Annex 2

Response to SERO's request for king mackerel stock assessment data resulting from the SEDAR 16 Review Workshop

Request 1: Yield projections associated with $F_{current}$, 65%$F_{30\%SPR}$, 75%$F_{30\%SPR}$, 85%$F_{30\%SPR}$, $F_{30\%SPR}$, and $F_{40\%SPR}$ by migratory group through 2016 (See Worksheet ProjBaseModels[1]). Projection methodology is explained in document SEDAR16-RW-01. The yield vales are presented in **Table A2.1**, corresponding to landings only, starting in the 2008 fishing year. For each constant F scenario, the deterministic results are shown. In addition, the median and upper/lower 80% confidence limits estimated from 1000 bootstrap runs are presented. For all projections, F during the 2007 fishing year was assumed to be equal to the geometric mean F during 2004 - 2006 ($F_{current}$) as agreed by the SEDAR 16 RW. As approved by the RW, average proportions of dead discards by age from the last three years (2004-06) were used for projections of stock status to estimate landings only.

Request 2: Trends in landings, and dead discards in pounds by year, fishing mode (shrimp, commercial, charter, private and headboat), and migratory group (see worksheet "TrendsLandingsDeadDiscards", Attachment 1). The requested values, presented in **Table A2.2**, are for the 1981-2006 assessment period base model. Recall that for the base model, the catch within the mixing area during Winter (Nov.-Mar.) was split 50% among migratory units. **Tables A2.2.1**, **A2.2.2** and **A2.2.3** show estimates of landed recreational and commercial catch (i.e., no bycatch or discards are included). The assessment models, however, included estimates of dead discards from recreational fisheries (**Table A2.2.4**) and estimates of bycatch from shrimp fisheries (**Table A2.2.5**), in addition to the landed catch. Estimates of dead discards from recreational fisheries were calculated in numbers at age. For this purpose, numbers at age were converted to weight units using the average weight of landed fish. Estimates of shrimp bycatch are only available in numbers of fish of age 0. The recreational catches were estimated for two fishing modes only, Headboat and MRFSS (private, charter, etc).

Request 3: Trends in fishing mortality and spawning stock biomass by year and migratory group (see Worksheet "F_SSB_trends1981_06", Attachment 1). **Tables A2.3.1** and **A2.3.2** show the trends in fishing mortality and spawning stock biomass, by year and migratory group, for the base models. The deterministic result and the median and 80% confidence bounds estimated from 1000 bootstrap runs are shown. "Apical F" refers to the maximum F at age in each year, as estimated by the VPA model. $F_{current}$ was calculated as recommended by the RW as the maximum F at age from the geometric mean of the current year and the prior 2 years.

Request 4 (items 1', 2', 3' in SERO's data request): Yield projections at $F_{current}$, 65%$F_{30\%SPR}$, 75%$F_{30\%SPR}$, 85%$F_{30\%SPR}$, $F_{30\%SPR}$, and $F_{40\%SPR}$ for three alternative management areas delineated by: a) the Dade-Monroe county line, b) the Council boundary line, and c) allocating all fish caught in the mixing zone- winter time to the Gulf of Mexico king mackerel migratory group (see worksheet "ProjAlternTORBound", Attachment 1). Projection methodology and the approximation of different management areas are explained in document SEDAR16-RW-01. The projection results, presented in **Table A2.4.1** and **A2.4.2**, include the projected yield during 2007-2016 (landings only) for the deterministic run, by management unit. Projection scenarios start in the 2008 fishing year. F during the 2007 fishing year was assumed to be equal to the geometric mean F during 2004 - 2006 (i.e., equal to $F_{current}$).

[1] Worksheet names refer to the spreadsheet SEROrequest_Oct08_Final.xlsx, attached as **Attachment 1**.

ANNEX 2

Table A2.1 Yield projections associated with $F_{current}$, 65%$F_{30\%SPR}$, 75%$F_{30\%SPR}$, 85%$F_{30\%SPR}$, $F_{30\%SPR}$, and $F_{40\%SPR}$ by migratory group through 2016.

Atlantic stock unit

	2006*	2007**	2008	2009	2010	2011	2012	2013	2014	2015	2016
Yield landings lbs											
F30%SPR											
Deterministic run	9,852,460	9,277,053	9,453,423	9,248,393	9,153,594	9,131,548	8,860,379	8,787,627	8,794,241	8,736,921	8,703,851
low CL	9,852,460	8,423,864	7,206,912	7,321,553	7,484,695	7,716,180	7,689,725	7,696,339	7,740,431	7,665,474	7,612,563
Median	9,852,460	9,732,308	9,755,456	9,760,968	9,816,084	9,806,163	9,526,176	9,284,769	9,230,756	9,170,129	9,163,515
upp CL	9,852,460	11,455,221	13,064,595	12,850,747	12,703,037	12,370,139	11,788,119	11,437,584	11,400,105	11,342,785	11,239,168
F40%SPR											
Deterministic run	9,852,460	9,277,053	6,668,984	6,955,585	7,239,982	7,522,173	7,475,876	7,548,629	7,665,474	7,672,088	7,685,315
low CL	9,852,460	8,423,864	5,075,042	5,498,330	5,912,799	6,375,769	6,497,024	6,600,641	6,754,965	6,777,011	6,765,988
Median	9,852,460	9,732,308	6,894,958	7,328,167	7,772,398	8,125,138	8,093,171	8,058,999	8,071,124	8,044,669	8,079,943
upp CL	9,852,460	11,455,221	9,270,439	9,706,955	10,079,536	10,304,408	10,000,170	9,905,371	9,896,552	9,925,212	9,812,777
Fcurrent											
Deterministic run	9,852,460	9,277,053	9,504,129	9,288,076	9,184,459	9,155,799	8,880,221	8,805,264	8,809,673	8,750,148	8,717,079
low CL	9,852,460	8,423,864	8,395,204	8,132,854	7,938,847	8,024,827	7,879,322	7,824,207	7,797,751	7,674,292	7,691,929
Median	9,852,460	9,732,308	10,265,827	10,069,615	10,006,783	9,979,226	9,660,658	9,379,568	9,339,885	9,282,565	9,226,347
upp CL	9,852,460	11,455,221	12,564,146	12,714,060	12,703,037	12,557,532	11,863,076	11,607,340	11,605,135	11,428,765	11,331,762
F 85%SPR30											
Deterministic run	9,852,460	9,277,053	8,170,333	8,236,471	8,344,498	8,476,775	8,313,633	8,309,224	8,368,749	8,337,884	8,326,861
low CL	9,852,460	8,423,864	5,853,274	6,261,129	6,525,684	6,871,810	6,986,450	7,076,840	7,147,387	7,109,909	7,083,453
Median	9,852,460	9,732,308	7,898,062	8,261,824	8,571,574	8,819,594	8,724,795	8,581,495	8,569,369	8,550,630	8,564,960
upp CL	9,852,460	11,455,221	10,672,580	10,961,385	11,003,273	11,115,709	10,716,672	10,564,553	10,529,279	10,529,279	10,385,979
F 75%SPR30											
Deterministic run	9,852,460	9,277,053	7,290,688	7,497,923	7,718,385	7,943,256	7,850,662	7,892,550	7,985,144	7,978,530	7,980,735
low CL	9,852,460	8,423,864	5,218,342	5,690,132	6,005,393	6,404,430	6,587,413	6,688,826	6,772,602	6,777,011	6,770,397
Median	9,852,460	9,732,308	7,045,975	7,505,639	7,912,392	8,234,267	8,234,267	8,132,854	8,161,514	8,139,468	8,160,412
upp CL	9,852,460	11,455,221	9,517,357	9,956,077	10,176,539	10,416,843	10,103,787	9,993,556	10,046,467	9,995,760	9,925,212
F 65%SPR30											
Deterministic run	9,852,460	9,277,053	6,391,202	6,706,463	7,017,315	7,319,348	7,295,097	7,378,873	7,506,741	7,519,969	7,537,606
low CL	9,852,460	8,423,864	4,576,797	5,088,270	5,443,214	5,873,115	6,071,532	6,219,241	6,325,063	6,360,337	6,369,156
Median	9,852,460	9,732,308	6,170,740	6,699,849	7,174,945	7,562,959	7,625,791	7,600,437	7,662,167	7,631,302	7,668,781
upp CL	9,852,460	11,455,221	8,335,679	8,893,449	9,246,189	9,583,496	9,380,671	9,312,327	9,407,126	9,402,717	9,356,420

Gulf of Mexico stock unit

	2006*	2007**	2008	2009	2010	2011	2012	2013	2014	2015	2016
Yield landings lbs											
Fcurrent											
Deterministic run	8,900,063	11,810,165	14,393,983	15,156,783	14,526,260	13,022,708	11,576,475	10,621,873	9,958,282	9,671,681	9,455,628
low CL	8,900,063	10,822,494	12,308,410	12,546,509	12,094,561	11,331,762	10,414,639	9,896,552	9,301,304	8,959,588	8,756,762
Median boots	8,900,063	11,972,205	14,408,313	15,134,736	14,594,604	13,677,481	12,446,199	11,655,841	10,921,702	10,544,711	10,317,635
upp CL	8,900,063	13,613,546	17,275,425	18,931,097	18,406,397	17,154,171	15,566,842	14,479,963	13,245,374	12,676,582	12,372,344
F30%SPR											
Deterministic run	8,900,063	11,810,165	17,129,920	17,491,478	16,285,549	14,239,659	12,431,869	11,276,646	10,502,824	10,147,879	9,885,529
low CL	8,900,063	10,822,494	13,399,698	13,734,801	13,071,209	12,098,971	11,053,979	10,299,998	9,680,499	9,387,284	9,089,660
Median boots	8,900,063	11,972,205	17,271,016	17,597,300	16,467,431	15,002,459	13,378,754	12,397,697	11,489,392	11,056,184	10,761,867
upp CL	8,900,063	13,613,546	22,134,414	23,082,402	21,587,668	19,171,401	16,940,322	15,500,704	14,030,220	13,386,470	12,903,658
F40%SPR											
Deterministic run	8,900,063	11,810,165	12,610,443	13,542,999	13,223,328	12,046,060	10,833,517	10,017,807	9,437,991	9,199,891	9,014,703
low CL	8,900,063	10,822,494	9,711,364	10,434,480	10,394,797	10,103,787	9,504,129	9,107,297	8,732,511	8,587,006	8,390,795
Median boots	8,900,063	11,972,205	12,529,974	13,447,097	13,151,678	12,515,644	11,542,303	10,985,636	10,362,830	10,118,117	9,867,892
upp CL	8,900,063	13,613,546	16,043,041	17,630,369	17,257,788	16,007,767	14,616,650	13,695,118	12,678,786	12,204,792	11,814,574
F 65%SPR30											
Deterministic run	8,900,063	11,810,165	11,512,541	12,513,440	12,356,911	11,369,240	10,299,998	9,568,063	9,041,159	8,833,924	8,668,577
low CL	8,900,063	10,822,494	9,389,489	10,125,833	10,081,741	9,940,645	9,334,373	8,977,225	8,617,871	8,432,683	8,262,927
Median boots	8,900,063	11,972,205	12,152,984	13,114,199	12,937,830	12,299,591	11,387,980	10,834,619	10,226,143	9,979,226	9,713,569
upp CL	8,900,063	13,613,546	15,282,446	16,673,563	16,477,352	15,449,997	14,274,933	13,401,903	12,359,116	11,979,921	11,631,590
F 75%SPR30											
Deterministic run	8,900,063	11,810,165	13,161,599	14,050,062	13,640,002	12,365,730	11,080,435	10,220,632	9,614,361	9,360,829	9,164,617
low CL	8,900,063	10,822,494	10,738,718	11,417,742	11,155,392	10,846,745	10,042,057	9,550,426	9,102,888	8,875,812	8,644,326
Median boots	8,900,063	11,972,205	13,889,124	14,721,370	14,278,240	13,365,526	12,226,839	11,503,722	10,804,857	10,481,880	10,160,005
upp CL	8,900,063	13,613,546	17,460,613	18,723,862	18,181,525	16,814,659	15,297,878	14,246,273	13,022,708	12,595,011	12,149,677
F 85%SPR30											
Deterministic run	8,900,063	11,810,165	14,777,587	15,496,294	14,790,815	13,214,510	11,715,366	10,732,104	10,053,080	9,755,456	9,532,789
low CL	8,900,063	10,822,494	12,057,083	12,625,875	12,129,835	11,591,907	10,635,101	9,980,328	9,488,697	9,204,301	8,922,109
Median boots	8,900,063	11,972,205	15,595,502	16,213,899	15,481,964	14,266,115	12,897,044	12,033,934	11,211,610	10,818,085	10,512,744
upp CL	8,900,063	13,613,546	19,612,325	20,637,475	19,713,738	17,939,017	16,111,384	14,918,683	13,534,180	13,066,800	12,548,714

Table A2.2. Trends of landings and dead discards king mackerel VPA final models.

A2.2.1 Estimates total landings king **ATL** stock

Fishing Year	Commercial million lbs	Recreational million lbs	Total wgt	Commercial numbers	Recreational numbers	Total numbers
1981/82	5.142	4.754	9.896	480,266	672,661	1,152,928
1982/83	5.597	4.878	10.474	497,104	618,612	1,115,717
1983/84	3.627	6.353	9.980	329,327	828,373	1,157,700
1984/85	3.049	5.546	8.595	254,939	676,709	931,648
1985/86	3.781	6.215	9.996	285,533	876,422	1,161,954
1986/87	3.313	5.972	9.286	313,999	875,388	1,189,387
1987/88	3.730	3.572	7.301	392,905	627,079	1,019,983
1988/89	3.549	4.975	8.524	358,110	693,435	1,051,545
1989/90	3.247	3.404	6.651	303,412	477,546	780,959
1990/91	3.232	3.549	6.781	356,494	526,174	882,667
1991/92	3.186	6.310	9.496	337,728	831,938	1,169,667
1992/93	3.374	6.385	9.760	308,504	812,354	1,120,858
1993/94	2.766	4.245	7.011	260,266	427,433	687,698
1994/95	2.960	3.728	6.688	269,440	455,905	725,345
1995/96	2.675	4.551	7.225	223,112	592,380	815,492
1996/97	3.601	4.600	8.201	376,671	523,291	899,962
1997/98	3.636	5.490	9.126	361,157	664,584	1,025,741
1998/99	3.770	4.420	8.190	363,327	541,535	904,862
1999/00	2.933	3.149	6.082	299,869	409,295	709,165
2000/01	2.951	4.624	7.575	273,692	589,034	862,725
2001/02	2.853	3.786	6.638	236,627	383,171	619,798
2002/03	2.721	2.923	5.644	245,148	385,442	630,591
2003/04	2.623	3.903	6.526	228,115	489,948	718,063
2004/05	3.765	3.870	7.635	356,888	409,594	766,482
2005/06	3.187	3.011	6.198	297,772	442,298	740,071
2006/07	3.731	3.775	7.506	357,494	497,313	854,807

Table A2.2.2 Estimates total landings king **GOM** stock

Fishing Year	Commercial million lbs	Recreational million lbs	Total	Commercial numbers	Recreational numbers	Total numbers
1981/82	2.894	2.124	5.018	449,537	254,017	703,554
1982/83	2.981	6.450	9.432	333,460	791,645	1,125,105
1983/84	1.786	1.969	3.755	294,527	332,643	627,171
1984/85	2.103	2.580	4.682	252,870	400,486	653,357
1985/86	2.265	1.668	3.933	324,790	195,390	520,179
1986/87	0.997	2.405	3.402	135,592	387,802	523,394
1987/88	0.591	1.364	1.956	73,968	228,302	302,270
1988/89	0.948	3.559	4.506	103,859	410,210	514,069
1989/90	1.343	2.254	3.596	163,674	420,556	584,230
1990/91	1.260	2.659	3.919	170,529	400,459	570,988
1991/92	1.448	2.902	4.350	180,768	571,667	752,435
1992/93	2.452	3.735	6.187	371,597	476,770	848,367
1993/94	1.824	3.657	5.480	231,819	511,105	742,923
1994/95	2.120	5.372	7.492	286,647	649,925	936,572
1995/96	1.840	3.576	5.416	247,401	482,121	729,522
1996/97	1.965	4.439	6.404	307,525	516,774	824,299
1997/98	2.469	3.662	6.132	322,152	477,714	799,866
1998/99	2.673	2.909	5.582	365,877	370,742	736,620
1999/00	2.271	2.312	4.583	283,018	323,146	606,164
2000/01	2.234	2.723	4.957	286,303	386,283	672,586
2001/02	2.103	2.827	4.929	283,148	400,567	683,715
2002/03	2.253	2.752	5.005	347,289	407,184	754,473
2003/04	2.290	2.797	5.087	311,588	365,081	676,669
2004/05	2.284	2.628	4.913	355,707	361,502	717,209
2005/06	2.103	2.992	5.095	305,755	414,590	720,345
2006/07	2.417	3.343	5.761	325,725	508,393	834,118

Table A2.2.3. Estimates recreational landings by sector king mackerel.

Stock	Fyear	Headboat million lbs	MRFSS million	Total
ATL	1981	-	4.754	4.754
	1982	-	4.878	4.878
	1983	-	6.353	6.353
	1984	-	5.546	5.546
	1985	0.010	6.205	6.215
	1986	0.283	5.689	5.972
	1987	0.207	3.365	3.572
	1988	0.183	4.792	4.975
	1989	0.176	3.228	3.404
	1990	0.229	3.320	3.549
	1991	0.251	6.059	6.310
	1992	0.179	6.206	6.385
	1993	0.161	4.084	4.245
	1994	0.177	3.551	3.728
	1995	0.137	4.414	4.551
	1996	0.311	4.289	4.600
	1997	0.168	5.323	5.490
	1998	0.123	4.298	4.420
	1999	0.151	2.998	3.149
	2000	0.150	4.474	4.624
	2001	0.102	3.683	3.786
	2002	0.094	2.830	2.923
	2003	0.075	3.829	3.903
	2004	0.141	3.728	3.869
	2005	0.184	2.826	3.011
	2006	0.154	3.621	3.775

Stock	Fyear	Headboat million lbs	MRFSS million	Total
GOM	1981	0.024	2.099	2.124
	1982	0.110	6.340	6.450
	1983	0.096	1.873	1.969
	1984	0.085	2.494	2.580
	1985	0.119	1.548	1.668
	1986	0.168	2.237	2.405
	1987	0.094	1.270	1.364
	1988	0.103	3.455	3.559
	1989	0.152	2.101	2.254
	1990	0.141	2.518	2.659
	1991	0.148	2.754	2.902
	1992	0.204	3.531	3.735
	1993	0.228	3.429	3.657
	1994	0.196	5.177	5.372
	1995	0.195	3.381	3.576
	1996	0.271	4.168	4.439
	1997	0.285	3.378	3.662
	1998	0.172	2.737	2.909
	1999	0.220	2.092	2.313
	2000	0.137	2.586	2.723
	2001	0.146	2.681	2.827
	2002	0.183	2.569	2.752
	2003	0.135	2.662	2.797
	2004	0.214	2.415	2.629
	2005	0.221	2.771	2.992
	2006	0.243	3.100	3.343

Table A2.2.4. Estimates dead discards for king mackerel by migratory unit.

Dead discards numbers of fish

All recreational fisheries only

Fishing Year	Gulf	Atlantic	Avg wgt Gulf	Avg wgt Atlantic	Dead disc wgt lbs Gulf	Dead disc wgt lbs Atlantic
1981/82	2,002	494	8.35	7.06	16,721	3,491
1982/83	6,241	232	8.14	7.88	50,804	1,828
1983/84	26	52	5.91	7.66	155	398
1984/85	1,759	303	6.44	8.19	11,317	2,481
1985/86	1,999	2,617	8.53	7.09	17,042	18,541
1986/87	5,908	8,770	6.20	6.82	36,603	59,782
1987/88	7,366	9,324	5.97	5.69	43,978	53,060
1988/89	9,807	8,812	8.67	7.17	84,999	63,169
1989/90	26,236	6,103	5.35	7.12	140,462	43,467
1990/91	33,620	7,012	6.63	6.74	223,019	47,253
1991/92	31,141	16,604	5.07	7.58	157,939	125,827
1992/93	16,655	8,011	7.83	7.85	130,361	62,914
1993/94	21,886	7,471	7.15	9.92	156,441	74,142
1994/95	37,025	6,246	8.26	8.17	305,779	51,032
1995/96	32,092	14,357	7.41	7.67	237,824	110,189
1996/97	26,028	13,369	8.58	8.78	223,368	117,410
1997/98	21,158	19,585	7.66	8.25	162,057	161,648
1998/99	23,037	17,020	7.84	8.16	180,585	138,802
1999/00	20,088	20,356	7.15	7.69	143,617	156,468
2000/01	29,799	18,589	7.04	7.84	209,861	145,791
2001/02	64,614	25,042	7.05	9.87	455,569	247,185
2002/03	53,170	19,826	6.75	7.58	359,071	150,235
2003/04	41,252	27,671	7.65	7.96	315,775	220,264
2004/05	53,527	27,253	7.26	9.44	388,827	257,241
2005/06	84,446	38,118	7.21	6.80	608,938	259,237
2006/07	63,644	32,020	6.57	7.58	418,172	242,821

Table A2.2.5. Estimates of bycatch of king mackerel by migratory unit made by the shrimp fishery.

Age 0 numbers of fish

Fishing Year	Gulf	Atlantic
1981/82	560,714	-
1982/83	234,807	-
1983/84	447,285	-
1984/85	1,467,069	-
1985/86	725,460	-
1986/87	811,806	-
1987/88	1,476,385	-
1988/89	1,690,808	-
1989/90	2,742,900	23,369
1990/91	2,093,187	64,146
1991/92	2,014,732	25,742
1992/93	1,465,161	27,117
1993/94	2,789,829	13,497
1994/95	3,136,550	21,055
1995/96	2,739,787	40,141
1996/97	1,376,113	59,534
1997/98	1,348,322	15,744
1998/99	1,193,085	47,539
1999/00	1,210,741	32,003
2000/01	1,078,106	18,381
2001/02	772,155	7,198
2002/03	641,061	8,479
2003/04	1,542,801	15,383
2004/05	2,888,086	8,185
2005/06	1,909,170	7,202
2006/07	923,292	13,120

ANNEX 2

Table A2.3.1. Trends in spawning stock (eggs) and fishing mortality for **Atlantic** king mackerel.

	SSB VPA estimated value Million hydrated eggs			
Year	Deterministic	low CI	Median	upp CI
1981	4508	4496	4509	4551
1982	4568	4555	4569	4615
1983	4587	4573	4589	4640
1984	4498	4483	4500	4555
1985	4418	4400	4420	4483
1986	4275	4253	4277	4353
1987	4086	4059	4089	4182
1988	3873	3842	3877	3985
1989	3555	3520	3559	3682
1990	3545	3500	3550	3705
1991	3580	3520	3587	3797
1992	3369	3294	3377	3640
1993	3098	3010	3108	3416
1994	2962	2861	2973	3328
1995	2873	2753	2887	3307
1996	2847	2698	2864	3383
1997	2824	2643	2844	3474
1998	2701	2494	2722.5	3439
1999	2641	2410	2664.5	3433
2000	2640	2382	2658.5	3442
2001	2476	2194	2485.5	3258
2002	2377	2069	2374	3119
2003	2341	2000	2320	3008
2004	2365	1958	2336	3038
2005	2433	1973	2426.5	3102
2006	2443	1951	2476.5	3203

	SSB/MSST			
Year	Deterministic	low CI	Median	upp CI
1981	2.468	2.463	2.470	2.492
1982	2.501	2.495	2.503	2.528
1983	2.512	2.505	2.514	2.541
1984	2.463	2.455	2.465	2.495
1985	2.419	2.410	2.421	2.455
1986	2.341	2.330	2.343	2.383
1987	2.237	2.224	2.240	2.290
1988	2.121	2.105	2.124	2.182
1989	1.947	1.928	1.950	2.015
1990	1.941	1.917	1.945	2.028
1991	1.960	1.928	1.965	2.078
1992	1.845	1.804	1.851	2
1993	1.696	1.648	1.703	1.869
1994	1.622	1.567	1.629	1.820
1995	1.573	1.508	1.582	1.808
1996	1.559	1.478	1.570	1.849
1997	1.546	1.448	1.559	1.898
1998	1.479	1.367	1.493	1.877
1999	1.446	1.320	1.459	1.872
2000	1.446	1.305	1.456	1.883
2001	1.356	1.202	1.361	1.782
2002	1.302	1.134	1.300	1.706
2003	1.282	1.095	1.271	1.647
2004	1.295	1.074	1.280	1.657
2005	1.332	1.081	1.329	1.697
2006	1.338	1.071	1.357	1.749

	F apical VPA estimate fishing mortality rate			
Year	Deterministic	low CI	Median	upp CI
1981	0.442	0.440	0.442	0.443
1982	0.386	0.383	0.386	0.387
1983	0.382	0.378	0.381	0.382
1984	0.287	0.284	0.287	0.288
1985	0.441	0.437	0.441	0.442
1986	0.288	0.284	0.288	0.289
1987	0.208	0.205	0.208	0.209
1988	0.287	0.282	0.287	0.289
1989	0.219	0.213	0.219	0.220
1990	0.331	0.320	0.331	0.334
1991	0.311	0.297	0.311	0.316
1992	0.345	0.325	0.344	0.351
1993	0.318	0.293	0.317	0.326
1994	0.252	0.226	0.251	0.260
1995	0.361	0.318	0.360	0.376
1996	0.366	0.314	0.364	0.383
1997	0.390	0.320	0.388	0.416
1998	0.315	0.240	0.312	0.346
1999	0.233	0.165	0.230	0.264
2000	0.263	0.203	0.259	0.298
2001	0.285	0.248	0.287	0.305
2002	0.269	0.245	0.274	0.294
2003	0.358	0.284	0.362	0.406
2004	0.377	0.324	0.393	0.455
2005	0.344	0.296	0.373	0.458
2006	0.359	0.310	0.409	0.534

	Fcurr/ MFMT			
Year	Deterministic	low CI	Median	upp CI
1983	0.914	0.784	0.854	0.919
1984	0.745	0.637	0.695	0.749
1985	0.754	0.645	0.704	0.758
1986	1.010	0.863	0.943	1.016
1987	0.804	0.684	0.751	0.808
1988	0.613	0.521	0.572	0.616
1989	0.623	0.528	0.581	0.625
1990	0.669	0.566	0.625	0.672
1991	0.683	0.575	0.638	0.684
1992	0.815	0.680	0.762	0.817
1993	0.974	0.802	0.912	0.977
1994	0.937	0.758	0.878	0.940
1995	0.831	0.658	0.780	0.835
1996	0.906	0.703	0.852	0.913
1997	1.154	0.873	1.086	1.165
1998	1.025	0.746	0.965	1.043
1999	0.783	0.530	0.737	0.814
2000	0.705	0.477	0.666	0.739
2001	0.725	0.517	0.687	0.747
2002	0.718	0.551	0.684	0.740
2003	0.771	0.628	0.741	0.814
2004	0.893	0.725	0.877	0.983
2005	0.984	0.811	0.985	1.150
2006	1.006	0.869	1.076	1.306

Table A2.3.2. Trends in spawning stock (eggs) and fishing mortality for **Gulf** king mackerel.

	SSB VPA estimated value Million hydrated eggs			
Year	**Deterministic**	**low CI**	**Median**	**upp CI**
1981	2123	2103	2111	2124
1982	2036	2015	2023	2036
1983	1555	1532	1541	1556
1984	1590	1565	1574.5	1591
1985	1502	1473	1484	1503
1986	1532	1495	1509	1534
1987	1590	1543	1561	1592
1988	1731	1676	1697	1733
1989	1748	1680	1706	1751
1990	1885	1796	1830	1888
1991	2040	1929	1972	2045
1992	2215	2072	2126.5	2220
1993	2245	2070	2137.5	2252
1994	2265	2052	2134	2273
1995	2210	1932	2038.5	2220
1996	2340	1987	2123	2353
1997	2443	2006	2174	2459
1998	2509	1979	2185.5	2531
1999	2658	2036	2286.5	2700
2000	2788	2106	2396.5	2850
2001	2876	2162	2487	2968
2002	2873	2180	2526	3032
2003	2872	2226	2578	3091
2004	2955	2343	2728	3218
2005	3285	2645	3116	3644
2006	3921	3224	3846	4512

	SSB/MSST			
Year	**Deterministic**	**low CI**	**Median**	**upp CI**
1981	0.811	0.804	0.807	0.812
1982	0.778	0.770	0.773	0.779
1983	0.594	0.586	0.589	0.595
1984	0.607	0.598	0.602	0.608
1985	0.574	0.563	0.567	0.575
1986	0.585	0.572	0.577	0.586
1987	0.607	0.590	0.597	0.608
1988	0.661	0.641	0.649	0.662
1989	0.668	0.643	0.652	0.669
1990	0.720	0.687	0.700	0.722
1991	0.779	0.738	0.754	0.782
1992	0.846	0.792	0.813	0.849
1993	0.857	0.792	0.817	0.861
1994	0.865	0.785	0.816	0.869
1995	0.844	0.739	0.779	0.849
1996	0.894	0.760	0.811	0.900
1997	0.933	0.767	0.831	0.940
1998	0.958	0.757	0.835	0.967
1999	1.015	0.779	0.874	1.032
2000	1.065	0.806	0.916	1.089
2001	1.098	0.828	0.951	1.134
2002	1.097	0.834	0.966	1.159
2003	1.097	0.851	0.987	1.180
2004	1.129	0.896	1.043	1.227
2005	1.255	1.012	1.191	1.394
2006	1.498	1.237	1.471	1.725

	F apical VPA estimate fishing mortality rate			
Year	**Deterministic**	**low CI**	**Median**	**upp CI**
1981	0.340	0.340	0.342	0.343
1982	1.008	1.008	1.012	1.014
1983	0.413	0.413	0.414	0.415
1984	0.427	0.427	0.429	0.430
1985	0.558	0.558	0.561	0.563
1986	0.556	0.556	0.561	0.565
1987	0.493	0.492	0.499	0.504
1988	0.368	0.367	0.383	0.393
1989	0.548	0.548	0.557	0.563
1990	0.422	0.421	0.439	0.449
1991	0.568	0.568	0.586	0.597
1992	0.713	0.711	0.732	0.745
1993	0.508	0.505	0.552	0.584
1994	0.681	0.679	0.707	0.724
1995	0.537	0.535	0.582	0.614
1996	0.378	0.375	0.420	0.451
1997	0.294	0.292	0.336	0.369
1998	0.313	0.311	0.362	0.401
1999	0.346	0.306	0.339	0.365
2000	0.313	0.259	0.286	0.313
2001	0.212	0.191	0.214	0.239
2002	0.177	0.158	0.185	0.220
2003	0.225	0.202	0.263	0.332
2004	0.223	0.176	0.210	0.257
2005	0.239	0.195	0.233	0.279
2006	0.288	0.212	0.254	0.313

	Fcurr/ MFMT			
Year	**Deterministic**	**low CI**	**Median**	**upp CI**
1983	1.446	1.385	1.530	1.647
1984	1.434	1.376	1.520	1.637
1985	1.398	1.347	1.489	1.607
1986	1.343	1.294	1.431	1.544
1987	1.440	1.387	1.532	1.654
1988	1.613	1.558	1.726	1.863
1989	1.846	1.790	1.983	2.141
1990	1.754	1.713	1.899	2.053
1991	2.027	1.974	2.187	2.367
1992	1.866	1.829	2.032	2.199
1993	1.984	1.957	2.186	2.382
1994	1.942	1.924	2.169	2.373
1995	2.095	2.077	2.365	2.603
1996	1.898	1.889	2.159	2.379
1997	1.536	1.516	1.754	1.935
1998	1.267	1.233	1.424	1.570
1999	1.231	1.165	1.323	1.453
2000	1.273	1.153	1.290	1.412
2001	1.132	0.974	1.119	1.236
2002	0.854	0.738	0.843	0.942
2003	0.765	0.709	0.826	0.958
2004	0.778	0.692	0.810	0.952
2005	0.826	0.728	0.899	1.106
2006	0.827	0.714	0.828	0.969

ANNEX 2

Table A2.4.1. Yield projections at $F_{current}$, 65%$F_{30\%SPR}$, 75%$F_{30\%SPR}$, 85%$F_{30\%SPR}$, $F_{30\%SPR}$, and $F_{40\%SPR}$ for the Final model and three alternative management areas for the Atlantic king mackerel (deterministic run, in million lbs).

Projections Final Model

Year	F30%SPR	F40%SPR	F 85%SPR30	F 75%SPR30	F 65%SPR30	Fcurrent
2007	9.277	9.277	9.277	9.277	9.277	9.277
2008	9.453	6.669	8.170	7.291	6.391	9.504
2009	9.248	6.956	8.236	7.498	6.706	9.288
2010	9.154	7.240	8.344	7.718	7.017	9.184
2011	9.132	7.522	8.477	7.943	7.319	9.156
2012	8.860	7.476	8.314	7.851	7.295	8.880
2013	8.788	7.549	8.309	7.893	7.379	8.805
2014	8.794	7.665	8.369	7.985	7.507	8.810
2015	8.737	7.672	8.338	7.979	7.520	8.750
2016	8.704	7.685	8.327	7.981	7.538	8.717

Projections adjusted for Dade-Monroe management unit

Year	F30%SPR	F40%SPR	F 85%SPR30	F 75%SPR30	F 65%SPR30	Fcurrent
2007	10.264	10.264	10.264	10.264	10.264	10.264
2008	11.326	8.079	9.784	8.726	7.645	10.906
2009	11.205	8.493	9.965	9.062	8.096	10.843
2010	10.915	8.692	9.941	9.188	8.346	10.644
2011	10.548	8.743	9.791	9.172	8.447	10.363
2012	9.999	8.495	9.391	8.871	8.244	9.871
2013	9.738	8.421	9.220	8.762	8.194	9.642
2014	9.612	8.427	9.157	8.741	8.218	9.534
2015	9.501	8.392	9.079	8.692	8.195	9.432
2016	9.427	8.372	9.031	8.661	8.182	9.366

Projections adjusted for Council boundary management unit

Year	F30%SPR	F40%SPR	F 85%SPR30	F 75%SPR30	F 65%SPR30	Fcurrent
2007	11.082	11.082	11.082	11.082	11.082	11.082
2008	12.312	8.791	10.636	9.486	8.310	11.813
2009	12.192	9.247	10.842	9.858	8.807	11.762
2010	11.861	9.450	10.802	9.983	9.068	11.539
2011	11.432	9.480	10.611	9.940	9.154	11.211
2012	10.815	9.194	10.158	9.596	8.917	10.663
2013	10.516	9.099	9.957	9.463	8.850	10.401
2014	10.367	9.093	9.877	9.429	8.865	10.273
2015	10.242	9.052	9.789	9.372	8.836	10.159
2016	10.159	9.027	9.734	9.335	8.819	10.085

Projections status quo catch Mixing-winter all GOM unit

Year	F30%SPR	F40%SPR	F 85%SPR30	F 75%SPR30	F 65%SPR30	Fcurrent
2007	7.756	7.756	7.756	7.756	7.756	7.756
2008	8.710	6.149	7.535	6.729	5.902	8.071
2009	8.221	6.202	7.335	6.687	5.990	7.747
2010	7.981	6.340	7.291	6.757	6.153	7.619
2011	7.897	6.543	7.355	6.905	6.376	7.617
2012	7.502	6.347	7.050	6.665	6.199	7.271
2013	7.423	6.389	7.026	6.682	6.252	7.222
2014	7.405	6.466	7.055	6.737	6.338	7.229
2015	7.330	6.442	7.002	6.702	6.318	7.167
2016	7.293	6.444	6.982	6.695	6.325	7.139

Table A2.4.2. Yield projections at $F_{current}$, 65%$F_{30\%SPR}$, 75%$F_{30\%SPR}$, 85%$F_{30\%SPR}$, $F_{30\%SPR}$, and $F_{40\%SPR}$ for the Final model and three alternative management areas for the Gulf king mackerel (deterministic run, in million lbs).

Projections Final Model

Year	F30%SPR	F40%SPR	F 85%SPR30	F 75%SPR30	F 65%SPR30	Fcurrent
2007	11.810	11.810	11.810	11.810	11.810	11.810
2008	17.130	12.610	14.778	13.162	11.513	14.394
2009	17.491	13.543	15.496	14.050	12.513	15.157
2010	16.286	13.223	14.791	13.640	12.357	14.526
2011	14.240	12.046	13.215	12.366	11.369	13.023
2012	12.432	10.834	11.715	11.080	10.300	11.576
2013	11.277	10.018	10.732	10.221	9.568	10.622
2014	10.503	9.438	10.053	9.614	9.041	9.958
2015	10.148	9.200	9.755	9.361	8.834	9.672
2016	9.886	9.015	9.533	9.165	8.669	9.456

Projections adjusted for Dade-Monroe management unit

Year	F30%SPR	F40%SPR	F 85%SPR30	F 75%SPR30	F 65%SPR30	Fcurrent
2007	10.823	10.823	10.823	10.823	10.823	10.823
2008	15.258	11.200	13.164	11.726	10.258	12.992
2009	15.535	12.006	13.768	12.486	11.124	13.602
2010	14.524	11.772	13.194	12.170	11.028	13.067
2011	12.823	10.826	11.900	11.137	10.242	11.816
2012	11.293	9.814	10.638	10.060	9.351	10.585
2013	10.326	9.145	9.822	9.351	8.753	9.785
2014	9.685	8.677	9.265	8.858	8.330	9.234
2015	9.384	8.480	9.014	8.647	8.159	8.990
2016	9.162	8.328	8.828	8.485	8.024	8.807

Projections adjusted for Council boundary management unit

Year	F30%SPR	F40%SPR	F 85%SPR30	F 75%SPR30	F 65%SPR30	Fcurrent
2007	10.005	10.005	10.005	10.005	10.005	10.005
2008	14.271	10.488	12.312	10.967	9.594	12.085
2009	14.548	11.252	12.891	11.690	10.413	12.683
2010	13.578	11.013	12.333	11.375	10.307	12.172
2011	11.940	10.088	11.080	10.369	9.535	10.968
2012	10.477	9.115	9.871	9.335	8.678	9.794
2013	9.549	8.467	9.084	8.650	8.097	9.026
2014	8.930	8.010	8.545	8.171	7.683	8.495
2015	8.643	7.820	8.305	7.967	7.518	8.262
2016	8.431	7.673	8.126	7.811	7.387	8.088

Projections status quo catch Mixing-winter all GOM unit

Year	F30%SPR	F40%SPR	F 85%SPR30	F 75%SPR30	F 65%SPR30	Fcurrent
2007	14.266	14.266	14.266	14.266	14.266	14.266
2008	25.155	18.371	21.663	19.286	16.868	17.167
2009	24.956	19.180	22.068	20.000	17.805	18.082
2010	22.862	18.481	20.754	19.143	17.346	17.577
2011	19.698	16.685	18.323	17.176	15.820	15.999
2012	16.837	14.775	15.946	15.135	14.118	14.257
2013	14.601	13.102	13.986	13.380	12.586	12.696
2014	12.897	11.693	12.416	11.925	11.263	11.354
2015	12.086	11.039	11.676	11.244	10.653	10.734
2016	11.548	10.591	11.177	10.781	10.232	10.307