SSC recommended an ABC of 33.95 million pounds (15,399 mt) in 2011 (Table 1), based on F_{TARGET} ($F_{40\%}$), which is F = 0.255 (50th percentile). This same target F was applied in 2009 and 2010. The SSC expressed concern about the retrospective pattern in recruitment and the implication of this pattern on the apparently large 2009 year class, which in turn may have a strong influence on the projected rebuilding scenario. However, after examining the effect of reducing the 2009 year class by half, it appeared that the stock would rebuild.

At the July 2010 meeting, the SSC considered summer flounder to be a level 3 assessment (based on the control rules in the proposed Omnibus Amendment), and considered the following to be the most significant sources of uncertainty: strong annual retrospective pattern in recruitment evident for the last three years; uncertainty in stock status because of lack of uncertainty estimation for the biological reference points (proxy used for F_{MSY}); uncertainty exists with respect to the estimate of M; no uncertainty characterization for the OFL; and, concern about the application of trawl calibration coefficients (ALBATROSS IV vs BIGELOW) that are being used for the first year, and their influence on the selectivity pattern and results of the assessment.

Based on these ABC recommendations, discards were subtracted to derive the TAL, which is then allocated with 60% to the commercial quota and 40% to the recreational harvest limit. After deducting research set-aside, the 2011 commercial quota was 17.38 million lb (7,881 mt) and the recreational harvest limit was 11.58 million lb (5,254 mt; Table 1). Management measures in the commercial fishery other than quotas and harvest limits (i.e., minimum fish size, gear requirements, etc.) have remained generally constant since 1999.

Table 1. Summary of management measures and landings 1993-2011, and 2012 staff proposed.

Management measures	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
ABC (m lb)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TAC (m lb)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TAL (m lb)	20.73	26.68	19.40	18.52	18.52	18.52	18.52	18.52	17.91	24.3
Com. quota-initial (m lb)	12.35	16.01	14.69	11.11	11.11	11.11	11.11	11.11	10.75	14.58
Com. quota-adjusted (m lb)		15.60	14.61[a]	10.21	8.38	10.93	10.73	10.88	10.06	14.46
Com. landings	12.60	14.53	15.38	12.92	8.81	11.19	10.63	11.21	10.96	14.49
Rec. harvest limit (m lb)	8.38	10.67	7.76	7.04	7.41	7.41	7.41	7.41	7.16	9.72
Rec. harvest limit-adjusted (m lb)	-	-	-	-	-	-	-	-	-	-
Rec. landings	8.83	9.33	5.42	9.82	11.87	12.48	8.37	16.47	11.64	8.01
Com. fish size (in)	13	13	13	13	14	14	14	14	14	14
Min. mesh size (in, diamond)	5.5	5.5	5.5	5.5	5.5	5.5	5.5[b]	5.5[b]	5.5[b]	5.5[b]

Management measures	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012 proposed
ABC (m lb)	NA	NA	NA	NA	NA	NA	21.50	25.5	33.95	36.89
TAC (m lb)	NA	NA	NA	NA	NA	NA	20.90	25.5	33.95	36.89
TAL (m lb)	23.3	28.2	30.3	23.6	17.11	15.77	18.45	22.13	29.48	-
Com. quota-initial (m lb)	13.98	16.92	18.18	14.15	10.27	9.46	11.07	13.28	17.68	17.70
Com. quota-adjusted (m lb)	13.87	16.76	17.90	13.94	9.79	9.32	10.74	12.79	17.38	-
Com. landings	14.22	18.14	17.25	13.81	9.90	9.13	10.69	13.38	-	-
Rec. harvest limit (m lb)	9.32	11.28	12.12	9.44	6.84	6.31	7.38	8.85	11.79	10.62
Rec. harvest limit-adjusted (m lb)	9.28	11.21	11.98	9.29	6.68	6.21	7.16	8.59	11.58	-
Rec. landings	11.64	10.87	10.58	11.55	9.86	7.90	6.30	4.97	-	-
Com. fish size (in)	14	14	14	14	14	14	14	14	14	14
Min. mesh size (in, diamond)	5.5[b]	5.5[b]	5.5[b]	5.5[b]	5.5[b]	5.5[b]	5.5[b]	5.5[b]	5.5[b]	5.5b

[a] Includes 3.05 m lb added by court order. [b] Whole Net. NA=not applicable

Table 2. The 2011 state-by-state quotas and the amount of summer flounder landed by commercial fishermen, in each state as of week ending June 4, 2011.

	Commercial			Research
State	Cumulative Landings (lb)	Quota (lb)[a]	Percent of Quota (%)	Set-Aside Landings (lb)
ME	0	8,264	0	0
NH	0	80	0	0
MA	322,359	1,156,952	28	0
RI	1,441,374	2,724,939	53	3,766
CT	173,055	392,171	44	993
NY	618,636	1,328,675	47	22,368
NJ	1,201,115	2,921,480	41	0
DE	0	0	0	0
MD	103,909	298,330	35	0
VA	3,473,212	5,077,934	68	0
NC	2,787,959	3,379,144	83	0
Other	0	0	0	0
Totals	10,121,619	17,287,969	59	27,127

[a] Note that the total quota column accounts for Delaware as zero. Quotas adjusted for research set-aside and overages. Source: NMFS Weekly Quota Report for week ending June 4, 2011.

Biological Reference Points

The SAW 47 biological reference points for summer flounder include a fishing mortality threshold of $F_{MSY} = F_{35\%}$(as F_{MSY} proxy) = 0.310 and $SSB_{MSY} = SSB_{35\%}$(as SSB_{MSY} proxy) = 132.4 million lb (60,074 mt). The minimum stock size threshold, one-half SSB_{MSY}, is estimated to be 66.2 million lb (30,037 mt). A fishing mortality target was proposed as by the Southern Demersal Workgroup of $F_{TARGET} = F_{40\%}$ = 0.255.

Stock Status and Projections

The most recent benchmark peer-reviewed accepted assessment for summer flounder resulted from the June 2008 Stock Assessment Workshop (SAW/SARC 47). The assessment utilizes an age-structured assessment model called ASAP. Documentation on this assessment and previous stock assessments, such as reports on stock status, including annual assessment and reference point update reports, Stock Assessment Workshop (SAW) reports, and Stock Assessment Review Committee (SARC) panelist reports, are available online at the NEFSC website: http://www.nefsc.noaa.gov/saw/.

The assessment update presented last year (June 2010) indicated that the summer flounder stock is not overfished and overfishing is not occurring relative to the biological reference points established in the SAW 47 assessment. The fishing mortality rate has been below 1.0 since 1997 and was estimated to be 0.237 in 2009, below the threshold fishing mortality reference point F_{MSY} = 0.310. SSB was estimated to be 117.9 million lb (53,458 mt) in 2009, about 89% of the SSB_{MSY} = 132.4 million lb (60,074 mt).

The 2011 Data and Projection Update for Summer Flounder indicates that fishing at $F_{TARGET} = F_{40\%}$ = 0.255 during 2012 is projected to maintain the stock above SSB_{MSY} and could provide median landings in

2012 of 32.8 million lb (14,886 mt), which is above the MSY landings of 28.9 million lb (13,122 mt). The projection update also suggests that that 2010 projected SSB is 163.4 million lb (74,119 mt; about 123% of SSB_{MSY}) and the 2010 projected F was about 0.2.

Rebuilding Timeline

Under the current rebuilding program, the summer flounder stock is to be fully rebuilt no later than January 1, 2013. The SAW 47 proposed SSB_{MSY} rebuilding target is estimated to be 132.4 million lb (60,074 mt). Based on the 2010 assessment estimated 2009 SSB was117.9 million lbs (53,458 mt), which is about 89% of the rebuilding target.

Basis for 2012 ABC Recommendation

Although multi-year management measures can be specified through this FMP, staff do not think it appropriate to set measures for multiple years at this time given the potential transition to a new assessment process (i.e., operational and research tracks). This is also the first year of the new Omnibus measures will be implemented. Therefore, staff recommend measures be specified for one year, fishing year 2012.

The recommended OFL for 2012 of 43.89 million lb (19,910 mt) is defined by the fishing mortality threshold of F=0.31 and projected biomass in 2012. It is clear that recommendations for ABC, which would equal the OFL, would not account for any scientific uncertainty associated with estimation of OFL and the assessment of the summer flounder stock. Last year, the SSC classified the summer flounder assessment as level 3. As a level 3 assessment, ABC could be derived based on an OFL distribution generated by a chosen CV or by applying the control rule 75% of F_{MSY} to derive ABC. The SSC may also deviate from the control rule levels and recommend a different ABC. However, any such deviation must include the following: a description of why the deviation is warranted, description of the methods used to derive the alternative ABC, and an explanation of how the deviation is consistent with National Standard 2. There is uncertainty associated with selecting the appropriate OFL distribution and identification of a CV which characterizes all sources of uncertainty in the assessment of the summer flounder stock. The fishing mortality rate associated with 75% of F_{MSY} (F=0.23) is slightly lower than the F target from SAW 47 applied to this fishery since 2009 ($F_{TARGET} = F_{40\%} = 0.255$) and recommended by the SSC in 2010 and 2011. Fishing at F=0.255 has resulted in continued stock growth towards rebuilding targets and provides a buffer for uncertainty relative to the OFL (84% of the OFL). Therefore, staff recommend an ABC of 36.89 million lb (16,735 mt) for 2012 based on F = 0.255 (Table 3).

Other Management Measures

Recreational and Commercial ACLs

In the Omnibus Amendment, ABC=TAC and the sum of the commercial and recreational ACL equals the ABC (Figure 1; Table 4)). An ABC of 36.89 million lb (16,735 mt) is comprised of both landings and discards. Based on the allocation percentages of the FMP, 60% of the landings are allocated to the commercial fishery, and 40% to the recreational (Table 3). Discards are apportioned based on the contribution from each fishing sector using the 2007-2009 average ratios; 84% of dead discards are attributable to the recreational fishery, 16% to the commercial.

Table 3. Allocation of the summer flounder ABC to the commercial and recreational ACLs for 2012 (Staff recommended).

	Catch (Landings + Discards)	Landings Portion	Discards Portion
ABC	36.89 mil lb (16,735 mt)	32.74 mil lb (14,866 mt)	4.12 mil lb (1,869 mt)
Recreational ACL	16.56 mil lb (7,511 mt)	13.11 mil lb (5,946 mt)	3.45 mil lb (1,565 mt)
Commercial ACL	20.34 mil lb (9,224 mt)	19.66 mil lb (8,920 mt)	0.67 mil lb (304 mt)

Table 4. Omnibus Amendment terminology and relationship to previous FMP terms.

Previous Term	New Term	Definition	Use in Omnibus
Overfishing Limit (OFL)	Unchanged	The OFL is an estimate of the catch level above which overfishing is occurring. The amount of catch that corresponds to the estimate of MFMT applied to a stock and is expressed in terms of numbers or weight of fish.	OFL = catch level calculated by MFMT
Acceptable Biological Catch (ABC)	Unchanged	The level of a stock's annual catch that accounts for the scientific uncertainty in the estimate of OFL. May not exceed OFL.	ABC is established by SSC
Fishery	Sector	Distinct user group to which separate management strategies and separate catch quotas apply. For summer flounder, there are recreational and commercial sectors.	Recreational Sector, Commercial Sector
Total Allowable Catch (TAC)	Sum of Sector Annual Catch Limits (ACL)	The level of annual catch of a stock that serves as the basis for invoking AMs. The sum of the sector ACLs may not exceed ABC. For summer flounder Σ sector ACLs is set equal to ABC.	Σ sector ACLs = ABC
	Sector Annual Catch Target (ACT)	An amount of annual catch of a stock by sector that is the management target of the fishery, including discards, and accounts for management uncertainty in controlling the actual catch at or below ACL.	Recreational ACT, Commercial ACT
Total Allowable Landings (TAL)	Sector Total Allowable Landings (TAL)	Annual amount of total landings permitted by sector after removing estimated discards.	Sector TALs = sector ACT – sector discards
Research Set-Aside (RSA)	Unchanged	Amount of Total Allowable Landings (TAL) up to 3 percent that may be set aside to fund research activities	TAL – X% (up to 3%) = RHL and Commercial Quota
Recreational Harvest Limit (RHL)	Unchanged	Annual management target for the recreational sector after removing research set-aside.	RHL = Recreational Sector TAL- RSA
Commercial Quota	Unchanged	Annual management target for the commercial sector after removing research set-aside.	Commercial Quota = Commercial Sector TAL -RSA
Optimum Yield (OY)	Unchanged	The long-term average amount of desired yield from a stock or fishery. OY cannot exceed MSY.	OY
½ B_{MSY} Proxy	Minimum Stock Size Threshold (MSST)	Level of stock biomass below which the stock is considered to be overfished.	MSST = ½ B_{MSY} Proxy
$F_{35\%} = F_{MSY}$ Proxy	Maximum Fishing Mortality Threshold (MFMT)	The level of fishing mortality (F), on an annual basis, above which overfishing is occurring.	MFMT = $F_{35\%}$ = F_{MSY} Proxy

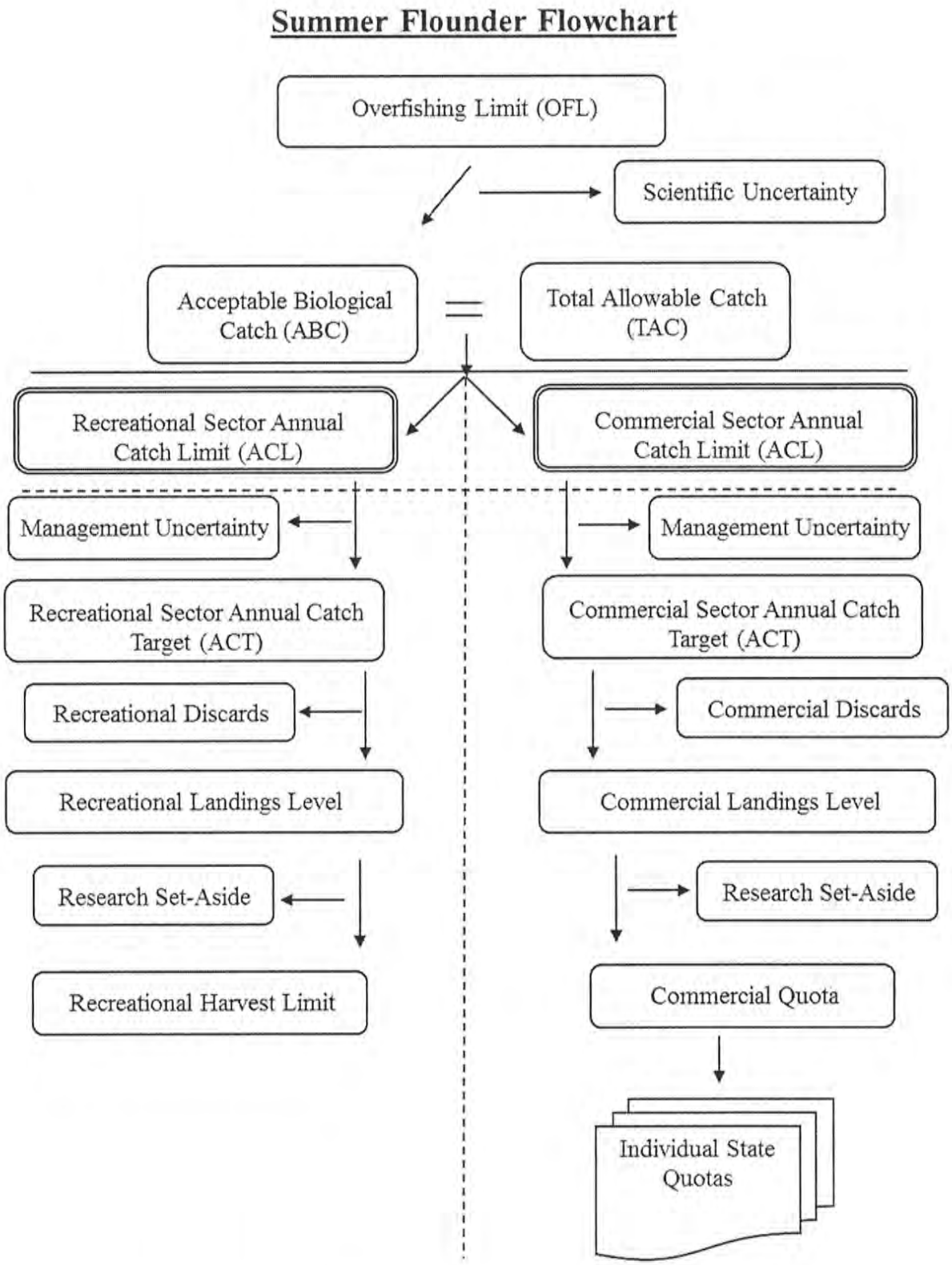


Figure 1. Summer flounder flowchart.

Considerations for ACTs

As described in the Omnibus Amendment, the Summer Flounder Monitoring Committee will be responsible for recommending ACTs for the Council to consider. The relationship between the recreational and commercial ACTs, and other catch components (current and proposed) are given in Figure 1 and Table 4. The Committee may provide other recommendations relevant to setting catch limits consistent with the Magnuson-Stevens Act (MSA). The Monitoring Committee can consider all relevant sources of management uncertainty in the summer flounder fishery and provide the technical basis, including any formulaic control rules, for any reduction in catch when recommending an ACT. The ACTs, technical basis, and sources of management uncertainty would be described and provided to the Council.

Management uncertainty is comprised of two parts: uncertainty in the ability of managers to control catch and uncertainty in quantifying the true catch (i.e., estimation errors). Management uncertainty can occur because of a lack of sufficient information about the catch (e.g., due to late reporting, underreporting, and/or misreporting of landings or bycatch) or because of a lack of management precision (i.e., the ability to constrain catch to desired levels).

Staff recommend the Monitoring Committee consider past sector-specific landings performance, as a basis for quantifying management uncertainty (i.e., implementation error) and as an indicator of future ability to achieve catch targets when developing the 2012 commercial and recreational ACT recommendations (Table 5). The Monitoring Committee should also consider the potential imprecision/variability in expected observed recreational and commercial catch to ensure the sector-specific ACLs are not exceeded. Staff recommend a 10% reduction in catch from the commercial ACL to address potential imprecision in observed catch estimates relative to the catch target for 2012. This would result in a commercial ACT of 18.30 million lb (8,301 mt) for 2012. For the recreational fishery, Staff recommend a 19% reduction in catch from the recreational ACL to address both potential imprecision in observed catch (10%) and past performance (9%) of the recreational fishery relative to harvest limits. This results in a recreational ACT of 13.41 million lb (6,084 mt).

Table 5. Commercial and recreational fishery performance relative to quotas and harvest limits, 2006-2010.

Year	Commercial Landings (mil lb)	Commercial Quota (mil lb)	Percent Overage(+)/ Underage(-)	Recreational Landings (mil lb)	Recreational Harvest Limit (mil lb)	Percent Overage(+)/ Underage(-)
2006	13.81	13.94	-1%	11.55	9.29	24%
2007	9.90	9.79	1%	9.86	6.68	48%
2008	9.13	9.32	-2%	7.90	6.21	27%
2009	10.69	10.74	0%	6.30	7.16	-12%
2010	13.38	12.79	5%	4.97	8.59	-42%
5-yr Avg.	-	-	0%	-	-	+9%

Commercial Quotas and Recreational Harvest Limit

The landings-based allocations (i.e., commercial 60%, recreational 40%) were maintained in the derivation of the sector-specific ACLs and ACTs, such that the sum of the sector-specific TALs (commercial and recreational landings levels) will be equal to overall TAL (Table 3). Based on the staff recommended ACTs given above, the commercial quota is 17.70 million lb (8,029 mt) and the

recreational harvest limit is 10.62 million lb (4,817 mt). The commercial quota would be divided amongst the states based on the allocation percentages given in Table 6.

Table 6. The summer flounder allocation formula for the commercial fisheries in each state.

State	Allocation (%)
ME	0.04756
NH	0.00046
MA	6.82046
RI	15.68298
CT	2.25708
NY	7.64699
NJ	16.72499
DE	0.01779
MD	2.03910
VA	21.31676
NC	27.44584
Total	100

Specific management measures that will be used to achieve the harvest limit for the recreational fishery in 2012 will not be determined until after the first four waves of 2011 recreational landings are reviewed. These data will be available in October, 2011. The Monitoring Committee will meet in November 2011 to review these landings data and make recommendations regarding changes in the recreational possession limit, minimum size, and season. Given the performance of the recreational fishery relative to the recreational harvest limit in recent years, management measures (i.e., minimum size, possession limits, and seasons) should be implemented that are designed to achieve the recreational ACT, while preventing the recreational ACL from being exceeded.

Gear Regulations and Minimum Fish Size - Commercial Fishery

Amendment 2 of the Summer Flounder FMP contains provisions that allow for changes in the minimum fish size and minimum net mesh provisions. Current regulations require a 14 inch-TL minimum fish size in the commercial fishery and a 5.5 inch diamond or 6 inch square minimum mesh in the entire net for vessels possessing more than the threshold amount of summer flounder, i.e., 200 lb in the winter and 100 lb in the summer. The minimum fish size and mesh requirements may be changed through specifications based on the recommendations of the Monitoring Committee. Staff do not recommend any changes to the minimum fish size or mesh provisions.

Exemption Programs

Vessels landing more than 200 lb of summer flounder, east of longitude 72° 30.0'W, from November 1 through April 30, and not using a 5.5" minimum mesh (diamond) or 6" minimum mesh (square) net, are required to obtain a small mesh exemption program (SMEP) permit from NMFS. The Summer Flounder, Scup, and Black Sea Bass FMP requires that sea sampling data be reviewed annually to determine if vessels fishing seaward of the line, with smaller than the required minimum mesh size and landing more than 200 lb of summer flounder, are discarding more than 10% of their summer flounder catch. Staff evaluated the available NMFS sea sample data for the period from November 1, 2010 to April 30, 2011. These data indicate that a total of 288 trips were observed east 72° 30.0'W; 109 of these trips landed

summer flounder (Table 6). Of those 109 trips, 68 reported using small mesh and 16 landed more than 200 lb of summer flounder. Of those 16 trips, 3 trips discarded more than 10% of their catch. The percentage of trips that met all these criteria relative to the total number of observed trips east of 72° 30.0'W is 1% (3 trips/288 trips). The prior year percentage of trips that met the criteria was 0.2%. Based on this information, staff recommend no change in the SMEP program for 2012.

Table 6. Numbers of trips that meet specific criteria based on observer trips from November 1, 2010 to April 30, 2011.

November 1, 2010 – April 30, 2011	Trips
Trips with tows east of 72° 30' W Longitude	288
That landed summer flounder	109
That used small mesh	68
That landed more than 200 lb of summer flounder	16
Number that discarded >10% of summer flounder catch	3
Total discards (lb) from those 3 trips	886
Total landings (lb) from those 3 trips	1,389
Total catch (lb) from those 3 trips	2,275

In addition, vessels fishing with a two-seam otter trawl flynet are exempt. Specifically, flynets have large mesh in the wings that measure 8 to 64 inches, the belly of the net has 35 or more meshes that are at least 8 inches, and the mesh decreases in size throughout the body of the net to 2 inches or smaller. Only North Carolina has a flynet fishery at present. The supplemental memo from Chris Batsavage dated June 23, 2011 indicates that summer flounder comprised less than 1% of the total landings by flynet in North Carolina in 2010. Therefore, staff recommend no change to this exemption program.

Bycatch

Fishermen from a few states have indicated that the commercial regulatory discards associated with the summer flounder quotas are a problem. As such, the states that allocate 15% of their quota to bycatch fisheries should continue to do so, and all other states should consider this measure.

Research Set-Aside

Staff recommend up to 3% of the TAL be made available for the Research Set-Aside Program.

NCDENR
North Carolina Department of Environment and Natural Resources
Division of Marine Fisheries

Beverly Eaves Perdue
Governor

Dr. Louis B. Daniel III
Director

Dee Freeman
Secretary

Memorandum

To: Jessica Coakley, MAFMC

From: Chris Batsavage, NCDMF

Date: June 23, 2011

Subject: Species composition and landings from the 2010 North Carolina flynet fishery

The following table provides the species composition and landings in pounds from the North Carolina flynet fishery in 2010. Individual landings listed as "other species" are not reported because the data are confidential and cannot be distributed to sources outside the NC Division of Marine Fisheries (North Carolina General Statute 113-170.3 (c)). Confidential data can only be released in a summarized format that does not allow the user to track landings or purchases to an individual. If you have any questions, please feel free to contact me.

Species	Weight (lb)	Percent
Atlantic Croaker	3,807,850	66.96
Atlantic Menhaden (Bait)	186,710	3.28
Striped Bass	183,610	3.23
Bluefish	152,103	2.67
Squid, Loligo	67,749	1.19
Sea Mullet (Kingfish)	26,005	0.46
Weakfish	13,248	0.23
Monkfish (Whole)	7,319	0.13
Black Sea Bass	5,645	0.10
Sheepshead	4,063	0.07
Butterfish	2,650	0.05
Black Drum	1,854	0.03
Summer Flounder	1,644	0.03
Cobia	1,509	0.03
Triggerfish	100	0.00
Spadefish	90	0.00
Other Species	1,225,011	21.54
Total	5,708,770	

Other Species

Squid	Thresher Shark	King Mackerel	Pufferfish
Atlantic Mackerel	Cutlassfish (Ribbonfish)	Golden Tilefish	Skipjack Tuna
Scup	Lookdown	Horseshoe Crab	Spot
Smooth Dogfish	Blueline Tilefish	Little Tunny (False Albacore)	
John Dory	Amberjacks	Dolphin	Spanish Mackerel
Hakes (Ling/Whting)	Skates	Blacktip Shark	Spotted Seatrout

3441 Arendell Street, P.O. Box 769, Morehead City, North Carolina 28557
Phone: 252-726-7021 \ FAX: 252-726-0254 \ Internet: www.ncdmf.net

2011 Data and Projection Update for Summer Flounder

Table 1. Summer flounder commercial landings by state (thousands of lb) and coastwide (thousands of pounds ('000 lbs), metric tons (mt)).

Year	Total ME	NH	MA	RI	CT	NY	NJ	DE	MD+	VA+	NC+	'000 lbs	mt
1940	0	0	2847	258	149	1814	3554	3	444	1247	498	10814	4905
1941	na	na	na	na	na	na	na	na	183	764	na	947	430
1942	0	0	193	235	126	1286	987	2	143	475	498	3945	1789
1943	0	0	122	202	220	1607	2224	11	143	475	498	5502	2496
1944	0	0	719	414	437	2151	3159	8	197	2629	498	10212	4632
1945	0	0	1730	467	270	3182	3102	2	460	1652	1204	12297	5578
1946	0	0	1579	625	478	3494	3310	22	704	2889	1204	14305	6489
1947	0	0	1467	333	813	2695	2302	46	532	1754	1204	11146	5056
1948	0	0	2370	406	518	2308	3044	15	472	1882	1204	12219	5542
1949	0	0	1787	470	372	3560	3025	8	783	2361	1204	13570	6155
1950	0	0	3614	1036	270	3838	2515	25	543	1761	1840	15442	7004
1951	0	0	4506	1189	441	2636	2865	20	327	2006	1479	15469	7017
1952	0	0	4898	1336	627	3680	4721	69	467	1671	2156	19625	8902
1953	0	0	3836	1043	396	2910	7117	53	1176	1838	1844	20213	9168
1954	0	0	3363	2374	213	3683	6577	21	1090	2257	1645	21223	9627
1955	0	0	5407	2152	385	2608	5208	26	1108	1706	1126	19726	8948
1956	0	0	5469	1604	322	4260	6357	60	1049	2168	1002	22291	10111
1957	0	0	5991	1486	677	3488	5059	48	1171	1692	1236	20848	9456
1958	0	0	4172	950	360	2341	8109	209	1452	2039	892	20524	9310
1959	0	0	4524	1070	320	2809	6294	95	1334	3255	1529	21230	9630
1960	0	0	5583	1278	321	2512	6355	44	1028	2730	1236	21087	9565
1961	0	0	5240	948	155	2324	6031	76	539	2193	1897	19403	8801
1962	0	0	3795	676	124	1590	4749	24	715	1914	1876	15463	7014
1963	0	0	2296	512	98	1306	4444	17	550	1720	2674	13617	6177
1964	0	0	1384	678	136	1854	3670	16	557	1492	2450	12237	5551
1965	0	0	431	499	106	2451	3620	25	734	1977	272	10115	4588
1966	0	0	264	456	90	2466	3830	13	630	2343	4017	14109	6400
1967	0	0	447	706	48	1964	3035	0	439	1900	4391	12930	5865
1968	0	0	163	384	35	1216	2139	0	350	2164	2602	9053	4106
1969	0	0	78	267	23	574	1276	0	203	1508	2766	6695	3037
1970	0	0	41	259	23	900	1958	0	371	2146	3163	8861	4019
1971	0	0	89	275	34	1090	1850	0	296	1707	4011	9352	4242
1972	0	0	93	275	7	1101	1852	0	277	1857	3761	9223	4183
1973	0	0	506	640	52	1826	3091	*	495	3232	6314	16156	7328
1974	*	0	1689	2552	26	2487	3499	0	709	3111	10028	22581	10243
1975	0	0	1768	3093	39	3233	4314	5	893	3428	9539	26311	11934
1976	*	0	4019	6790	79	3203	5647	3	697	3303	9627	33368	15135
1977	0	0	1477	4058	64	2147	6566	5	739	4540	10332	29927	13575
1978	0	0	1439	2238	111	1948	5414	1	676	5940	10820	28586	12966
1979	5	0	1175	2825	30	1427	6279	6	1712	10019	16084	39561	17945

* = less than 500 lb; na = not available; + = NMFS did not identify flounders to species prior to 1978 for NC and 1957 for both MD and VA and thus the numbers represent all unclassified flounders.

Sources: 1940-1977 USDC 1984; 1978-1979 unpublished NMFS General Canvas data

Table 1 continued.

Year	Total ME	NH	MA	RI	CT	NY	NJ	DE	MD+	VA+	NC+	'000 lb	mt
1980	4	0	367	1277	48	1246	4805	1	1324	8504	13643	31216	14159
1981	3	0	598	2861	81	1985	4008	7	403	3652	7459	21056	9551
1982	18	*	1665	3983	64	1865	4318	8	360	4332	6315	22928	10400
1983	84	0	2341	4599	129	1435	4826	5	937	8134	7057	29548	13403
1984	2	*	1488	4479	131	2295	6364	9	813	9673	12510	37765	17130
1985	3	*	2249	7533	183	2517	5634	4	577	5037	8614	32352	14675
1986	0	*	2954	7042	160	2738	4017	4	316	3712	5924	26866	12186
1987	8	*	3327	4774	609	2641	4451	4	319	5791	5128	27052	12271
1988	5	0	2421	4719	741	3439	6006	7	514	7756	6770	32377	14686
1989	9	0	1878	3083	513	1464	2865	3	204	3689	4206	17913	8125
1990	3	0	628	1408	343	405	1458	2	138	2144	2728	9257	4199
1991	0	0	1124	1672	399	719	2341	4	232	3715	3516	13722	6224
1992	*	*	1383	2532	495	1239	2871	12	319	5172	2576	16599	7529
1993	6	0	903	1942	225	849	2466	6	254	3052	2894	12599	5715
1994	4	0	1031	2649	371	1269	2356	4	179	3091	3571	14525	6588
1995	5	0	1128	2325	319	1248	2319	4	174	3304	4555	15381	6977
1996	8	0	800	1763	266	936	2369	8	266	2286	4218	12920	5861
1997	3	0	745	1566	257	823	1321	5	215	2370	1501	8806	3994
1998	6	0	707	1712	263	822	1863	11	224	2616	2967	11190	5076
1999	6	0	813	1637	245	804	1918	8	201	2196	2801	10627	4820
2000	7	0	789	1703	240	800	1848	12	252	2206	3354	11211	5085
2001	22	0	694	1800	267	751	1745	7	223	2660	2789	10958	4970
2002	1	0	1009	2286	357	1053	2407	3	327	2970	4078	14491	6573
2003	0	0	926	2178	272	1073	2384	6	329	3492	3559	14219	6450
2004	0	0	1193	3085	406	1594	2831	8	284	3906	4834	18141	8228
2005	3	0	1274	2926	449	1804	2529	5	333	3869	4059	17253	7826
2006	7	0	910	2120	314	1262	2346	4	248	2669	3926	13806	6262
2007	3	0	660	1515	207	939	1698	3	178	2025	2669	9897	4489
2008	1	0	647	1469	223	858	1544	1	199	1764	2424	9133	4143
2009	0	0	732	1794	244	1140	1799	0	166	1993	2819	10689	4848
2010	0	0	852	2289	612	1364	2166	2	225	2643	3223	13376	6067

* = less than 500 lb; na = not available;

Sources: 1980-2009 State and Federal reporting systems

Table 2. Estimated total landings (catch types A + B1, [mt]) of summer flounder by recreational fishermen. SHORE mode includes fish taken from beach/bank and man-made structures. P/C indicates catch taken from party/charter boats, while P/R indicates fish taken from private/rental boats. Proportional Standard Error (PSE) is for the TOTAL landings estimate.

	YEAR										
	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
North											
Shore	87	59	17	7	25	21	32	2	16	6	20
P/C Boat	85	87	4	2	45	4	<1	<1	<1	6	<1
P/R Boat	875	454	388	328	2,597	582	290	141	89	150	175
TOTAL	1,047	600	409	337	2,667	607	323	144	106	162	196
Mid											
Shore	295	1,254	399	140	293	129	330	52	56	306	126
P/C Boat	3,112	2,196	1,426	609	1,093	1,098	776	125	264	364	267
P/R Boat	3,085	8,389	5,686	4,187	3,521	3,596	4,928	985	1,665	2,673	2,536
TOTAL	6,492	11,839	7,511	4,936	4,907	4,823	6,034	1,162	1,985	3,343	2,929
South											
Shore	87	134	98	230	425	34	113	57	76	25	25
P/C Boat	12	12	23	20	7	1	<1	<1	<1	<1	<1
P/R Boat	629	102	471	142	96	54	163	71	161	80	91
TOTAL	728	248	592	392	528	89	277	129	238	106	117
All											
Shore	469	1,447	514	377	743	184	475	111	148	337	171
P/C Boat	3,209	2,295	1,453	631	1,145	1,103	778	127	266	371	269
P/R Boat	4,589	8,945	6,545	4,657	6,214	4,232	5,381	1,197	1,915	2,903	2,802
TOTAL	8,267	12,687	8,512	5,665	8,102	5,519	6,634	1,435	2,329	3,611	3,242
PSE (%)	25	7	8	11	9	9	4	6	4	4	4

Table 2 continued.

	YEAR										
	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
North											
Shore	26	29	14	15	17	56	27	73	6	20	32
P/C Boat	10	14	6	8	17	22	18	43	16	30	35
P/R Boat	214	401	320	518	445	833	738	1,536	695	559	540
TOTAL	250	444	340	541	479	911	783	1,652	717	609	607
Mid											
Shore	94	122	108	78	127	160	136	363	187	135	148
P/C Boat	617	499	179	414	712	274	286	649	349	274	457
P/R Boat	2,833	2,958	1,721	3,246	3,898	4,096	2,461	4,596	3,842	2,517	4,009
TOTAL	3,544	3,579	2,008	3,738	4,737	4,530	2,883	5,608	4,378	2,926	4,614
South											
Shore	61	102	30	26	18	18	13	24	15	9	22
P/C Boat	<1	1	<1	2	1	1	<1	<1	<1	1	<1
P/R Boat	150	105	80	147	147	199	115	185	168	88	35
TOTAL	212	208	111	175	166	218	129	210	184	98	58
All											
Shore	181	253	152	119	162	234	176	460	208	164	202
P/C Boat	628	514	186	424	730	297	305	693	366	305	493
P/R Boat	3,197	3,464	2,121	3,911	4,490	5,128	3,314	6,317	4,705	3,164	4,584
TOTAL	4,006	4,231	2,459	4,454	5,382	5,659	3,795	7,470	5,279	3,632	5,279
PSE (%)	4	4	5	3	4	5	5	4	4	4	4

Table 2 continued.

	YEAR						
	2004	2005	2006	2007	2008	2009	2010
North							
Shore	23	13	11	2	0	8	4
P/C Boat	18	25	16	75	56	23	38
P/R Boat	962	679	816	504	698	271	249
TOTAL	1,003	717	843	581	754	302	291
Mid							
Shore	147	100	81	136	74	60	47
P/C Boat	297	505	208	430	166	270	163
P/R Boat	3,374	3,321	3,766	3,167	2,553	2,184	1,691
TOTAL	3,818	3,926	4,055	3,733	2,793	2,514	1,901
South							
Shore	30	10	17	9	12	8	14
P/C Boat	4	<1	1	16	<1	1	<1
P/R Boat	77	70	76	106	24	31	47
TOTAL	110	81	94	131	37	40	61
All							
Shore	200	123	109	147	86	76	65
P/C Boat	318	531	225	521	223	294	202
P/R Boat	4,413	4,070	4,658	3,777	3,275	2,486	1,987
TOTAL	4,931	4,724	4,992	4,445	3,584	2,856	2,253
PSE (%)	4	5	5	5	5	5	5

Table 3. NEFSC research trawl survey indices of abundance for summer flounder. Indices are stratified mean numbers (n) and weight (kg) per tow. Spring indices are for offshore strata 1-12 61-76; autumn indices are for offshore strata 1-2, 5-6, 9-10, 61, 65, 69, and 73. Winter indices (1992-2007) are for NEFSC offshore strata 1-3, 5-7, 9-11, 13-14, 16-17, 61-63, 65-67, 69-71, and 73-75. n/a = not available due to incomplete coverage (spring) or end of survey (winter). Note that door and vessel conversion factors for 1967-2008 are not significant; 1967-2008 gear conversion factors have not been included due to limited sample size and extreme violation of underlying assumptions in experimental work

Year	Spring (n)	Spring (kg)	Autumn (n)	Autumn (kg)
1967	n/a	n/a	1.35	1.25
1968	0.15	0.16	1.10	1.00
1969	0.19	0.16	0.59	0.61
1970	0.09	0.09	0.15	0.13
1971	0.22	0.28	0.42	0.27
1972	0.47	0.21	0.39	0.27
1973	0.76	0.54	0.87	0.63
1974	1.37	1.26	1.70	1.86
1975	1.97	1.61	3.00	2.48
1976	2.83	2.00	1.14	0.85
1977	2.84	1.74	2.17	1.75
1978	2.55	1.40	0.32	0.40
1979	0.40	0.35	1.17	0.94
1980	1.30	0.78	0.94	0.57
1981	1.50	0.80	0.91	0.72
1982	2.27	1.11	1.57	0.90
1983	0.95	0.53	0.90	0.47
1984	0.66	0.38	0.99	0.65
1985	2.38	1.20	1.24	0.87
1986	2.14	0.82	0.68	0.45
1987	0.93	0.38	0.26	0.28
1988	1.50	0.68	0.11	0.11
1989	0.32	0.24	0.20	0.08
1990	0.72	0.27	0.27	0.19
1991	1.08	0.35	0.51	0.17

Table 3 continued.

Year	Winter (n)	Winter (kg)	Spring (n)	Spring (kg)	Autumn (n)	Autumn (kg)
1992	12.30	4.90	1.20	0.46	0.85	0.49
1993	13.60	5.50	1.27	0.48	0.11	0.04
1994	12.05	6.03	0.93	0.46	0.60	0.35
1995	10.93	4.81	1.09	0.46	1.13	0.83
1996	31.25	12.35	1.76	0.67	0.71	0.45
1997	10.28	5.54	1.06	0.61	1.32	0.92
1998	7.76	5.13	1.19	0.76	2.32	1.58
1999	11.06	7.99	1.60	1.01	2.42	1.66
2000	15.76	12.59	2.14	1.70	1.90	1.82
2001	18.59	15.68	2.69	2.16	1.56	1.55
2002	22.68	18.43	2.47	2.29	1.32	1.40
2003	35.62	27.48	2.91	2.42	2.00	1.93
2004	17.77	15.25	3.03	2.43	3.00	3.06
2005	12.89	10.32	1.81	1.59	1.57	1.83
2006	21.04	15.93	1.77	1.34	2.10	1.79
2007	16.83	12.89	3.25	3.17	2.21	2.45
2008	n/a	n/a	1.40	1.38	1.38	1.62

Table 4. NEFSC research trawl spring and autumn survey indices from the FSV *Henry B. Bigelow* (HBB) and calibrated, equivalent indices for the FSV *Albatross IV* (ALB) time series. Indices are stratified mean numbers (n) and weight (kg) per tow. Spring indices are for offshore strata 1-12 61-76; autumn indices are for offshore strata 1-2, 5-6, 9-10, 61, 65, 69, and 73. The spring catch number calibration factor is 3.2255; the catch weight factor is 3.0657. The autumn catch number calibration factor is 2.4054; the catch weight factor is 2.1409.

Year	Spring (n) HBB	Spring (kg) HBB	Spring (n) ALB	Spring (kg) ALB
2009	5.642	3.605	1.749	1.176
2010	7.131	4.808	2.211	1.568
2011	8.173	4.930	2.534	1.608

Year	Autumn (n) HBB	Autumn (kg) HBB	Autumn (n) ALB	Autumn (kg) ALB
2009	7.062	5.622	2.936	2.626
2010	3.777	3.003	1.570	1.403

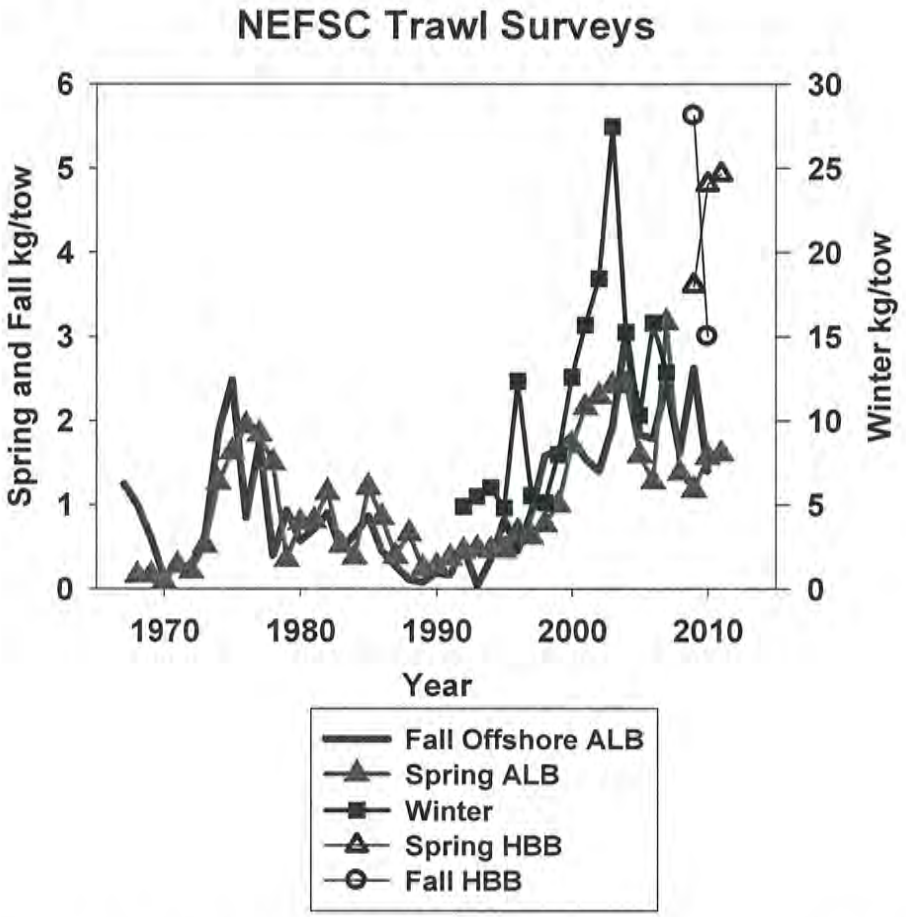


Figure 1. NEFSC trawl survey indices for summer flounder from the Winter, Spring and Fall (offshore strata only) series. HBB indices have been converted to ALB equivalents for 2009-2010 using aggregate calibration factors (see Table 4).

Table 5. Projections for 2010-2012: The stochastic projections do not explicitly account for the recent retrospective pattern in the assessment, as per the 2006 S&T Peer Review (Terceiro 2006) recommendation. Projections are made from the 2009 estimated stock sizes from the 2010 assessment update; the projected recruitment was drawn from the distribution of 1982-2009 recruitment estimates (NEFSC 2010 CRD 10-14).

Commercial fishery landings in 2010 were 6,067 mt (13.4 million lbs; recreational landings were 2,253 mt (5.0 million lbs); total landings were 8,320 mt (18.3 million lbs). Projections indicate associated discards in 2010 of 1,418 mt (3.1 million lbs), a median (50% probability) fishing mortality in 2010 of F = 0.196, and median SSB in 2010 of 74,119 mt, above the biomass target of SSBMSY = SSB35% = 60,074 mt.

If the landings in 2011 equal the TAL = 13,372 mt (29.5 million lbs), the 2011 discards are projected to be 1,999 mt (4.4 million lbs), with median F in 2011 = 0.246 and a median SSB on November 1, 2011 of 78,409 mt, above the biomass target of SSBMSY = SSB35% = 60,074 mt.

Fishing at Ftarget = F40% = 0.255 during 2012 is projected to maintain the stock above SSBMSY = SSB35% = 60,074 mt. The projections indicate that fishing at Ftarget = 0.255 in 2012 could provide median landings in 2012 (14,886 mt = 32.8 million lbs) that exceed the MSY landings (13,122 mt = 28.9 million lbs).

Landings, Discards, and Spawning Stock Biomass (SSB) in metric tons

	2010	2011	2012
Landings	8,320	13,372	14,886
Discards	1,418	1,999	1,869
SSB	74,119	78,409	78,567
F	0.196	0.246	0.255

AGEPRO VERSION 3.3

PROJECTION RUN: Summer Flounder 2011 Projection Update: Project FMSY = 0.310

INPUT FILE: H:\NFTDATA\FLUKE\ASAP\F2010\PRO_F2011_FMSY.IN

OUTPUT FILE: H:\NFTDATA\FLUKE\ASAP\F2010\PRO_F2011_FMSY.OUT

NUMBER OF SIMULATIONS PER BOOTSTRAP REALIZATION: 100
TOTAL NUMBER OF SIMULATIONS: 100000
NUMBER OF FEASIBLE SIMULATIONS: 100000
PROPORTION OF SIMULATIONS THAT ARE FEASIBLE: 1.00000000000000
NUMBER OF BOOTSTRAP REALIZATIONS: 1000

NUMBER OF RECRUITMENT MODELS: 1
PROBABLE RECRUITMENT MODELS: 14
RECRUITMENT MODELS BY YEAR

YEAR	RECRUITMENT MODELS
2010	14
2011	14
2012	14

RECRUITMENT MODEL PROBABILITIES BY YEAR

YEAR	MODEL PROBABILITY
2010	1.00000000000000
2011	1.00000000000000
2012	1.00000000000000

RECRUITMENT MODEL SAMPLING FREQUENCIES BY YEAR

YEAR	MODEL SAMPLING FREQUENCIES
2010	100000
2011	100000
2012	100000

MIXTURE OF F AND QUOTA BASED CATCHES

YEAR	F	QUOTA (THOUSAND MT)
2010		8.320
2011		13.372
2012	0.310	

SPAWNING STOCK BIOMASS (THOUSAND MT)

YEAR	AVG SSB (000 MT)	STD
2010	74.837	6.597
2011	79.208	7.709
2012	76.428	7.322

PERCENTILES OF SPAWNING STOCK BIOMASS (000 MT)

YEAR	1%	5%	10%	25%	50%	75%	90%	95%	99%

2010	61.557	64.858	66.876	70.385	74.119	79.120	83.090	85.986	94.239
2011	63.395	67.884	69.964	73.955	78.409	84.124	89.128	92.383	102.113
2012	61.644	65.529	67.601	71.280	75.808	80.958	86.022	89.447	96.205

ANNUAL PROBABILITY THAT SSB EXCEEDS THRESHOLD: 60.074 THOUSAND MT

YEAR	Pr(SSB >= Threshold Value) FOR FEASIBLE SIMULATIONS
2010	0.994
2011	0.999
2012	0.996

Pr(SSB >= Threshold Value) AT LEAST ONCE:= 0.999

MEAN BIOMASS (THOUSAND MT) FOR AGES: 1 TO 8

YEAR	AVG MEAN B (000 MT)	STD
2010	89.904	7.769
2011	93.967	8.242
2012	92.422	9.088

PERCENTILES OF MEAN STOCK BIOMASS (000 MT)

YEAR	1%	5%	10%	25%	50%	75%	90%	95%	99%
2010	73.850	78.728	80.816	84.579	89.135	94.683	99.979	103.585	113.060
2011	77.147	81.743	84.022	88.260	93.204	99.168	104.625	108.294	117.400
2012	74.334	78.960	81.525	86.003	91.609	98.044	104.473	108.763	116.824

ANNUAL PROBABILITY THAT MEAN BIOMASS EXCEEDS THRESHOLD: 60.074 THOUSAND MT

YEAR	Pr(MEAN B >= Threshold Value) FOR FEASIBLE SIMULATIONS
2010	1.000
2011	1.000
2012	1.000

Pr(MEAN B >= Threshold Value) AT LEAST ONCE:= 1.000

F WEIGHTED BY MEAN BIOMASS FOR AGES: 1 TO 8

YEAR	AVG F_WT_B	STD
2010	0.115	0.009
2011	0.171	0.015
2012	0.225	0.012

PERCENTILES OF F WEIGHTED BY MEAN BIOMASS FOR AGES: 1 TO 8

YEAR	1%	5%	10%	25%	50%	75%	90%	95%	99%
2010	0.092	0.100	0.103	0.108	0.115	0.121	0.127	0.130	0.136
2011	0.136	0.148	0.153	0.161	0.171	0.181	0.190	0.196	0.207
2012	0.195	0.203	0.209	0.218	0.227	0.234	0.239	0.243	0.249

ANNUAL PROBABILITY THAT F WEIGHTED BY MEAN BIOMASS EXCEEDS THRESHOLD: 0.310

YEAR	Pr(F_WT_B > Threshold Value) FOR FEASIBLE SIMULATIONS

2010	0.000
2011	0.000
2012	0.000

TOTAL STOCK BIOMASS (THOUSAND MT)

YEAR	AVG TOTAL B (000 MT)	STD
2010	71.951	5.730
2011	84.197	7.266
2012	86.142	8.426

PERCENTILES OF TOTAL STOCK BIOMASS (000 MT)

YEAR	1%	5%	10%	25%	50%	75%	90%	95%	99%
2010	60.502	62.977	65.029	68.100	71.332	75.668	79.203	81.594	88.582
2011	69.526	73.341	75.324	79.260	83.354	89.013	93.223	96.493	105.631
2012	68.979	73.604	75.968	80.291	85.411	91.409	97.068	100.907	109.575

ANNUAL PROBABILITY THAT TOTAL STOCK BIOMASS EXCEEDS THRESHOLD: 60.074 THOUSAND MT

YEAR	Pr(B >= Threshold Value) FOR FEASIBLE SIMULATIONS
2010	0.993
2011	1.000
2012	1.000

Pr(B >= Threshold Value) AT LEAST ONCE:= 1.000

RECRUITMENT UNITS ARE: 1000.00000000000 FISH

YEAR CLASS	AVG RECRUITMENT	STD
2010	43273.393	14334.794
2011	43247.242	14269.771
2012	43307.896	14327.657

PERCENTILES OF RECRUITMENT UNITS ARE: 1000.00000000000 FISH

YEAR CLASS	1%	5%	10%	25%	50%	75%	90%	95%	99%
2010	17006.489	28629.268	29312.407	33808.299	38913.392	49228.335	64955.284	78113.073	81530.983
2011	17232.850	28629.642	29318.888	33888.728	38905.778	49208.943	64418.595	77884.889	81519.840
2012	17320.239	28627.105	29319.170	33885.249	39071.397	49211.141	64986.445	78048.153	81530.645

LANDINGS (000 MT)

YEAR	AVG LANDINGS (000 MT)	STD
2010	8.320	0.000
2011	13.372	0.000
2012	17.876	1.876

PERCENTILES OF LANDINGS (000 MT)

YEAR	1%	5%	10%	25%	50%	75%	90%	95%	99%

2010	8.320	8.320	8.320	8.320	8.320	8.320	8.320	8.320	8.320
2011	13.372	13.372	13.372	13.372	13.372	13.372	13.372	13.372	13.372
2012	14.031	15.167	15.659	16.588	17.681	19.030	20.274	21.110	23.540

DISCARDS (000 MT)

YEAR	AVG DISCARDS (000 MT)	STD
2010	1.423	0.092
2011	2.002	0.092
2012	2.254	0.222

PERCENTILES OF DISCARDS (000 MT)

YEAR	1%	5%	10%	25%	50%	75%	90%	95%	99%
2010	1.206	1.279	1.316	1.359	1.418	1.485	1.541	1.578	1.664
2011	1.787	1.850	1.885	1.937	1.999	2.066	2.117	2.152	2.212
2012	1.820	1.933	1.991	2.098	2.229	2.390	2.554	2.659	2.860

CATCH BIOMASS (000 MT)

YEAR	AVG CATCH (000 MT)	STD
2010	9.743	0.092
2011	15.374	0.092
2012	20.130	2.055

PERCENTILES OF CATCH BIOMASS (000 MT)

YEAR	1%	5%	10%	25%	50%	75%	90%	95%	99%
2010	9.526	9.598	9.636	9.679	9.737	9.805	9.860	9.898	9.984
2011	15.159	15.222	15.257	15.309	15.371	15.438	15.489	15.524	15.584
2012	15.908	17.162	17.696	18.713	19.920	21.404	22.771	23.700	26.253

REALIZED F SERIES

YEAR	AVG F	STD
2010	0.197	0.017
2011	0.246	0.024
2012	0.310	0.000

PERCENTILES OF REALIZED F SERIES

YEAR	1%	5%	10%	25%	50%	75%	90%	95%	99%
2010	0.160	0.170	0.175	0.185	0.196	0.207	0.218	0.226	0.237
2011	0.189	0.208	0.217	0.229	0.246	0.261	0.277	0.288	0.306
2012	0.310	0.310	0.310	0.310	0.310	0.310	0.310	0.310	0.310

ANNUAL PROBABILITY FULLY-RECRUITED F EXCEEDS THRESHOLD: 0.310

YEAR	Pr(F > Threshold Value) FOR FEASIBLE SIMULATIONS
2010	0.000
2011	0.006
2012	0.000

AGEPRO VERSION 3.3

PROJECTION RUN: Summer Flounder 2011 Projection Update: Project Ftarget = 0.255

INPUT FILE: H:\NFTDATA\FLUKE\ASAP\F2010\PRO_F2011_FTARGET.IN

OUTPUT FILE: H:\NFTDATA\FLUKE\ASAP\F2010\PRO_F2011_FTARGET.OUT

NUMBER OF SIMULATIONS PER BOOTSTRAP REALIZATION: 100
TOTAL NUMBER OF SIMULATIONS: 100000
NUMBER OF FEASIBLE SIMULATIONS: 100000
PROPORTION OF SIMULATIONS THAT ARE FEASIBLE: 1.00000000000000
NUMBER OF BOOTSTRAP REALIZATIONS: 1000

NUMBER OF RECRUITMENT MODELS: 1
PROBABLE RECRUITMENT MODELS: 14
RECRUITMENT MODELS BY YEAR

YEAR	RECRUITMENT MODELS
2010	14
2011	14
2012	14

RECRUITMENT MODEL PROBABILITIES BY YEAR

YEAR	MODEL PROBABILITY
2010	1.00000000000000
2011	1.00000000000000
2012	1.00000000000000

RECRUITMENT MODEL SAMPLING FREQUENCIES BY YEAR

YEAR	MODEL SAMPLING FREQUENCIES
2010	100000
2011	100000
2012	100000

MIXTURE OF F AND QUOTA BASED CATCHES

YEAR	F	QUOTA (THOUSAND MT)
2010		8.320
2011		13.372
2012	0.255	

SPAWNING STOCK BIOMASS (THOUSAND MT)

YEAR	AVG SSB (000 MT)	STD
2010	74.837	6.597
2011	79.208	7.709
2012	79.200	7.577

PERCENTILES OF SPAWNING STOCK BIOMASS (000 MT)

YEAR	1%	5%	10%	25%	50%	75%	90%	95%	99%

2010	61.557	64.858	66.876	70.385	74.119	79.120	83.090	85.986	94.239
2011	63.395	67.884	69.964	73.955	78.409	84.124	89.128	92.383	102.113
2012	63.869	67.911	70.066	73.869	78.567	83.893	89.117	92.655	99.731

ANNUAL PROBABILITY THAT SSB EXCEEDS THRESHOLD: 60.074 THOUSAND MT

YEAR	Pr(SSB >= Threshold Value) FOR FEASIBLE SIMULATIONS
2010	0.994
2011	0.999
2012	0.999

Pr(SSB >= Threshold Value) AT LEAST ONCE:= 1.000

MEAN BIOMASS (THOUSAND MT) FOR AGES: 1 TO 8

YEAR	AVG MEAN B (000 MT)	STD
2010	89.904	7.769
2011	93.967	8.242
2012	94.132	9.235

PERCENTILES OF MEAN STOCK BIOMASS (000 MT)

YEAR	1%	5%	10%	25%	50%	75%	90%	95%	99%
2010	73.850	78.728	80.816	84.579	89.135	94.683	99.979	103.585	113.060
2011	77.147	81.743	84.022	88.260	93.204	99.168	104.625	108.294	117.400
2012	75.738	80.448	83.051	87.609	93.315	99.850	106.359	110.725	118.968

ANNUAL PROBABILITY THAT MEAN BIOMASS EXCEEDS THRESHOLD: 60.074 THOUSAND MT

YEAR	Pr(MEAN B >= Threshold Value) FOR FEASIBLE SIMULATIONS
2010	1.000
2011	1.000
2012	1.000

Pr(MEAN B >= Threshold Value) AT LEAST ONCE:= 1.000

F WEIGHTED BY MEAN BIOMASS FOR AGES: 1 TO 8

YEAR	AVG F_WT_B	STD
2010	0.115	0.009
2011	0.171	0.015
2012	0.186	0.010

PERCENTILES OF F WEIGHTED BY MEAN BIOMASS FOR AGES: 1 TO 8

YEAR	1%	5%	10%	25%	50%	75%	90%	95%	99%
2010	0.092	0.100	0.103	0.108	0.115	0.121	0.127	0.130	0.136
2011	0.136	0.148	0.153	0.161	0.171	0.181	0.190	0.196	0.207
2012	0.161	0.168	0.173	0.180	0.187	0.193	0.198	0.200	0.206

ANNUAL PROBABILITY THAT F WEIGHTED BY MEAN BIOMASS EXCEEDS THRESHOLD: 0.310

YEAR	Pr(F_WT_B > Threshold Value) FOR FEASIBLE SIMULATIONS

2010	0.000
2011	0.000
2012	0.000

TOTAL STOCK BIOMASS (THOUSAND MT)

YEAR	AVG TOTAL B (000 MT)	STD
2010	71.951	5.730
2011	84.197	7.266
2012	86.142	8.426

PERCENTILES OF TOTAL STOCK BIOMASS (000 MT)

YEAR	1%	5%	10%	25%	50%	75%	90%	95%	99%
2010	60.502	62.977	65.029	68.100	71.332	75.668	79.203	81.594	88.582
2011	69.526	73.341	75.324	79.260	83.354	89.013	93.223	96.493	105.631
2012	68.979	73.604	75.968	80.291	85.411	91.409	97.068	100.907	109.575

ANNUAL PROBABILITY THAT TOTAL STOCK BIOMASS EXCEEDS THRESHOLD: 60.074 THOUSAND MT

YEAR	Pr(B >= Threshold Value) FOR FEASIBLE SIMULATIONS
2010	0.993
2011	1.000
2012	1.000

Pr(B >= Threshold Value) AT LEAST ONCE:= 1.000

RECRUITMENT UNITS ARE: 1000.00000000000 FISH

YEAR CLASS	AVG RECRUITMENT	STD
2010	43273.393	14334.794
2011	43247.242	14269.771
2012	43307.896	14327.657

PERCENTILES OF RECRUITMENT UNITS ARE: 1000.00000000000 FISH

YEAR CLASS	1%	5%	10%	25%	50%	75%	90%	95%	99%
2010	17006.489	28629.268	29312.407	33808.299	38913.392	49228.335	64955.284	78113.073	81530.983
2011	17232.850	28629.642	29318.888	33888.728	38905.778	49208.943	64418.595	77884.889	81519.840
2012	17320.239	28627.105	29319.170	33885.249	39071.397	49211.141	64986.445	78048.153	81530.645

LANDINGS (000 MT)

YEAR	AVG LANDINGS (000 MT)	STD
2010	8.320	0.000
2011	13.372	0.000
2012	15.051	1.581

PERCENTILES OF LANDINGS (000 MT)

YEAR	1%	5%	10%	25%	50%	75%	90%	95%	99%

2010	8.320	8.320	8.320	8.320	8.320	8.320	8.320	8.320	8.320
2011	13.372	13.372	13.372	13.372	13.372	13.372	13.372	13.372	13.372
2012	11.810	12.767	13.182	13.965	14.886	16.023	17.071	17.778	19.824

DISCARDS (000 MT)

YEAR	AVG DISCARDS (000 MT)	STD
2010	1.423	0.092
2011	2.002	0.092
2012	1.890	0.186

PERCENTILES OF DISCARDS (000 MT)

YEAR	1%	5%	10%	25%	50%	75%	90%	95%	99%
2010	1.206	1.279	1.316	1.359	1.418	1.485	1.541	1.578	1.664
2011	1.787	1.850	1.885	1.937	1.999	2.066	2.117	2.152	2.212
2012	1.526	1.621	1.669	1.759	1.869	2.004	2.140	2.228	2.396

CATCH BIOMASS (000 MT)

YEAR	AVG CATCH (000 MT)	STD
2010	9.743	0.092
2011	15.374	0.092
2012	16.940	1.732

PERCENTILES OF CATCH BIOMASS (000 MT)

YEAR	1%	5%	10%	25%	50%	75%	90%	95%	99%
2010	9.526	9.598	9.636	9.679	9.737	9.805	9.860	9.898	9.984
2011	15.159	15.222	15.257	15.309	15.371	15.438	15.489	15.524	15.584
2012	13.383	14.439	14.890	15.746	16.764	18.013	19.165	19.946	22.102

REALIZED F SERIES

YEAR	AVG F	STD
2010	0.197	0.017
2011	0.246	0.024
2012	0.255	0.000

PERCENTILES OF REALIZED F SERIES

YEAR	1%	5%	10%	25%	50%	75%	90%	95%	99%
2010	0.160	0.170	0.175	0.185	0.196	0.207	0.218	0.226	0.237
2011	0.189	0.208	0.217	0.229	0.246	0.261	0.277	0.288	0.306
2012	0.255	0.255	0.255	0.255	0.255	0.255	0.255	0.255	0.255

ANNUAL PROBABILITY FULLY-RECRUITED F EXCEEDS THRESHOLD: 0.310

YEAR	Pr(F > Threshold Value) FOR FEASIBLE SIMULATIONS
2010	0.000
2011	0.006
2012	0.000

MID-ATLANTIC FISHERY MANAGEMENT COUNCIL

Richard B. Robins, Jr.
Chairman

Lee G. Anderson
Vice-Chairman

800 North State Street, Suite 201
Dover, Delaware 19901
Tel 302-674-2331
Toll Free 877-446-2362
Fax 302-674-5399
www.mafmc.org

Christopher M. Moore, Ph.D.
Executive Director

M E M O R A N D U M

DATE: August 2, 2011

TO: Richard B. Robins, Jr., Chairman, Mid-Atlantic Fishery Management Council

FROM: John Boreman, Ph.D., Chairman, MAFMC Scientific and Statistical Committee

Subject: Report of July 2011 Meeting of the MAFMC Scientific and Statistical Committee

The Scientific and Statistical Committee (SSC) of the Mid-Atlantic Fishery Management Council (MAFMC) met on 27-28 July 2011 primarily to review stock assessment information and develop acceptable biological catch (ABC) recommendations for four species under the management purview of the MAFMC: scup, summer flounder, black sea bass, and bluefish. Additional meeting topics included an update from the SSC's Ecosystems Subcommittee (additional details provided below), a short discussion of research priorities, and a status report on planning for the upcoming National SSC Workshop (Attachment 1). A total of 13 of the 17 SSC members were in attendance, which represented a quorum as defined by the SSC standard operating procedures. Also in attendance were representatives of the MAFMC, MAFMC staff, Northeast Fisheries Science Center, (NEFSC), ASMFC, the ASMFC Summer Flounder, Scup, and Black Sea Bass Monitoring Committee, and the public (Attachment 2).

SSC ECOSYSTEMS SUBCOMMITTEE REPORT

The Ecosystems Subcommittee covered two topics at the meeting that addressed progress being made by the subcommittee towards developing SSC advice for the MAFMC: (1) how to handle forage species when setting ABCs; and (2) a draft vision statement, and associated objectives and standards for ecosystem-based fisheries management. The SSC endorsed the subcommittee's proposed approach for addressing forage species, which is a decision tree based on questions directed at the relative productivity of the species in the ecosystem and whether or not the species supports a directed fishery. The subcommittee will continue refining its definition of a forage species and the bases for criteria used in the decision tree. Also, Dr. Ed Houde, a member of the subcommittee, gave a presentation that outlined his thoughts for an appropriate vision statement for ecosystems-based fisheries management and its associated goals, objectives, and standards (Attachment 3). The SSC considered his presentation as an excellent starting point in crafting draft vision and goal statements for the council to consider.

ABC RECOMMENDATIONS

The SSC began its discussion of ABCs for scup, summer flounder, black sea bass, and bluefish with a presentation by Dr. Mike Wilberg, chair of the SSC Scientific Uncertainty (SUN) Subcommittee, on uncertainty in the overfishing limit (OFL) in relation to setting ABCs (Attachment 4). Mike analyzed a number of studies conducted on the topic and concluded that: (1) a lognormal distribution for OFLs appears to be reasonable; (2) coefficients of variation (CVs) or log-scale standard deviations of stock biomass in the range of 35 - 60% seem reasonable given the assessment methods used for mid-Atlantic species under the purview of the MAFMC; and (3) uncertainty in F_{limit} (F_{msy} or its proxy) should be about the same magnitude as for stock biomass (35 - 60%). Since the OFL is estimated by multiplying stock biomass by F_{limit}, a CV of 100% could serve as a default value in the absence of an acceptable estimate from the stock assessment. The SSC agreed to use a lognormal distribution with a 100% CV (log-scale SD = 0.83) as a default OFL distribution for Tier 3 assessment species.

We then followed the same approach to setting the ABC for each species that was used in the previous SSC meeting. Initially, the MAFMC staff lead for a given species described the assessment history, the most recent survey and landings information, and the basis for the most recent quota set by the MAFMC. The NEFSC stock assessment lead for the species was then allowed an opportunity to comment, followed by the SSC's socioeconomics lead and biology lead. Finally, members of the Monitoring Committee and the public were then invited to comment. Following this comment period, the SSC biology lead for the species led the SSC discussion on selection of an ABC for the 2011 fishing year by developing a consensus response to each of the Terms of Reference provided by the MAFMC. The terms of reference were the same for each of the four species. The SSC also developed a list of research recommendations for each species.

The following represents the consensus responses by the SSC to the ABC terms of reference provided by the MAFMC for each of the four species considered in the 27-28 July 2011 meeting.

Scup

1) The materials considered in reaching its recommendations:

- MAFMC staff memorandum from Jessica Coakley to Chris Moore: "Scup Management Measures for 2012," dated 27 June 2011.
- Terceiro, M. 2010. Stock assessment of scup for 2010. Northeast Fisheries Science Center Reference Document 10-16. 96 pp.
- Northeast Data Poor Stocks Working Group. 2009. The Northeast Data Poor Stocks Working Group report, December 8-12 2008 meeting. Part A. Skate species complex, deep sea red crab, Atlantic wolffish, scup, and black sea bass. Part B. Weakfish. Northeast Fisheries Science Center Reference Document 09-02A & B. 886 pp.
- Northeast Fisheries Science Center. 2011. 2011 Data and projection update for scup. Unpublished MS. 7 pp.
- Miller, T., Muller, R., O'Boyle, B., and A. Rosenberg. 2009. Report by the Peer Review Panel for the Northeast Data Poor Stocks Working Group. Prepared for Data Poor Assessment Working Group Northeast Fisheries Science Center. 38 pp.
- Wilberg, M. 2011. Uncertainty of the overfishing limit for setting ABCs. Presentation to SSC on July 27, 2011.

2) The level (1-4) that the SSC deems most appropriate for the information content of the most recent

stock assessment, based on criteria listed in the version of the proposed Omnibus Amendment submitted to the Secretary of Commerce:

The SSC designated the assessment as **Tier 3**, because the structure of the assessment was unchanged from the previous specification. There were no new estimates of uncertainties associated with maximum fishing mortality rate (OFL).

3) If possible, the level of catch (in weight) associated with the overfishing limit (OFL) based on the maximum fishing mortality rate threshold:

According to the projections in the Terceiro (2010), the level in catch is **29,883 mt (65.9 million lb)**, based on an OFL F_{msy} proxy = $F_{40\%}$ = 0.177.

*4) The level of catch (in weight) associated with the acceptable biological catch (ABC) for the stock. The ABC will be selected based on the overfishing definition contained in the FMP, and will reflect the level of scientific uncertainty inherent in the stock assessment such that the recommended ABC is less than or equal to the overfishing limit consistent with the Council's risk policy described in the Omnibus Amendment, the Act, and the National Standard 1 Guidelines to the Act**:***

The SSC recommended a single year specification of ABC.

The SSC recommended an ABC of **24,200 mt (53.4 million lb)** based on the control rule for Tier 3 assessments. The SSC used an assumed CV of the OFL with a lognormal distribution of 100%, noting that the ratio of B/BMSY is greater than 1, and that scup exhibit a typical life history. The SSC applied the Council's risk policy of P* = 0.4. The recommended ABC is 81% of the catch at OFL. The assumed value of the CV was derived from a meta-analysis of practices used by other Councils and a review of the expected accuracy of estimates from SCA models generally (Wilberg 2011). The value recommended here for ABC was similar to that recommended by staff based on a 0.75*F_{msy} approach.

5) If possible, the probability of overfishing associated with the OFL and ABC catch level recommendations:

Based on the method applied, the probability of overfishing associated with the ABC is 40%, conditional on the assumed lognormal distribution of OFL with an associated CV = 100%.

6) The most significant sources of scientific uncertainty associated with determination of OFL and ABC:

- While older age scup (age 3+) are represented in the catch used in the assessment model, most indices used in the model do not include ages 3+. As a result, the dynamics of the older ages of scup are driven principally by catches and inferences regarding year class strength;
- Commercial discard estimates are imprecise and in some years are a large proportion of the total catch;
- Uncertainty exists with respect to the estimate of natural mortality (M) used in the assessment;
- Uncertainty in the stock status resulting from uncertainties in the estimates of both the stock's biomass and the biological reference point proxy used for F_{MSY};
- The assessment does not contain a characterization of uncertainty for the OFL and other biological reference points; the SSC assumed that OFL has a lognormal distribution with a CV = 100%, based on a meta-analysis of survey and statistical catch-at-age accuracies;
- Recruitment appears high in recent years, but it is unclear how these recent high levels would compare to historical levels of recruitment;

- Survey indices are particularly sensitive to scup availability, which results in high inter-annual variability; and
- Uncertainties results from the application of aggregate trawl calibration coefficients (ALBATROSS IV vs BIGELOW) and their influence on the selectivity pattern and results of the assessment.

7) Ecosystem considerations that the SSC took into account, beyond those already incorporated into the stock assessment, in selecting the ABC, and the basis for those considerations:

No additional ecosystem considerations were applied in calculating ABC.

8) A certification that the recommendations provided by the SSC represent the best scientific information available:

To the best of the SSC's knowledge, these recommendations are based on the best available scientific information.

Research Recommendations

- Quantify the consumption patter of scup;
- Evaluate indices of stock abundance;
- Conduct biological studies to investigate maturity schedules and factors affecting annual availability of scup to research surveys;
- Improve estimates of discards and discard mortality for commercial and recreational fisheries; and
- Explore the utility of incorporating ecological relationships, predation, and oceanic events that influence scup population size on the continental shelf and its availability to resource surveys into the stock assessment model.

Summer Flounder

1) The materials considered in reaching its recommendations:

- MAFMC staff memorandum from Jessica Coakley to Chris Moore: “Summer flounder management measures for 2012,” dated 27 June 2011.
- Terceiro, M. 2010. Stock assessment of summer flounder for 2010. Northeast Fisheries Science Center Reference Document 10-14. 142 pp.
- Northeast Fisheries Science Center. 2008. 47th Northeast Regional Stock Assessment Workshop (47th SAW) Assessment Report. Northeast Fisheries Science Center Reference Document 08-12a. 335 pp.
- Northeast Fisheries Science Center. 2008. 47th Northeast Regional Stock Assessment Workshop (47th SAW) Assessment Summary Report. Northeast Fish Science Center Reference Document 08-11. 22 pp.
- Carmichael, J., M. Armstrong, K. Stokes, and Y. Jiao. 2008. Summary Report of the 47th Northeast Regional Stock Assessment Review Committee (SARC 47). Prepared for Northeast Region Stock Assessment Workshop. 39 pp.
- Northeast Fisheries Science Center. 2011. 2011 data and projection update for summer flounder. Unpublished MS. 11 pp.
- Wilberg, M. 2011. Uncertainty of the overfishing limit for setting ABCs. Presentation to SSC on July 27, 2011.

2) The level (1-4) that the SSC deems most appropriate for the information content of the most recent stock assessment, based on criteria listed in the version of the proposed Omnibus Amendment submitted to the Secretary of Commerce:

Tier 3.

3) If possible, the level of catch (in weight) associated with the overfishing limit (OFL) based on the maximum fishing mortality rate threshold:

The OFL is **19,910 mt (43.9 million lb)** based on a threshold F = 0.31 and 2011 projected biomass.

4) The level of catch (in weight) associated with the acceptable biological catch (ABC) for the stock. The ABC will be selected based on the overfishing definition contained in the FMP, and will reflect the level of scientific uncertainty inherent in the stock assessment such that the recommended ABC is less than or equal to the overfishing limit consistent with the Council's risk policy described in the Omnibus Amendment, the Act, and the National Standard 1 Guidelines to the Act:

The SSC recommends a single year specification of ABC.

The SSC determined ABC to be **16,124 mt (35.5 million lb)** based on an OFL of 19,910 mt, 2011 projected B/Bmsy = 126%, P* = 0.4, and a lognormal distribution with of CV = 100%. The value recommended here for ABC is similar to an ABC associated with the prior $F_{target} = F_{40\%}$. The assumed value of the CV was derived from a meta-analysis of practices used by other Councils and a review of the expected accuracy of estimates from SCA models generally (Wilberg 2011).

5) If possible, the probability of overfishing associated with the OFL and ABC catch level recommendations:

Based on the method applied, the probability of overfishing associated with ABC is 40%, conditional on an assumed lognormal distribution of OFL with and associated CV = 100%.

6) The most significant sources of scientific uncertainty associated with determination of OFL and ABC:

- Strong annual retrospective pattern in recruitment evident for the last three years of the assessment;
- Uncertainty in stock status because of lack of uncertainty estimation for the biological reference points (proxy used for F_{MSY});
- Uncertainty exists with respect to the estimate of M;
- No uncertainty characterization for the OFL; and
- Uncertainties resulting from the application of aggregate trawl calibration coefficients (ALBATROSS IV vs. BIGELOW) and their influence on the results of the assessment.

7) Ecosystem considerations that the SSC took into account, beyond those already incorporated into the stock assessment, in selecting the ABC, and the basis for those considerations:

No additional ecosystem considerations were applied in calculating ABC.

8) A certification that the recommendations provided by the SSC represent the best scientific information available:

To the best of the SSC's knowledge, these recommendations are based on the best available scientific information.

Research Recommendations

- Evaluate uncertainties in biomass to determine potential modifications to default OFL CV; and
- Evaluate the size distribution of landed and discarded fish, by sex, in the summer flounder recreational fishery this could be considered for all catch components, which would include the commercial fishery).

Black Sea Bass

1) The materials considered in reaching its recommendations:

- MAFMC staff memorandum from Jessica Coakley to Chris Moore: "Black Sea Bass Management Measures for 2012," dated 27 June 2011.
- Northeast Fisheries Science Center. 2011. Attachment 1: black sea bass 2012 projection update. Unpublished MS. 12 pp.
- Shepherd, G. R., and J. Nieland. 2010. Black sea bass 2010 stock assessment update. Northeast Fisheries Science Center Reference Document 10-13. 34 pp.
- Northeast Data Poor Stocks Working Group. 2009. The Northeast Data Poor Stocks Working Group Report, December 8-12, 2008 Meeting. Part A. Skate species complex, deep sea red crab, Atlantic wolffish, scup, and black sea bass. US Department of Commerce, Northeast Fisheries Science Center Reference Document. 09-02; 496 p.
- Wilberg, M. 2011. Uncertainty of the overfishing limit for setting ABCs. Presentation to SSC on July 27, 2011.

2) The level (1-4) that the SSC deems most appropriate for the information content of the most recent stock assessment, based on criteria listed in the version of the proposed Omnibus Amendment submitted to the Secretary of Commerce:

The SSC determined that the black sea bass assessment qualified as a **Tier 4**. The SSC noted that an OFL was available, but that there were concerns regarding the divergence of observed and predicted survey indices in recent years that make the reliability of the OFL point estimate questionable. The SSC notes that a new benchmark assessment will be completed in December and recommend re-evaluation of the tier at that point.

3) If possible, the level of catch (in weight) associated with the overfishing limit (OFL) based on the maximum fishing mortality rate threshold:

The assessment indicates that the catch associated with OLF is 3,551 mt (7.8 million lb) based on an F_{msy} proxy = $F_{40\%}$ = 0.42. However, the SSC did not endorse this estimate because of concerns about the high uncertainty in the OFL that is not well characterized in the assessment. There are large uncertainties related to stock structure, life history, and natural mortality that remain unresolved in the assessment.

4) The level of catch (in weight) associated with the acceptable biological catch (ABC) for the stock. The ABC will be selected based on the overfishing definition contained in the FMP, and will reflect the level of scientific uncertainty inherent in the stock assessment such that the recommended ABC is less

than or equal to the overfishing limit consistent with the Council's risk policy described in the Omnibus Amendment, the Act, and the National Standard 1 Guidelines to the Act:

The SSC recommended a single year specification of ABC.

The SSC recommended a level of catch associated with the ABC of **2,041 mt (4.5 million lb)**, based on the application of a constant catch policy adopted for the 2010-2011 specification.

5) If possible, the probability of overfishing associated with the OFL and ABC catch level recommendations:

It is not possible to provide an estimate of the probability of overfishing as the SSC did not endorse the estimate of OFL in the assessment.

6) The most significant sources of scientific uncertainty associated with determination of OFL and ABC:

- Atypical life history strategy (protogynous hermaphrodite);
- Strong annual retrospective pattern in biomass evident in recent years;
- Uncertainty in stock status because of the lack of uncertainty estimation for the biological reference points (proxy used for F_{MSY}) and model output;
- Assessment assumes a completely mixed stock, while tagging analyses suggest otherwise;
- Uncertainty exists with respect to M — because of the unusual life history strategy the current assumption of a constant M in the model for both sexes may not adequately capture the dynamics in M;
- No uncertainty characterization for the OFL; and
- Concern about the application of aggregate trawl calibration coefficients (ALBATROSS IV vs BIGELOW) and their influence on the selectivity pattern and results of the assessment.

7) Ecosystem considerations that the SSC took into account, beyond those already incorporated into the stock assessment, in selecting the ABC, and the basis for those considerations:

No additional information pertinent to ecosystem considerations was included in selecting the ABC.

8) A certification that the recommendations provided by the SSC represent the best scientific information available:

To the best of the SSC's knowledge, these recommendations are based on the best available scientific information.

Research Recommendations

- Validate methods used to age black sea bass (scales vs otoliths);
- Increase age sampling across all components of the commercial and recreational fisheries;
- Develop a fixed gear survey of black sea bass similar to the one developed for scup.

Bluefish

1) The materials considered in reaching its recommendations:

- MAFMC staff memorandum from Jim Armstrong to Chris Moore: "Bluefish ABC and Management Measures for 2012," dated 6 July 2011.
- MAFMC staff memorandum from Jim Armstrong to Chris Moore: "Addendum to Staff Memo on 2012 Bluefish Measures," dated 7 July 2011.
- Coastal Pelagic Working Group. 2011. Bluefish 2011 stock assessment update. Unpublished MS. Northeast Fisheries Science Center. 44 pp.
- Wilberg, M. 2011. Uncertainty of the overfishing limit for setting ABCs. Presentation to SSC on July 27, 2011.

2) The level (1-4) that the SSC deems most appropriate for the information content of the most recent stock assessment, based on criteria listed in the version of the proposed Omnibus Amendment submitted to the Secretary of Commerce:

The SSC designated the assessment as **Tier 3**, because the structure of the assessment was unchanged from previous specification. There were no new estimates of uncertainties associated with maximum fishing mortality rate (OFL).

3) If possible, the level of catch (in weight) associated with the overfishing limit (OFL) based on the maximum fishing mortality rate threshold:

The OFL is **18,572 mt (40.9 million lb)**, based on an F_{msy} of 0.19.

4) The level of catch (in weight) associated with the acceptable biological catch (ABC) for the stock. The ABC will be selected based on the overfishing definition contained in the FMP, and will reflect the level of scientific uncertainty inherent in the stock assessment such that the recommended ABC is less than or equal to the overfishing limit consistent with the Council's risk policy described in the Omnibus Amendment, the Act, and the National Standard 1 Guidelines to the Act:

The SSC recommended a single year specification of ABC.

The SSC recommends an ABC of **14,535 mt (32.0 million lb)** (provisional) based on the control rule for Tier 3 assessments. The SSC used an assumed CV of OFL with a lognormal distribution of 100%, noting that the ratio of (B/B_{MSY}) based on mid-year estimates from 2011 is 0.9645, and that bluefish exhibit a typical life history. The SSC applied the Council's policy of P* = 0.384. The projection is 78.3% of the catch at OFL. The assumed value of the CV was derived from a meta-analysis of practices used by other Councils and a review of the expected accuracy of estimates from SCA models generally (Wilberg 2011).

5) If possible, the probability of overfishing associated with the OFL and ABC catch level recommendations:

Based on the method applied, the probability of overfishing associated with the ABC is 38.4%, conditional on the assumed lognormal distribution of OFL with an associated CV = 100%.

6) The most significant sources of scientific uncertainty associated with determination of OFL and ABC:

- There is a significant amount of missing data involved in the age-length keys (ALKs), which are critical for development of the catch at age matrix;
- Concern about the application of aggregate trawl calibration coefficients (ALBATROSS IV vs BIGELOW), and their influence on the selectivity pattern and results of the assessment. Also, some near shore areas previously sampled by the ALBATROSS IV are unavailable for sampling by the BIGELOW;
- Commercial discards are assumed to be insignificant, which may not be the case;
- Much of population biomass (~40%) is in the aggregated 6+ age group for which there is relatively little information;
- Questions have been raised about the uncertainty in the MRFSS estimates in general, and are particularly relevant here given the highly episodic nature of bluefish catches in the recreational fisheries coast wide; and
- The basis for the unusual bimodal selectivity curve used in the ASAP model is not well understood.

7) Ecosystem considerations that the SSC took into account, beyond those already incorporated into the stock assessment, in selecting the ABC, and the basis for those considerations:

No additional information pertinent to ecosystem considerations was included in selecting the ABC.

8) A certification that the recommendations provided by the SSC represent the best scientific information available:

To the best of the SSC's knowledge, these recommendations are based on the best available scientific information.

Research Recommendations

- Evaluate amount and length frequency of discards from the commercial and recreational fisheries;
- Collect data on size and age composition of the fisheries by gear type and statistical area;
- Initiate fishery-dependent and fishery-independent sampling of offshore populations of bluefish during the winter months (consider migration, seasonal fisheries, and unique selectivity patterns resulting in the bimodal partial recruitment pattern; consider if the migratory pattern results in several recruitment events); and
- Develop bluefish index surveys (proof of concept), including abundance/biomass trend estimates for the offshore populations in winter.

Attachments

cc:
MAFMC SSC Members, R. Seagraves, J. Coakley, J. Armstrong, Lee Anderson, C. Moore

Attachment 1

Mid-Atlantic Fishery Management Council
Scientific and Statistical Committee Meeting
July 27-28, 2011
Agenda

Wednesday July 27, 2011

1000 Ecosystems Subcommittee Report

1100 2012-13 Research Priorities

1300 2012 OFL/ABC recommendations for scup

1600 2012 OFL/ABC recommendations for summer flounder

Thursday July 28, 2011

0830 Summer flounder OFL/ABC cont.

1000 2012 OFL/ABC recommendations for black sea bass

1300 2012 OFL/ABC recommendations for bluefish

1530 National SSC IV Planning Report

1600 Adjourn

ATTENDANCE

27 July 2011

Rich Seagraves	MAFMC Staff
Jessica Coakley	MAFMC Staff
Lee Anderson	MAFMC Vice Chair
Rick Robins	MAFMC Chair
John Boreman	SSC Chair – NCSU
Tom Miller	SSC Vice-chair, UMCES/CBL
Mike Wilberg	SSC Member, UMCES/CBL
Mike Frisk	SSC Member, Stony Brook Univ
David Tomberlin	SSC Member, NMFS/ST
Wendy Gabriel	SSC Member, NMFS/NEFSC
Mark Holliday	SSC Member, NMFS/F
Bonnie McCay (27th only)	SSC Member, Rutgers
Cynthia Jones	SSC Member, Old Dominion Univ
Jason Link	SSC Member, NMFS/NEFSC
Edward Houde	SSC Member, UMCES/CBL
Doug Lipton	SSC Member, UMCP
David Secor	SSC Member, UMCES/CBL
Fred Serchuk	SSC Liaison, NMFS/NEFSC
Mike Ruccio	NMFS/NERO
Jeff Kaelin	Lund's Seafood
Kristen Cervoli	Pew Foundation
Toni Kearns	MC Member, ASMFC
Jason McNamee	MC Member, CTDEP
John Maniscalco	MC Member, NYDEC
Mark Terceiro	MC Member, NMFS/NEFSC
Greg Wojcik	MC Member, CTDEP
Chris Batsavage	MC Member, NCDMF
Gary Shepherd	NMFS/NEFSC
Tom Hoff (27th only)	MAFMC Staff
Mike Ruccio	NMFS/NERO

28 July 2011

Same attendees as 27 July, plus

Jim Armstrong	MAFMC Staff
Mike Waine	ASMFC Staff
Rob O'Reilly	MC Member, VMRC
Steve Doctor	MC Member, MDDNR
Tobey Curtis	NMFS/NERO

Guidance for Developing Ecosystem-Based Approaches for Fisheries Management in the Mid-Atlantic Region

Presentation
SSC Subcommittee on EBFM
27 July 2011

E. D. Houde

Thoughts on EBFM. Hilborn (2011)

Phase 1.

"The most important elements of EBFM are keeping fishing mortality rates low enough to prevent ecosystem-wide overfishing, reducing or eliminating by-catch, and avoiding habitat-destroying fishing methods."

Phase 2.

"Extended EBFM that consists of considering trophic interactions and area-based management."

Developing a Vision

What does the Council Envision for EBFM in the Mid-Atlantic Region?

May I suggest:

1. A productive and healthy ecosystem.
2. Sustainable, productive, and profitable fisheries.
3. Recognition and respect for ecosystem services other than fisheries.
4. An engaged, broad stakeholder community.
5. A responsive, adaptive management system.

Goals Statement

- What specifically does the Council hope to achieve?
- In what timeframe?
- Define measures of success
- Adopt goals that do not limit a range of management actions

Overarching Principles

- Do no harm to the ecosystem (or as little as possible)
- Be an advocate for the ecosystem and services it provides
- Adopt, accept, and promote the precautionary approach
- Respect the broad community of stakeholders

EBFM Represents a Shift in Management Priorities and Perspective

Emphasis shifts from management of single species to achieve high yield and profit, generally by controlling catch and effort, to management that assures long-term productivity, a high level of ecosystem services, sustainable fisheries, and sustainability of the ecosystem itself.

Why develop and implement ecosystem-based approaches to fisheries management in the Mid-Atlantic region?

- To conserve the productivity, structure and resiliency of the coastal ecosystem
- To respect uncertainty; reduce risk of management failure
- To follow the "precautionary approach." Do No Harm!
- To preserve options of future generations.

How can we gauge success?

- Indicators and Reference Points
- Limits and Thresholds
- Multiple Indicators
- Triggers for Action
- Spatially Explicit Actions

All of these may sound familiar and little different from what has been used in single species management, but the particular indicators, levels and limits, and triggers could be different. For example, F levels of forage species could be set much lower than traditionally or B could be higher. Or, the level of F and B on a predator might be regulated to manage a forage fish species.

EBFM Represents a Shift in Management Priorities and Perspective

- Conserve ecosystem integrity and resilience
- Promote habitat and water quality
- Pay particular attention to maintenance of key predator-prey relationships
- Manage total removals from the ecosystem

What Immediate Steps Can Be Taken to Adopt EBFM?

- Continue risk-averse, single-species fisheries management.
  - --Set target fishing mortality levels below those that yield MSY.
  - --Maintain adequate spawning stock biomass and fecundity.
- Regulate of deny use of gears that are destructive of key habitats or which result in unwanted bycatch.
- Reduce or eliminate bycatch.
  - --Young and small individuals of targeted species.
  - --Untargeted species, including threatened and endangered species.
- Consider and initiate development of new indicators and reference points.
- Rigorously enforce fisheries and environmental laws and regulations.

Intermediate Steps

- Place a cap on total fisheries removals from the ecosystem.
  - --The cap should be flexible and adaptive, responsive to shifts in productivity of the ecosystem.
- Explicitly account for predator-prey interactions.
  - --Recognize critical predator-prey interactions and manage to conserve prey resources.
  - --Develop and incorporate multispecies modeling into assessments.
- Expand the use of spatially-explicit management approaches.
  - --Managed areas.
  - --Temporal-spatial management measures.
- Increase stakeholder involvement in the management process.
  - --Further democratize diverse stakeholder inputs.
  - --Recognize the diverse stakeholder interests (including, but beyond fisheries).

Long-term Steps

- Recognize and account for externalities.
  - --Account for long-term shifts in productivity (e.g., climate change).
  - --Improve water quality.
- Restore damaged habitats.
- Manage to conserve food-web structure and function.
  - --Incorporate ecosystem modeling into assessments.
- Build on and expand on a “managed areas” approach.
  - --Ultimately, zoning and networking to achieve EBFM and broader ecosystem management goals.
- Review institutional and governance structures to support EBFM.
  - --Strengthen inter-agency collaboration and cooperation protocols.
  - --Consider possible need for new institutions.
- Formally embrace and implement a broadly adaptive and integrative management approach to insure sustainable fisheries and continuation of other ecosystem services.

What is the Best Pathway?

- Build on Single Species management?
- Move aggressively towards Multispecies management?
- Develop and Implement a broad “ecosystem plan?”

Uncertainty of the Overfishing Limit for setting ABCs

Mike Wilberg
Chesapeake Biological Laboratory
University of Maryland Center for Environmental Science
7-27-2011

Overfishing Limit

- Ideally we would like Catch @ F_{MSY} (OFL)

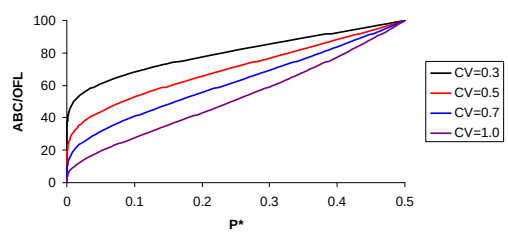
$$OFL = \overline{B} \times F_{MSY}$$

- Uncertainty in biomass in last year and F_{msy}
- Var(OFL)=Cov(B,F)^2 + 2*Cov(B,F)*B*F + F^2*VB + B^2*VF + VF*VB

Options

- Precision of OFL from the assessment model
  - Assumes model is "true"
- Model averaging
  - Techniques still need to be developed
- Ad hoc method (based on survey or meta-analysis)

Effect of uncertainty on buffer



Presentation and Consequences

- As long as we are buffering away from OFL is getting the uncertainty correct important?
  - The Council has specified a policy on P* on the basis that it represents the acceptable probability of overfishing
  - If we know we are under (or over) estimating the uncertainty in OFL, the meaning of P* changes

North Pacific Groundfish Approach

- Use the average CV from the last three years of the survey
  - Ranges from 9-51%, with a mean of ~19%
- Method was easy to apply across a range of species and produced more consistent estimates than other methods considered

North Pacific Groundfish Approach

- Only considers uncertainty in biomass
- Assumes that uncertainty in the survey maps to uncertainty in estimated stock size

North Pacific Crab Approach

- Use the uncertainty estimated from the stock assessment model and a P* of 0.49

Pacific Approach

- Meta-analysis of stock assessment estimates of biomass over time
- Estimated the log-scale SD in biomass for each year among assessments and averaged over all species
- Log-scale SD was 0.36, ~37% CV

Pacific Approach

- Log-scale SDs of 0.72 (82% CV) and 1.44 (264% CV) are used for category 2 and 3 stocks (generally species complexes)

Pacific Approach

- Only considers uncertainty in biomass
- Assumes that variance of biomass is completely described by the stock assessments conducted
- i.e., Stock assessments over time have been unbiased

Determining expected distribution of OFL

- Majority of the stock assessments in the Mid-Atlantic are age-structured or length and age-structured
- Many simulations studies of performance of SCA models have been conducted
- Provide “best-case” estimates of accuracy and distribution of estimates

Simulation Studies Examined

- Bence et al. 1993
- Ianelli 2002
- Punt et al. 2002
- Yin and Sampson 2004
- Labelle 2005
- Radomski et al. 2005
- Wilberg and Bence 2006
- Magnusson and Hilborn 2007
- Wilberg and Bence 2008
- Conn et al. 2010
- Linton and Bence 2010

Best case

- In most cases the data-generating model is nearly identical to the estimation model
- In almost all simulation studies examined
  - M
  - Selectivity functional form
  - Stock recruitment model
  - Weights for data
- In some simulation studies examined
  - Steepness
  - Constant catchability for indices

Review of Accuracy

- The distribution of biomass estimates tends to have a long right-hand tail (perhaps suggesting a lognormal distribution)
- Two primary factors affecting accuracy are level of fishing mortality and the quality (CV and yearclasses included) of the index of abundance

Accuracy Estimates

- Bence et al. 1993
  Mean CV in ending biomass = 60% (14, 183)
- Yin and Sampson 2004
  Mean CV in ending biomass = 35% (9, 94)
- Radomski et al. 2005
  Mean CV in ending biomass = 19% (0, 77)

Accuracy Estimates

- Wilberg and Bence 2006

FF - Mean CV in ending biomass = 72% (20, 314)
WN - Mean CV in ending biomass = 52% (23, 210)
RW - Mean CV in ending biomass = 70% (17, 407)

- Wilberg and Bence 2008

FF - Mean CV in ending biomass = 34% (32, 35)
WN - Mean CV in ending biomass = 29% (14, 48)
RW - Mean CV in ending biomass = 29% (26, 34)

Accuracy Estimates

- Conn et al. 2010 (uncertainty in F_{msy})

h=0.5 SE=0.22
h=0.7 SE=0.23
h=0.9 SE=0.19

h=0.5 SE=0.33
h=0.7 SE=0.51
h=0.9 SE=0.53

- Cor(B,Fmsy) ~ 0.5

Conclusions

- Lognormal distribution for OFL appears to be reasonable
- CVs of B (or log-scale SDs) in the range of 35-60% seem reasonable given the assessment methods
- Uncertainty in F_{lim} should be about the same magnitude as for B

North Pacific Approach

Stock	Tier	F_{40}	F_{35}	Buffer size	SSB CV	Survey CV of last 3	P* SSB	P* Survey	Buffer at P*=0.12 (SSB)	Buffer at P*=0.12 (Survey)
GOA POP	3	0.06	0.07	0.84	29%	17%	0.27	0.15	0.72	0.82
GOA Arrowtooth	3	0.19	0.22	0.84	4%	9%	0.00	0.03	0.95	0.90
GOA Pollock	3	0.13	0.15	0.87	11%	14%	0.10	0.15	0.88	0.85
GOA P. Cod	3	0.44	0.54	0.81	16%	18%	0.10	0.13	0.83	0.81
GOA Rougheye	3	0.04	0.05	0.83	40%	17%	0.31	0.13	0.64	0.82
Sablefish	3	0.09	0.10	0.84	4%	13%	0.00	0.09	0.95	0.86
GOA Harlequin	5			0.75		51%		0.28		0.57
GOA Sleeper shark	6			0.75		29%		0.15		0.72
EBS Pollock	1	0.28	0.33	0.85	24%	10%	0.25	0.06	0.76	0.89
BSAI Flathead	3	0.28	0.34	0.82	6%	11%	0.00	0.03	0.93	0.88
BS N. Rockfish	3	0.04	0.05	0.83	9%	24%	0.02	0.22	0.90	0.75
BSAI Shortraker	5			0.75		26%		0.13		0.74
BSAI G. Grenadier	6			0.75		10%		0.00		0.89