

## Comprehensive ACL Amendment Actions & Alternatives

### Action 1. Consider designating some snapper-grouper species as ecosystem component species.

Table 1. Commercial and recreational landings from the snapper-grouper complex from 2005-2008 (lbs whole weight).  
Com = commercial; HB = headboat; CB = charter boat; OR = other recreational.

	2005				2006				2007				2008			
	COM	HB	CB	OR	COM	HB	CB	OR	COM	HB	CB	COM	HB	CB	OR	COM
<b>GAG</b>	671,043	84,649	143,449	375,188	614,572	54,914	110,863	370,390	713,197	78,859	105,946	420,479	539,700	39,105	64,679	567,565
<b>RED GROUPE</b>	424,193	75,452	27,546	181,115	469,238	33,244	53,071	430,062	606,358	44,569	91,758	510,777	534,171	20,786	69,372	1,020,082
<b>RED HIND</b>	14,915	462	207	101	89,684	718	1,140	1,168	534,171	3,905	106	4,804	173,333	707	29	6,845
<b>ROCK HIND</b>	17,369	7,713	783	7,184	30,615	4,539	1,373	1,918	20,519	12,402	342	12,190	22,114	3,773	218	2,705
<b>YELLOWMOUH GROUPE</b>	46	2,047	403	2,923	86	1,019	0	0	0	2,030	1,944	7,061	169	341	0	0
<b>TIGER GROUPE</b>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>BLACK GROUPE</b>	208,225	22,912	3,236	60,007	183,047	16,471	0	19,484	153,038	17,404	2,888	44,149	76,107	3,164	2,892	34,500
<b>YELLOWFIN GROUPE</b>	3,104	712	0	0	9,312	892	0	33,287	7,336	1,629	0	0	3,858	191	0	0
<b>GRAYSBY</b>	1,332	8,321	1,102	12,959	525	7,179	1,728	10,494	292	12,877	313	2,083	448	3,214	910	906
<b>CONEY</b>	9	185	445	0	7	95	0	417	11	121	84	1098	2	90	51	2555
<b>SCAMP</b>	309,131	57,689	32,588	31,786	356,302	64,301	59,842	67,619	364,106	100,016	31,208	98,720	280,381	28,729	15,022	58,166
<b>GOLIATH GROUPE</b>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>NASSAU GROUPE</b>	0	62	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>SNOWY GROUPE</b>	263,378	1,617	31,656	0	274,181	669	166,901	0	142,547	308	25,093	1,881	95,742	91	14,919	0
<b>YELLOWEDGE GROUPE</b>	59,949	66	1,561	0	51,495	53	0	0	40,074	0	0	0	56,733	0	152	0
<b>WARSAW GROUPE</b>	3,695	1,588	0	0	2,242	607	6,616	0	1,607	791	2,522	17,732	1,522	1,151	0	13,955
<b>SPECKLED HIND</b>	25,094	826	0	40	16,209	1,126	5,064	1,005	13,339	1,220	68	362	8,418	1,657	0	474
<b>MISTY GROUPE</b>	651	0	0	0	367	0	0	0	4,027	4	0	0	1,744	0	0	0
<b>TILEFISH (GOLDEN)</b>	315,812	0	195,808	44,432	447,772	0	33,909	10,152	342,755	0	0	4,782	374,040	0	0	0
<b>BLUELINE TILEFISH</b>	133,856	838	35,983	0	190,620	957	105,755	155,034	77,292	192	323,602	65,353	426,908	65	253,234	134,154
<b>QUEEN SNAPPER</b>	8,860	0	0	1,409	4,448	0	0	0	7,563	0	0	0	4,904	0	0	0

	2005				2006				2007				2008			
	COM	HB	CB	OR	COM	HB	CB	OR	COM	HB	CB	COM	HB	CB	OR	COM
<b>YELLOWTAIL SNAPPER</b>	1,321,563	147,469	47,200	261,634	1,231,049	83,328	35,948	254,087	952,792	85,184	51,255	314,298	1,362,324	91,142	18,922	242,970
<b>MUTTON SNAPPER</b>	167,600	61,505	68,250	311,525	166,604	70,026	24,914	322,278	134,816	57,073	35,435	490,212	108,104	42,220	14,325	523,426
<b>GRAY (MANGROVE) SNAPPER</b>	161,184	74,928	63,054	453,744	134,084	74,894	13,832	603,124	133,729	78,420	14,733	850,588	117,142	48,028	135,235	417,765
<b>LANE SNAPPER</b>	9,765	24,064	17,337	62,860	9,327	21,052	4,667	46,046	6,597	13,732	4,998	79,676	6,899	21,566	5,212	82,031
<b>MAHOGANY SNAPPER</b>	2	0	0	0	0	0	0	0	0	0	0	0	38	43	0	0
<b>DOG SNAPPER</b>	148	21	57	428	499	314	0	556	253	50	602	15,900	559	673	0	0
<b>SCHOOL-MASTER</b>	4	671	0	399	14	657	0	5,622	1	160	0	3,935	689	523	0	2,379
<b>CUBERA SNAPPER</b>	1,633	705	0	3,162	3,801	4,263	1,360	0	4,719	11,789	0	0	7,263	3,870	0	0
<b>SAND TILEFISH</b>	5,697	963	0	317	2,709	436	0	414	1,881	799	498	395	405	2,607	739	13,208
<b>PUDDINGWIFE</b>	0	8	0	0	0	0	0	829	0	0	0	0	0	8		
<b>HOGFISH</b>	35,755	1,043	551	110,743	37,353	1,259	0	57,137	36,422	4,156	0	149,353	49,632	1,078	1,265	53,642
<b>VERMILION SNAPPER</b>	1,120,323	311,975	105,356	165,912	849,390	402,349	115,250	175,931	1,074,968	613,792	107,097	240,744	1,158,518	301,173	76,672	299,294
<b>SILK SNAPPER</b>	34,980	2,217	0	866	23,534	1,497	0	185	18,262	3,765	1,027	0	20,051	1,044	567	0
<b>RED SNAPPER</b>	132,006	58,695	116,716	145,572	89,910	41,431	100,444	139,752	116,934	38,448	57,150	245,006	233,267	115,308	151,987	544,768
<b>BLACK SNAPPER</b>	0	0	0	0	228	0	0	0	16	0	0	0	382	0	0	0
<b>BLACKFIN SNAPPER</b>	934	7	0	0	774	20	0	0	197	64	472	712	52	86	20	0
<b>GRAY TRIGGERFISH</b>	0	74,928	42,414	238,122	0	82,523	35,280	173,213	0	133,343	109,207	267,656	0	90,624	37,734	365,966
<b>OCEAN TRIGGERFISH</b>	0	1,133	1,202	4,378	0	1,266	1,448	51	0	270	871	6,254	0	468	205	7,690
<b>QUEEN TRIGGERFISH</b>	0	1,183	0	49	0	1,179	86	0	0	3,405	1,484	198	0	644	146	0
<b>ATLANTIC SPADEFISH</b>	46,134	370	0	94,057	34,209	430	3,488	257,086	29,527	82	0	182,205	22,954	164	0	253,347
<b>GREATER AMBERJACK</b>	813,044	33,442	303,551	108,010	473,621	39,782	226,055	385,203	498,798	115,209	432,249	446,119	622,059	75,026	614,991	655,126
<b>LESSER AMBERJACK</b>	8,132	98	2,339	77	3,745	386	0	2,169	4,268	14,949	0	185	1,151	82	0	4,879
<b>ALMACO JACK</b>	91,003	23,797	29,729	13,055	111,763	31,445	67,888	65,212	155,738	45,336	25,867	107,589	173,161	26,692	51,722	45,922
<b>BANDED RUDDERFISH</b>	35,776	44,220	12,668	6,902	31,775	99,624	5,009	45,530	29,956	48,228	6,709	52,290	27,196	52,109	12,599	95,730

	2005				2006				2007				2008				
	COM	HB	CB	OR	COM	HB	CB	OR	COM	HB	CB	COM	HB	CB	OR	COM	
<b>YELLOW JACK</b>	0	168	0	29,491	0	55	0	11,082	0	59	602	7,485	0	59	0	0	
<b>BLUE RUNNER</b>	143,254	20,510	21,142	477,611	164,525	12,359	23,585	1,136,987	136,058	5,866	22,919	873,090	199,128	16,336	15,487	810,056	
<b>BAR JACK</b>	3,982	595	756	3,783	4,439	419	0	355	7,036	263	0	0	4,275	71	5,994	5714	
<b>CREVALLE JACK</b>	183,737	3,204	3,399	737,207	191,250	3,976	2,769	407,161	163,687	2,431	10,187	530,251	245,868	515	1,986	525,705	
<b>RED PORGY</b>	47,870	42,142	10,386	36,942	83,276	67,678	19,050	25,027	141,521	117,334	41,784	33,629	165,327	52,598	34,220	72,234	
<b>WHITE GRUNT</b>	18,469	163,780	46,047	147,915	35,219	160,199	73,058	174,683	0	262,320	82,232	232,703	0	119,113	47,110	312,918	
<b>PORKFISH</b>	0	2,086	295	7,716	0	2,111	0	0	0	765	0	20,249	0	507	0	10,309	
<b>MARGATE</b>	2,624	3,566	82	27,443	4,144	6,053	157	17,663	2,715	7,689	0	17,555	2,916	1,253	84	626	
<b>BLACK MARGATE</b>	0	217	917	60,640	0	1,340	97	36,539	0	17	0	62,363	0	569	185	52,758	
<b>TOMTATE</b>	0	19,180	2,211	21,714	0	26,273	4,032	27,840	0	18,372	957	43,737	0	15,879	60	29,797	
<b>BLUESTRIPED GRUNT</b>	0	4,732	53	25,258	0	4,564	0	70,320	0	3,244	97	63,990	0	3,495	0	34,015	
<b>FRENCH GRUNT</b>	0	0	0	0	0	0	0	0	0	66	0	0	0	0	0	1,704	
<b>SPANISH GRUNT</b>	0	0	0	0	0	0	0	688	0	0	0	0	0	0	0	0	
<b>SMALLMOUTH GRUNT</b>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<b>COTTONWICK</b>	0	0	0	0	0	0	0	0	0	20	0	0	0	20	0	0	
<b>SAILORS CHOICE</b>	0	0	1,312	4,359	0	0	818	728	0	0	362	11,193	0	106	40	14,167	
<b>GRASS PORGY</b>	0	0	0	273	0	0	0	0	0	2	0	0	0	7	42	0	
<b>JOLTHEAD PORGY</b>	6,367	13,116	12,888	13,571	2,513	10,842	3,596	11,592	3,505	19,783	1,440	14,542	6,609	10,023	2,482	46,458	
<b>SAUCEREYE PORGY</b>	0	207	540	1,803	0	1,509	77	591	0	892	267	0	0	685	0	0	
<b>WHITEBONE PORGY</b>	0	4,834	567	18,188	0	5,681	844	7,086	0	8,036	4,971	21,790	0	4,244	342	26,860	
<b>KNOBBED PORGY</b>	14,421	6,765	8,622	11,274	22,517	11,324	1,008	5,130	19,386	14,643	2,630	2,815	23,883	6,182	2,178	5,511	
<b>LONGSPINE PORGY</b>	32	0	0	0	16	0	0	0	13	17	0	0	0	0	0	0	
<b>SHEEPSHEAD</b>	227,153	66	18,241	1,605,486	222,004	3	2,121	1,447,423	235,731	6	6,768	1,998,488	262,333	19	18,245	2,263,372	
<b>SCUP</b>	352,715	10,412	0	2,617	232,707	8,797	31	8,532	66,979	6,764	18	3,889	203,064	5,716	0	18,508	
<b>BLACK SEA BASS</b>	468,487	179,657	100,446	629,322	559,928	174,064	92,979	643,619	379,512	162,067	86,546	582,545	405,088	99,309	49,096	406,550	
<b>ROCK SEA BASS</b>	166	1	0	360	583	0	18	922	1,413	0	0	1,631	272	0	0	4,447	
<b>BANK SEA BASS</b>	492	6,043		2,206	901	6,215	227	4,853	126	2,197	192	3,627	195	2,532	64	2,581	
<b>*WRECKFISH</b>																	

\*Wreckfish landings are confidential

**Alternative 1.** No Action (Status quo).

**Alternative 2.** Designate species with state and federal (combined) landings that are less than, or equal to 1,000 lbs, as ecosystem component species.

Table 2. Eleven species from Snapper-Grouper FMU with total state and federal (combined) landings from all sectors, that are less than or equal to 1,000 lbs, from 2005-2008.\*

COMMON NAME	AVERAGE LBS (whole weight); 2005-2008				
	COMM	HEAD-BOAT	CHARTER BOAT	OTHER REC	≤ 1000 LBS
TIGER GROUPE	0	0	0	0	0
MAHOGANY SNAPPER	10	11	0	0	21
BLACK SNAPPER	157	0	0	0	157
BLACKFIN SNAPPER	489	44	123	178	834
FRENCH GRUNT	0	17	0	426	443
SPANISH GRUNT	0	0	0	172	172
SMALLMOUTH GRUNT	0	0	0	0	0
COTTONWICK	0	10	0	0	10
GRASS PORGY	0	2	11	68	81
LONGSPINE PORGY	15	4	0	0	19
PUDDINGWIFE	0	4	0	207	211

**Alternative 3.** Designate species with state and federal (combined) landings that are less than, or equal to 2,500 lbs, as ecosystem component species.

Table 3. Sixteen species from Snapper-Grouper FMU with total state and federal (combined) landings from all sectors, that are less than or equal to 2,500 lbs, from 2005-2008.\*

COMMON NAME	AVERAGE LBS (whole weight); 2005-2008				
	COMM	HEAD-BOAT	CHARTER BOAT	OTHER REC	≤ 2500 LBS
TIGER GROUPE	0	0	0	0	0
CONEY	7	123	145	1,018	1,292
ROCK SEA BASS	609	0	5	1,840	2,453
MISTY GROUPE	1,697	1	0	0	1,698
MAHOGANY SNAPPER	10	11	0	0	21
BLACK SNAPPER	157	0	0	0	157
BLACKFIN SNAPPER	489	44	123	178	834
QUEEN TRIGGERFISH	0	1,603	429	62	2,093
FRENCH GRUNT	0	17	0	426	443
SPANISH GRUNT	0	0	0	172	172
SMALLMOUTH GRUNT	0	0	0	0	0
COTTONWICK	0	10	0	0	10
GRASS PORGY	0	2	11	68	81
SAUCEREYE PORGY	0	823	221	599	1,643
LONGSPINE PORGY	15	4	0	0	19
PUDDINGWIFE	0	4	0	207	211

**Alternative 4.** Designate species with state and federal (combined) landings that are less than, or equal to 5,000 lbs, as ecosystem component species.

Table 4. Eighteen species from Snapper-Grouper FMU with total state and federal (combined) landings from all sectors, that are less than or equal to 5,000 lbs, from 2005-2008.\*

COMMON NAME	AVERAGE LBS (whole weight); 2005-2008				
	COMM	HEAD-BOAT	CHARTER BOAT	OTHER REC	≤ 5000 LBS
<b>YELLOWMOUTH GROUPE</b>	75	1,359	587	2,496	<b>4,517</b>
<b>TIGER GROUPE</b>	0	0	0	0	<b>0</b>
<b>CONEY</b>	7	123	145	1,018	<b>1,292</b>
<b>ROCK SEA BASS</b>	609	0	5	1,840	<b>2,453</b>
<b>MISTY GROUPE</b>	1,697	1	0	0	<b>1,698</b>
<b>MAHOGANY SNAPPER</b>	10	11	0	0	<b>21</b>
<b>SCHOOLMASTER</b>	177	503	0	3,084	<b>3,764</b>
<b>BLACK SNAPPER</b>	157	0	0	0	<b>157</b>
<b>BLACKFIN SNAPPER</b>	489	44	123	178	<b>834</b>
<b>QUEEN TRIGGERFISH</b>	0	1,603	429	62	<b>2,093</b>
<b>FRENCH GRUNT</b>	0	17	0	426	<b>443</b>
<b>SPANISH GRUNT</b>	0	0	0	172	<b>172</b>
<b>SMALLMOUTH GRUNT</b>	0	0	0	0	<b>0</b>
<b>COTTONWICK</b>	0	10	0	0	<b>10</b>
<b>GRASS PORGY</b>	0	2	11	68	<b>81</b>
<b>SAUCEREYE PORGY</b>	0	823	221	599	<b>1,643</b>
<b>LONGSPINE PORGY</b>	15	4	0	0	<b>19</b>
<b>PUDDINGWIFE</b>	0	4	0	207	<b>211</b>

\*Note: Commercial data from 2005-2008 were examined (Tables 1, 2, and 3). Data are based on general canvas data summarized by Linda Hardy Bernstein (4-25-03) and Jack McGovern (May 2009). These represent landings for the South Atlantic including all of Monroe County. Headboat data were summarized by Jennifer Potts (4-28-03) and Jack McGovern. These represent landing for the South Atlantic to the Dry Tortugas. Charter boat and other recreational data were obtained using MRFSS' online custom query feature and summarized by Heather Blough (May 2003) and Jack McGovern (May 2009). These represent data (weight not numbers) for the South Atlantic and do not include Monroe County. Data represent observed and reported harvest only; not fish released alive. In cases where no data were recorded for a species, charter boat and/or other recreational landings were assumed to be zero.

**Action 2.** Remove species with low occurrence in federal waters from the Snapper-Grouper FMU.

**Alternative 1.** No Action (Status quo).

**Alternative 2.** Remove species with 95% of landings in state waters.

Table 5. Eleven species with >95% estimated landings (lbs, whole weight) from MRFSS (2005-2008) from state waters (SEFSC ACL dataset).

COMMON NAME	2005		2006		2007		2008		TOTAL			% STATE	TOP STATE	
	EEZ	STATE	EEZ	STATE	EEZ	STATE	EEZ	STATE	EEZ	STATE	TOTAL		MRFSS	HB
<b>GOLIATH GROUPE</b>	0	0	0	0	0	0	0	2,729	0	2,729	<b>2,729</b>	100%	EFL	EFL
<b>YELLOW JACK</b>	0	29,556	0	12,062	261	21,980	1,905	94,807	2,166	158,404	<b>160,570</b>	99%	EFL	EFL
<b>CREVALLE JACK</b>	16,072	724,534	11,228	399,058	11,046	529,392	13,425	514,265	51,771	2,167,249	<b>2,219,020</b>	98%	EFL	EFL
<b>SPANISH GRUNT</b>	0	0	0	688	0	0	0	0	0	688	<b>688</b>	100%	EFL	EFL
<b>FRENCH GRUNT</b>	0	0	0	270	0	2,965	0	1,703	0	4,938	<b>4,938</b>	100%	EFL	EFL
<b>MARGATE</b>	47	28,480	843	16,763	0	17,554	0	4,210	889	67,007	<b>67,896</b>	99%	EFL	NC
<b>PORKFISH</b>	1748	17,046	373	1,891	900	47,481	309	10,533	3,330	76,950	<b>80,280</b>	96%	EFL	EFL
<b>BLUESTRIPE</b>	811	24,500	0	70,320	1,346	62,742	1,234	37,755	3,391	195,318	<b>198,709</b>	98%	EFL	EFL
<b>BLACK MARGATE</b>	1,832	63,437	4,296	38,968	25	66,304	1,559	51,386	7,713	220,096	<b>227,809</b>	97%	EFL	EFL
<b>GRASS PORGY</b>	0	1,673	0	0	0	389	42	456	42	2,518	<b>2,560</b>	98%	EFL	EFL
<b>SHEEPSHEAD</b>	34,113	1,589,612	44,124	1,405,536	55,851	1,949,463	30,409	2,251,209	164,498	7,195,821	<b>7,360,319</b>	98%	EFL	SC

Note: Recreational data from 2005-2008 were examined (LAPP/DMB, October 2009) to determine the species predominantly caught in state waters, and hence consider removing them from the Snapper-Grouper FMU. Tables 4, 5, and 6 represent data from the SEFSC ACL Recreational Landings dataset, which contains monthly estimates of MRFSS and headboat landings by species. Species were categorized according to their total landings level and the percent of state vs. federal landings. Note this analysis could only be performed for MRFSS from this dataset due to the lack of spatial information for headboat and commercial data relative to EEZ. Species have been sorted in ascending order by cumulative landings. The state reporting the highest landings in MRFSS and headboat ('HB') is also listed.

Tiger grouper, black snapper, and smallmouth grunt did not have any reported landings.

**Alternative 3.** Remove species with 90% of landings in state waters.

Table 6. Twelve species with >90% estimated landings (lbs, whole weight) from MRFSS (2005-2008) from state waters (SEFSC ACL dataset).

COMMON NAME	2005		2006		2007		2008		TOTAL			% STATE	TOP STATE	
	EEZ	STATE	EEZ	STATE	EEZ	STATE	EEZ	STATE	EEZ	STATE	TOTAL		MRFSS	HB
<b>GOLIATH GROUPE</b>	0	0	0	0	0	0	0	2,729	0	2,729	<b>2,729</b>	100%	EFL	EFL
<b>YELLOW JACK</b>	0	29,556	0	12,062	261	21,980	1,905	94,807	2,166	158,404	<b>160,570</b>	99%	EFL	EFL
<b>CREVALLE JACK</b>	16,072	724,534	11,228	399,058	11,046	529,392	13,425	514,265	51,771	2,167,249	<b>2,219,020</b>	98%	EFL	EFL
<b>SPANISH GRUNT</b>	0	0	0	688	0	0	0	0	0	688	<b>688</b>	100%	EFL	EFL
<b>FRENCH GRUNT</b>	0	0	0	270	0	2,965	0	1,703	0	4,938	<b>4,938</b>	100%	EFL	EFL
<b>MARGATE</b>	47	28,480	843	16,763	0	17,554	0	4,210	889	67,007	<b>67,896</b>	99%	EFL	NC
<b>PORKFISH</b>	1748	17,046	373	1,891	900	47,481	309	10,533	3,330	76,950	<b>80,280</b>	96%	EFL	EFL
<b>BLUESTRIPE</b>														
<b>GRUNT</b>	811	24,500	0	70,320	1,346	62,742	1,234	37,755	3,391	195,318	<b>198,709</b>	98%	EFL	EFL
<b>BLACK MARGATE</b>	1,832	63,437	4,296	38,968	25	66,304	1,559	51,386	7,713	220,096	<b>227,809</b>	97%	EFL	EFL
<b>SAILORS CHOICE</b>	1868	35,152	863	2,934	1,752	19,417	892	15,285	5,374	72,788	<b>78,162</b>	93%	EFL	EFL
<b>GRASS PORGY</b>	0	1,673	0	0	0	389	42	456	42	2,518	<b>2,560</b>	98%	EFL	EFL
<b>SHEEPSHEAD</b>	34,113	1,589,612	44,124	1,405,536	55,851	1,949,463	30,409	2,251,209	164,498	7,195,821	<b>7,360,319</b>	98%	EFL	SC

**Alternative 4.** Remove species with 80% of landings in state waters.

Table 7. Twenty species with >80% estimated landings (lbs, whole weight) from MRFSS (2005-2008) from state waters (SEFSC ACL dataset).

COMMON NAME	2005		2006		2007		2008		TOTAL			% STATE	TOP STATE	
	EEZ	STATE	EEZ	STATE	EEZ	STATE	EEZ	STATE	EEZ	STATE	TOTAL		MRFSS	HB
<b>GOLIATH GROUPE</b>	0	0	0	0	0	0	0	2,729	0	2,729	<b>2,729</b>	100%	EFL	EFL
<b>GRAYSBY</b>	1,166	8,722	2,601	7,266	259	4,410	756	8,086	4,781	28,484	<b>33,265</b>	86%	EFL	SC
<b>CUBERA SNAPPER</b>	0	2,529	646	714	0	0	4,234	22,543	4,880	25,786	<b>30,666</b>	84%	EFL	SC
<b>YELLOW JACK</b>	0	29,556	0	12,062	261	21,980	1,905	94,807	2,166	158,404	<b>160,570</b>	99%	EFL	EFL
<b>CREVALLE JACK</b>	16,072	724,534	11,228	399,058	11,046	529,392	13,425	514,265	51,771	2,167,249	<b>2,219,020</b>	98%	EFL	EFL
<b>LESSER AMBERJACK</b>	0	2,339	957	1,213	0	0	0	4,878	957	8,430	<b>9,387</b>	90%	EFL	SC
<b>SCHOOLMASTER</b>	115	863	0	5,623	1,682	4,718	803	3,824	2,599	15,028	<b>17,627</b>	85%	EFL	EFL
<b>SPANISH GRUNT</b>	0	0	0	688	0	0	0	0	0	688	<b>688</b>	100%	EFL	EFL
<b>FRENCH GRUNT</b>	0	0	0	270	0	2,965	0	1,703	0	4,938	<b>4,938</b>	100%	EFL	EFL
<b>MARGATE</b>	47	28,480	843	16,763	0	17,554	0	4,210	889	67,007	<b>67,896</b>	99%	EFL	NC
<b>PORKFISH</b>	1,748	17,046	373	1,891	900	47,481	309	10,533	3,330	76,950	<b>80,280</b>	96%	EFL	EFL
<b>BLUESTRIPED GRUNT</b>	811	24,500	0	70,320	1,346	62,742	1,234	37,755	3,391	195,318	<b>198,709</b>	98%	EFL	EFL
<b>BLACK MARGATE</b>	1,832	63,437	4,296	38,968	25	66,304	1,559	51,386	7,713	220,096	<b>227,809</b>	97%	EFL	EFL
<b>SAILORS CHOICE</b>	1,868	35,152	863	2,934	1,752	19,417	892	15,285	5,374	72,788	<b>78,162</b>	93%	EFL	EFL
<b>GRASS PORGY</b>	0	1,673	0	0	0	389	42	456	42	2,518	<b>2,560</b>	98%	EFL	EFL
<b>SAUCEREYE PORGY</b>	139	4,511	591	781	326	0	0	0	1,056	5,293	<b>6,349</b>	83%	EFL	EFL
<b>HOGFISH</b>	15,220	122,442	28,431	31,261	8,451	166,472	10,212	48,043	62,314	368,218	<b>430,532</b>	86%	EFL	SC
<b>ATLANTIC SPADEFISH</b>	0	97,844	31,335	244,004	0	181,740	100,081	153,343	131,416	676,931	<b>808,347</b>	84%	EFL	SC
<b>BLUE RUNNER</b>	98,584	400,169	1,34,699	1,025,723	256,572	639,436	135,371	717,349	625,225	2,782,677	<b>3,407,902</b>	82%	EFL	EFL
<b>SHEEPSHEAD</b>	34,113	1,589,612	44,124	1,405,536	55,851	1,949,463	30,409	2,251,209	164,498	7,195,821	<b>7,360,319</b>	98%	EFL	SC

**Alternative 5.** Remove species under the Florida Marine Life Species Rule including queen triggerfish, porkfish, and puddingwife.

Source: Florida FWCC Rule No. 68-42.001, accessed at

<https://www.flrules.org/gateway/chapterhome.asp?chapter=68B-42>

Species codes can be viewed at:

[http://myfwc.com/License/Saltwater\\_Licenses\\_RS\\_MLList.htm#](http://myfwc.com/License/Saltwater_Licenses_RS_MLList.htm#)

**Action 3.** Consider multi-species groupings for specifying ACLs, ACTs, and AMs.

**Alternative 1.** No Action (Status quo).

**Alternative 2.** Establish three species groups based on results from Shertzer and Williams (2008). For snapper-grouper species in Table 10 not covered by the assemblages, ACLs, ACTs, and AMs would be specified on an individual basis.

1. Deepwater assemblage: Blueline tilefish, snowy grouper, speckled hind, and yellowedge grouper.
2. Southern assemblage: Blue runner, gray snapper, lane snapper, mutton snapper, and yellowtail snapper.
3. Northern assemblage: Bank sea bass, black sea bass, knobbed porgy, gag, gray triggerfish, greater amberjack, red porgy, red snapper, scamp, tomtate, vermilion snapper, white grunt, and whitebone porgy.

**Alternative 3.** Use spatial and temporal patterns from Shertzer *et al.* (2009) to establish three species groups. For snapper-grouper species in Table 10 not covered by the assemblages, ACLs, ACTs, and AMs would be specified on an individual basis.

1. North Carolina and South Carolina.
2. Georgia and N. Florida (north of Cape Canaveral).
3. South Florida (south of Cape Canaveral, including the Keys).

Note: Shertzer *et al.* (2009) do not provide list of species for three different geographic areas. Would have to request information from SEFSC.

**Alternative 4.** Use information from Shertzer *et al.* (2009), to establish two species groups north and south of the Cape Canaveral zoogeographic boundary (Table 8).

Table 8. Table 3 from Shertzer *et al.* (2009).

**Table 3**

Contributions of reef fishes toward the distinction of zoogeographic regions in recreational and commercial data sets.

Species	$\bar{x}_{\text{north}}$	$\bar{x}_{\text{south}}$	$\bar{\delta}_k$	$SD(\delta_k)$	$\bar{\delta}_k/SD(\delta_k)$	$\sum \bar{\delta}_k\%$
Recreational data set						
Black sea bass	17.52	0.90	4.81	1.30	3.68	11.26
Yellowtail snapper	0.57	15.77	4.53	0.93	4.88	21.87
Mutton snapper	0.45	12.13	4.01	0.71	5.61	31.26
Blue runner	0.39	6.98	2.65	0.60	4.44	37.47
Lane snapper	2.21	6.75	2.44	1.22	2.01	43.20
Gray snapper	3.37	8.77	2.26	1.35	1.68	48.50
Red snapper	6.62	0.92	2.15	1.16	1.86	53.55
Tomtate	8.59	2.56	2.01	1.20	1.68	58.27
Whitebone porgy	5.30	0.78	2.00	0.78	2.56	62.96
Gag	9.05	2.40	1.93	0.83	2.31	67.48
Vermilion snapper	11.37	4.26	1.87	0.96	1.95	71.87
Scamp	5.75	2.61	1.76	1.07	1.64	75.99
Bluestriped grunt	0.16	2.77	1.70	0.59	2.90	79.98
White grunt	7.25	8.28	1.68	1.11	1.51	83.91
Knobbed porgy	2.78	5.43	1.55	1.03	1.51	87.54
Gray triggerfish	9.70	5.35	1.44	0.84	1.72	90.92
Red grouper	3.04	6.75	1.37	0.93	1.47	94.13
Greater amberjack	5.02	3.44	1.26	0.61	2.05	97.08
Jolthead porgy	0.87	3.16	1.25	0.75	1.66	100.00
Commercial data set						
Yellowtail snapper	1.08	30.24	8.35	3.14	2.66	17.71
Black sea bass	20.36	0.63	6.69	2.53	2.65	31.90
Blue runner	0.33	13.46	5.46	1.68	3.25	43.48
Gag	22.49	4.91	5.08	2.32	2.19	54.26
Vermilion snapper	17.26	2.43	4.60	2.44	1.88	64.01
Mutton snapper	1.06	12.47	4.48	1.22	3.68	73.51
Gray snapper	5.37	11.30	3.26	1.91	1.71	80.41
White grunt	6.84	2.56	2.4	1.52	1.58	85.51
Red grouper	9.01	3.70	1.88	1.34	1.40	89.50
Greater amberjack	11.06	8.81	1.77	1.37	1.29	93.25
Black grouper	3.67	5.64	1.76	1.19	1.48	96.98
Snowy grouper	1.48	3.86	1.42	0.85	1.68	100.00

Data are summarized by the average proportion of trips ( $\bar{x}$ , prior to transformation) that caught species in each region, north or south, with separation near Cape Canaveral, Florida. Species are ordered by their contribution ( $\bar{\delta}_k$ ) to the average dissimilarity ( $\bar{\delta}$ ) between the two zoogeographic regions, reflected in the cumulative contribution ( $\sum \bar{\delta}_k\%$ ) to  $\bar{\delta}$ . Consistency of contribution is quantified by the standard deviation (SD). Values in first four columns were multiplied by 100.

**Alternative 5.** Establish species groups following methodology used for the Gulf of Mexico and Caribbean ACL Amendments.

**Alternative 6.** Species groupings based on similar life histories (Table 9).

Table 9. Composition and division of Snapper Grouper FMU (indicator species in bold).

<b>SHALLOW WATER GROUPEr</b>	<b>SHALLOW WATER SNAPPER, TILEFISH, AND WRASSE UNIT</b>	Banded rudderfish
<b>UNIT 1</b>	<b>Yellowtail snapper</b>	Yellow jack
<b>Gag</b>	Mutton snapper	Blue runner
Red grouper	Gray (mangrove) snapper	Bar jack
Red hind	Lane snapper	Crevalle jack
Rock hind	Mahogany snapper	<b>GRUNT AND PORGY</b>
Yellowmouth grouper	Dog snapper	<b>UNIT 1</b>
Tiger grouper	Schoolmaster	<b>Red porgy</b>
Black grouper	Cubera snapper	<b>UNIT 2</b>
Yellowfin grouper	Sand tilefish	<b>White grunt</b>
Graysby	Puddingwife	Porkfish
Coney	Hogfish	Margate
Scamp		Black margate
<b>UNIT 2</b>		Tomtate
<b>Goliath grouper</b>	<b>MID-SHELF SNAPPER UNIT</b>	Bluestriped grunt
<b>UNIT 3</b>	<b>Vermilion snapper</b>	French grunt
<b>Nassau grouper</b>	Silk snapper	Spanish grunt
	Red snapper	Smallmouth grunt
<b>DEEP WATER GROUPEr AND TILEFISH UNIT</b>	Black snapper	Cottonwick
<b>Snowy grouper</b>	Blackfin snapper	Sailors choice
Yellowedge grouper		Grass porgy
Warsaw grouper	<b>TRIGGERFISH AND SPADEFISH UNIT</b>	Jolthead porgy
Speckled hind	<b>Gray triggerfish</b>	Saucereye porgy
Misty grouper	Ocean triggerfish	Whitebone porgy
Tilefish (golden)	Queen triggerfish	Knobbed porgy
Blueline tilefish	Atlantic Spadefish	Longspine porgy
Queen snapper		Sheepshead
	<b>JACK UNIT</b>	Scup
	<b>Greater amberjack</b>	<b>SEA BASS UNIT</b>
	Lesser amberjack	<b>Black sea bass</b>
	Almaco jack	Rock sea bass
		Bank sea bass

**Action 4.** Specify an ABC control rule for species not undergoing overfishing.

**Alternative 1.** No Action (Status quo).

**Alternative 2.** Establish an ABC control rule, as per SSC recommendation for assessed species.

**Alternative 3.** Establish an ABC control rule, as per SSC recommendation for non-assessed species. ABCs will be established for 62 snapper-grouper species, \*4 species of shrimp, and 2 species of *Sargassum*.  
(Awaiting SSC input)

**Alternative 4.** Establish ABCs for dolphin. Note: ABCs not based on SSC recommendations.

**Alternative 4a.** A potential ABC range = 17,541,414 – 22,938,772 pounds based on 65% to 85% of MSY Option 2 and would apply for dolphin in the Atlantic.

**Alternative 4b.** Specify ABC separately for the Atlantic at \_\_\_\_\_ pounds.

**Alternative 5.** Establish ABCs for wahoo. Note: ABCs not based on SSC recommendations.

**Alternative 5a.** A potential ABC range = a.aa – b.bb million pounds based on 65% to 85% of MSY Option 1 or 2 and would apply for wahoo in the Atlantic.

**Alternative 5b.** Specify ABC separately for the Atlantic at \_\_\_\_\_ pounds.

\*Note: The 4 species of shrimp covered under the Shrimp FMP (White shrimp, *Litopenaeus setiferus*; Pink shrimp, *Farfantepenaeus duorarum*; Brown shrimp, *Farfantepenaeus aztecus*; and Rock shrimp, *Sycionia brevirostris*) are considered annual crops, and are hence exempt from requiring ACLs and AMs (MSRA section 104(b), see also section 600.310(h)(2)). However, they still need SDC, MSY, OY, ABC, and an ABC control rule (to be specified by the SSC).

**Allocations**

**Action 5.** Specify allocations among sectors for 62 snapper-grouper species (Table 10) or species groups.

Table 10. 62 species in the Snapper-Grouper FMU not undergoing overfishing.

Almaco jack	Misty grouper
Atlantic spadefish	Mutton snapper
Banded rudderfish	Nassau grouper
Bank sea bass	Ocean triggerfish
Bar jack	Porkfish
Black margate	Puddingwife
Black snapper	Queen snapper

Blackfin snapper	Queen triggerfish
Blue runner	Red porgy
Blueline tilefish	Red hind
Bluestriped grunt	Rock hind
Coney	Rock Sea Bass
Cottonwick	Sailors choice
Crevalle jack	Sand tilefish
Cubera snapper	Saucereye porgy
Dog snapper	Scamp
French grunt	Schoolmaster
Goliath grouper	Scup
Grass porgy	Sheepshead
Gray (mangrove) snapper	Silk snapper
Gray triggerfish	Smallmouth grunt
Graysby	Spanish grunt
Greater amberjack	Tiger grouper
Hogfish	Tomtate
Jolthead porgy	Yellow jack
Knobbed porgy	Yellowedge grouper
Lane snapper	Yellowfin grouper
Lesser amberjack	Yellowmouth grouper
Longspine porgy	Yellowtail snapper
Mahogany snapper	White grunt
Margate	Whitebone porgy

**Alternative 1.** No Action (Status quo).

**Alternative 2.** Divide allocations among two sectors, commercial and recreational.

Use the following equation:

Allocation by sector = (0.5 \* catch history) + (0.5 \* current trend) whereby, catch history =1986 onward, current trend = 2005-2007 for this amendment, and 3 years rolling forward for future amendments. (As per Council motion from September, 2008).

**Alternative 3.** Divide allocations among three sectors, commercial, recreational, and for-hire.

Use the following equation:

Allocation by sector = (0.5 \* catch history) + (0.5 \* current trend) whereby, catch history =1986 onward, current trend = 2005-2007 for this amendment, and 3 years rolling forward for future amendments. (As per Council motion from September, 2008).

## **Action 6. Specify allocations among sectors for dolphin.**

**Alternative 1.** No Action (Status quo).

**Alternative 2.** Divide allocations among two sectors, commercial and recreational.

Use the following equation:

Allocation by sector =  $(0.5 * \text{catch history}) + (0.5 * \text{current trend})$  whereby, catch history = 1986 onward, current trend = 2005-2007 for this amendment, and 3 years rolling forward for future amendments. (As per Council motion from September, 2008).

**Alternative 3.** Divide allocations among three sectors, commercial, recreational, and for-hire.

Use the following equation:

Allocation by sector =  $(0.5 * \text{catch history}) + (0.5 * \text{current trend})$  whereby, catch history = 1986 onward, current trend = 2005-2007 for this amendment, and 3 years rolling forward for future amendments. (As per Council motion from September, 2008).

## **Action 7. Specify allocations among sectors for wahoo.**

**Alternative 1.** No Action (Status quo).

**Alternative 2.** Divide allocations among two sectors, commercial and recreational.

Use the following equation:

Allocation by sector =  $(0.5 * \text{catch history}) + (0.5 * \text{current trend})$  whereby, catch history = 1986 onward, current trend = 2005-2007 for this amendment, and 3 years rolling forward for future amendments. (As per Council motion from September, 2008).

**Alternative 3.** Divide allocations among three sectors, commercial, recreational, and for-hire.

Use the following equation:

Allocation by sector =  $(0.5 * \text{catch history}) + (0.5 * \text{current trend})$  whereby, catch history = 1986 onward, current trend = 2005-2007 for this amendment, and 3 years rolling forward for future amendments. (As per Council motion from September, 2008).

## **Action 8. Specify allocations among sectors for *Sargassum* seaweed.**

Note: There has been no *Sargassum* harvest in the S. Atlantic waters since 1997 (SAFMC, 2002), and this action may not be relevant.

**Alternative 1.** No Action (Status quo).

**Alternative 2.** Divide allocations among two sectors, commercial and recreational.

Use the following equation:

Allocation by sector =  $(0.5 * \text{catch history}) + (0.5 * \text{current trend})$  whereby, catch history = 1986 onward, current trend = 2005-2007 for this amendment, and 3 years rolling forward for future amendments. (As per Council motion from September, 2008).

**Alternative 3.** Divide allocations among three sectors, commercial, recreational, and for-hire. Use the following equation:

Allocation by sector =  $(0.5 * \text{catch history}) + (0.5 * \text{current trend})$  whereby, catch history = 1986 onward, current trend = 2005-2007 for this amendment, and 3 years rolling forward for future amendments. (As per Council motion from September, 2008).

## **ACLs, ACTs, and AMs**

### **Snapper-grouper**

**Action 9.** Specify ACLs for 62 snapper grouper species or species groups.

**Alternative 1.** No Action (Status quo).

**Alternative 2.**

**Alternative 3.**

**Action 10.** Specify ACTs for 62 snapper-grouper species or species groups.

**Alternative 1.** No Action (Status quo).

**Alternative 2.**

**Alternative 3.**

**Action 11.** Specify AMs for 62 snapper-grouper species or species groups.

**Alternative 1.** No Action (Status quo).

**Alternative 2.**

**Alternative 3.**

### **Dolphin**

**Action 12.** Specify ACLs for dolphin.

**Alternative 1.** No Action (Status quo).

**Alternative 2.** ACL = 17,541,414 pounds based on 65% of MSY Option 2 and would apply for dolphin in the Atlantic.

**Alternative 3.** ACL = 20,240,093 pounds based on 75% of MSY Option 2 and would apply for dolphin in the Atlantic.

**Alternative 4.** ACL = 22,938,772 pounds based on 85% of MSY Option 2 and would apply for dolphin in the Atlantic.

**Alternative 5.** Specify ACL separately for the Atlantic at \_\_\_\_\_ pounds.

**Alternative 6.** Other.

### **Action 13.** Specify ACTs for dolphin.

**Alternative 1.** No Action (Status quo).

**Alternative 2.**

**Alternative 3.**

### **Action 14.** Specify AMs for dolphin.

**Alternative 1.** No Action (Status quo).

**Alternative 2.** The commercial AM for this stock is to prohibit harvest, possession, and retention when the quota is met. All purchase and sale is prohibited when the quota is met. Implement Accountability Measures (AMs) for the recreational sector for this stock. If the ACL is exceeded, the Regional Administrator shall publish a notice to reduce the length of the following fishing year by the amount necessary to ensure landings do not exceed the sector ACL for the following fishing year. Compare recreational ACL with recreational landings over a range of years. For 2011, use only 2011 landings. For 2012, use the average landings of 2011 and 2012. For 2013 and beyond, use three-year running average.

**Alternative 3.** Allow a bag limit adjustment in the subsequent year to account for recreational overages that occur in the current year.

**Alternative 4.** Other.

## **Wahoo**

### **Action 15.** Specify ACLs for wahoo.

**Alternative 1.** No Action (Status quo).

**Alternative 2.** ACL = c.cc million pounds based on 65% of MSY Option 1 or 2 and apply to wahoo in the Atlantic.

**Alternative 3.** ACL = d.dd million pounds based on 75% of MSY Option 1 or 2 and apply to wahoo in the Atlantic.

**Alternative 4.** ACL = e.ee million pounds based on 85% of MSY Option 1 or 2 and apply to wahoo in the Atlantic.

**Alternative 5.** Specify ACL separately for the Atlantic at \_\_\_\_\_ pounds.

**Alternative 6.** Other.

## **Action 16.** Specify ACTs for wahoo.

**Alternative 1.** No Action (Status quo).

**Alternative 2.**

**Alternative 3.**

## **Action 17.** Specify AMs for wahoo.

**Alternative 1.** No Action (Status quo).

**Alternative 2.** The commercial AM for this stock is to prohibit harvest, possession, and retention when the quota is met. All purchase and sale is prohibited when the quota is met. Implement Accountability Measures (AMs) for the recreational sector for this stock. If the ACL is exceeded, the Regional Administrator shall publish a notice to reduce the length of the following fishing year by the amount necessary to ensure landings do not exceed the sector ACL for the following fishing year. Compare recreational ACL with recreational landings over a range of years. For 2011, use only 2011 landings. For 2012, use the average landings of 2011 and 2012. For 2013 and beyond, use three-year running average.

**Alternative 3.** Allow a bag limit adjustment in the subsequent year to account for recreational overages that occur in the current year.

**Alternative 4.** Other.

## ***Sargassum***

Note: *Sargassum* may be classified as an annual crop and thus be exempt from the ACL and AM requirements (MSRA section 104(b), see also section 600.310(h)(2)). Estimates of production of *S. natans* and *S. fluitans* in the western North Atlantic are typically around  $1 \text{ mgC m}^{-2} \text{ d}^{-1}$  with slightly higher values reported from more nutrient rich shelf waters. Production has been shown to double under conditions of nitrogen and phosphorus enrichment (LaPointe, 1986 and 1995). Wong and Phang (2004) studied *S. baccularia* and *S. binderi* (found offshore similar to *S. natans*) in Malaysian waters, and found that both species attained two peaks and one low in standing crop over a 15-month period. Trono and Lluisma (1990) found intra-annual patterns of variation in the standing crop of four *Sargassum* species in Philippine waters.

**Action 18.** Specify ACLs for *Sargassum* seaweed.

**Alternative 1.** No Action (Status quo).

**Alternative 2.**

**Alternative 3.**

**Action 19.** Specify ACTs for *Sargassum* seaweed.

**Alternative 1.** No Action (Status quo).

**Alternative 2.**

**Alternative 3.**

**Action 20.** Specify AMs for *Sargassum* seaweed.

**Alternative 1.** No Action (Status quo).

**Alternative 2.**

**Alternative 3.**

Modify management measures for 62 snapper-grouper species or species groups. Note: After we get ABCs and ACLs for species we will have a better idea if there is a need for any management measures.

**Action 21. Greater Amberjack**

**Alternative 1.** No Action (Status quo).

**Alternative 2.** Change the commercial trip limit for greater amberjack.

**Alternative 2a.** Increase the greater amberjack commercial trip limit to 2,000 lbs.

**Alternative 2b.** Increase the greater amberjack commercial trip limit to 1,500 lbs.

**Action 22.** Modify management measures for dolphin.

**Alternative 1.** No Action (Status quo).

**Alternative 2.** Prohibit bag limit sales of dolphin from for-hire vessels.

**Alternative 3.** Establish minimum size limits off NC & SC.

**Alternative 4.** Establish minimum size limits in NEFMC and MAFMC.

**Alternative 5.** Increase the minimum size limit to 22 inches or 24 inches.

**Alternative 6.** Reduce the boat limit (for e.g. reduce by 1/3).

**Alternative 7.** Examine harvest by powerheads and evaluate whether it should be continue to be allowed.

**Alternative 8.** Explore a series of trip limits.

### **Action 23.** Modify management measures for wahoo.

**Alternative 1.** No Action (Status quo). Continue to prohibit sale of recreationally caught wahoo in or from the Atlantic EEZ. Continue the 500 pound commercial trip limit for wahoo (landed head and tail intact) with no transfer at sea allowed. Continue the recreational bag limit of 2 wahoo per person per day in the Atlantic EEZ. Continue to specify allowable gear for wahoo in the Atlantic EEZ as longline; hook and line gear including manual, electric, or hydraulic rod and reels; bandit gear; handline; and spearfishing gear (including powerheads).

**Alternative 2.** Other.

### **Action 24.** Modify management measures for *Sargassum* seaweed.

Note: Council needs to indicate if they want or need management for *Sargassum*.

**Alternative 1.** No Action (Status quo).

**Alternative 2.** Establish vessel limits.

**Alternative 3.** Modify quota.

**Alternative 4.** Modify gear.

**Alternative 5.** Modify closed areas.

**Alternative 6.** Modify closed seasons.

**Alternative 7.** Consider permit endorsements.

## Literature Cited

LaPointe, B.E. 1986. Phosphorus-limited photosynthesis and growth of *Sargassum natans* and *Sargassum fluitans* (Phaeophyceae) in the western North Atlantic. *Deep-Sea Res.* 33:391-399.

LaPointe, B.E. 1995. A comparison of nutrient-limited productivity in *Sargassum natans* from neritic vs. Oceanic waters of the western North Atlantic Ocean. *Limnol. Oceanogr.* 40:625-633.

SAFMC. 2002. Second Revised Final Fishery Management Plan for Pelagic *Sargassum* Habitat of the South Atlantic Region. Including a Final Environmental Impact Statement, Initial Regulatory Flexibility Analysis, Regulatory Impact Review, and Social Impact Assessment/Fishery Impact Statement. South Atlantic Fishery Management Council, 1 Southpark Cir., Ste 306, Charleston, S.C. 29407-4699.

Shertzer, K.W. and E.H. Williams. 2008. Fish assemblages and indicator species: reef fishes off the southeastern United States. *U.S. Fish Bull.* 106:257-269.

Shertzer, K.W., E.H. Williams, and J.C. Taylor. 2009. Spatial structure and temporal patterns in a large marine ecosystem: exploited reef fishes of the southeast United States. *Fisheries Res.* 100:126-133.

Trono, G.C. and Lluisma, A.O. 1990. Seasonality of standing crop of a *Sargassum* (Fucales, Phaeophyta) bed in Bolinao, Pangasinan, Philippines. *Hydrobiologia.* 204/205:331-338.

Wong, C-L. and S-M. Phang. 2004. Biomass production of two *Sargassum* species at Cape Rachado, Malaysia. *Hydrobiologia.* 512:79-88.