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Report of the Working Group on Assessment of New MoU Species (WGNEW)

August 2008

By correspondence

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Contents

Executive summary

The Working Group on Assessment of New MoU Species [WGNEW] deals with several species for which ICES so far (with the exception of sea bass) has never provided management advice. The species concerned are: sea bass, flounder (except for the Baltic), common dab (except for the Baltic), lemon sole, brill (except for the Baltic), turbot (except for the Baltic), witch flounder, red gurnard, tub gurnard, grey gurnard, striped red mullet, and John dory. Two meetings have so far been held: the first one in 2005 and a second one in 2007. The main task of WGNEW is to provide information on general biology, stock ID, fisheries, survey data, biological sampling and parameters, stock trends and management.

WGNEW only worked by correspondence this year. Since only sea bass and striped red mullet are part of ongoing research programmes, this report only contains an update of the information for these two species. For the other species the reader is referred to the two former reports of WGNEW (ICES 2006 and 2007).

To make significant progress WGNEW is of the opinion that it is essential that some funding is provided to make data available to WGNEW and to perform some analyses of these data. One of the coming EU Calls for proposals will contain the request for a study of WGNEW species. This Call, already expected late 2007, has been delayed however, but is now expected to be published in August 2008. Although WGNEW had hoped to be able to report on some first results, this study has yet to start.

1 Introduction and Terms of Reference of WGNEW

Terms of Reference (2007/2/ACOM25) for the Working Group were as follows: the Working Group on Assessment of New MoU Species [WGNEW] (Co-Chairs: Henk Heessen, Netherlands and Jean-Claude Mahé, France) will meet by correspondence in 2008 to review and coordinate progress on EC funded small-scale project on analyses of data for new assessment species: sea bass, flounder (except for the Baltic), common dab (except for the Baltic), lemon sole, brill (except for the Baltic), turbot (except for the Baltic), witch flounder, red gurnard, tub gurnard, grey gurnard, striped red mullet, and John dory. WGNEW will report by August 2008 for the attention of ACOM, LRC and RMC.

Unfortunately, the EU Call for Proposals, containing a study of WGNEW species has not yet been published, although this is currently expected for August 2008.

WGNEW, therefore only worked by correspondence this year. Since only sea bass and striped red mullet are part of ongoing research programmes, this report only contains an update of the information for these two species. For the other species the reader is referred to the two former reports of WGNEW (ICES 2006 and 2007). Two Working Documents on sea bass are added to this report as Annex 2 and 3.

2 Participants by correspondence

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Franck Coppin	France
Heino Fock	Germany
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3 Sea bass (Dicentrachus labrax)

3.1 General biology

Sea bass, *D. labrax*, are distributed in Northeast Atlantic shelf waters from southern Norway, through the North Sea, the Irish Sea, the Bay of Biscay, the Mediterranean and the Black Sea to Northwest Africa. A detailed description of the general biology can be found in the 2005 WGNEW report (ICES, 2006).

A recent tagging study (2000–2004) (Pawson *et al.*, 2007) suggests that the seasonal migration of adult bass from the North Sea to the Channel is now much less evident, though there is still considerable mixing at the adolescent stage between bass in the North Sea and populations further west (Pickett *et al.*, 2004).

3.2 Stock identity

Previous reports of SGBASS (ICES, 2002, 2004a) presented information, which can be used to identify stocks of bass in Community and adjacent waters in the Northeast Atlantic, and provided an interpretation in relation to potential stock assessment areas. This information was used to propose 'stock' boundaries for six areas within which fishery and biological data could be used in assessments of bass populations and for which management advice may be given.

3.3 The fisheries, history and development, and catch and effort data

A detailed description of the fisheries, history and general development of bass fisheries can be found in the 2005 and 2007 WGNEW reports (ICES, 2006, 2007).

3.3.1 Fisheries data

Table 3.1 presents a summary of the data that were available for use by SGBASS, updated for this report. Data on fishing effort expended by vessels taking bass are not available for all countries and years for which bass landings are given. The quality of the data is patchy, but bass fisheries in the English Channel appear to have been generally well sampled in recent years.

France

See the Working Document by Morizur *et al*. in Annex 3.

UK

The UK (England and Wales, no bass landings are reported into Scotland or Northern Ireland) has catch and effort data for 13 métier groups, covering four groups of ICES Divisions-IVb,c, VIId, VIIe,h and VIIa,f,g. These data include a regional fleet census from 1985 to 2006. The effort data are recorded in 'boat-days' or 'days on the ground' and are classed as good for midwater (pelagic) trawls from 1994, gillnets and longlines from 1985, commercial rod and line and handlines from 1986. The rest of the data for trawling métiers is of poor quality.

The UK has good landings data by division and rectangle for midwater (pelagic) trawls and by division for all other métiers. Other data by rectangle are of poor quality and there are no data by rectangle for recreational angling. Data on catch value per ICES division and price per grade are now moderate or good for most métiers and some price data for commercial lines are available.

The best estimates of annual catch and effort for bass have historically been obtained by integrating official statistics derived from landings declarations and local market sales at major ports with those from a voluntary, paid logbook system administered by CEFAS for minor ports and for the <10 m fleet which covers the bass fishery in England and Wales. The CEFAS logbook system is fully described in the report of WGNEW 2007 (ICES 2007) so will not be re-iterated here. In 2007, this logbook scheme was cancelled, resulting in catch and effort data from official statistics only. It is hoped that the scheme will be re-launched in 2009.

Limited discard data are available from the Cefas discard sampling programme.

3.3.2 Catch by country

Official statistics and the Working Group's estimates of total landings (difference shown as "unallocated") of bass by country over the period 1984 to 2004 are presented in Table 3.3. More detailed catch data by stock assessment areas are given in Tables 3.4–3.9.

UK (England and Wales)

The official total bass landings in England and Wales from Subareas IV and VII rose from 106 t in 1985 to 660 t in 1995, and have ranged around 500 t since then. Much of the bass catch landed into the UK is taken by small inshore vessels in a mixed gear fishery and does not go through major ports: these figures are therefore underestimates. The 'best estimates', suggest that landings remained around 600 t between 1985 and 1992, rose rapidly to 2200 t in 1994 (as the strong 1989 year class recruited), then fluctuated between 1050 and 1900 t (mean around 1500 t) until 2005. During this period, bass landings into England and Wales arose mainly from netting and line métiers.

Good quality data on recreational catch and effort in England and Wales were obtained for 1986/7 and 1992/3 as a result of two economic studies (Dunn *et al*., 1989; Dunn and Potten, 1994), which estimated that some 24 500 sea-anglers fished regularly for bass in the UK in 1986/87, and that the annual catch of bass taken by anglers in both 1987 and 1992 was around 410 t. There are no more recent estimates of recreational landings.

3.3.3 Fishing effort

Fishing effort for fleets which target bass or for which bass is a reliable bycatch (for lpue estimates) are available for three countries, France, the UK and Spain (Basque country), by métier and sea area.

UK

The numbers of UK vessels involved in fishing for bass in each stock area are estimated from a fleet census carried out biannually since 1985. In 1985, it was estimated that 185 UK boats were involved in fishing for bass in Subarea IV, increasing to 493 in 1994 decreasing to 232 in 1996 and rising to 626 in 2005. In Subarea VII, 1791 boats were involved in fishing for bass in 1985, rising to a peak of 1966 in 1994, with 1485 in 1996 and 2016 in 2005.

Total UK nominal effort (all areas combined) increased in the demersal trawl fleet from an annual mean of around 6000 days during 1984–1990 to a mean of 22 000 days during 1991–1995. Lower effort was estimated for the demersal trawl fleet during the

period 1996–2003, with a mean of 16 000 days. These fishing effort data are only indicative, having been compiled in various ways over the years.

Effort in the netting fleets has varied considerably with no real trend over the period 1984–2005, reaching a peak in most regions in 1993 and a trough in 1998/99. Effort in the line fleets were relatively constant from 1985 to 1990, after which they increased to a peak in 1992, fell across the years 1994–1996, and have since shown a slight increase.

From 1995, up to seven pairs of midwater trawlers targeted bass over winter/spring 2003/04, and spent a total number of 412 boat-days fishing, more than the previous highest (270 days), recorded in 2002/03.

Overall, the number of UK boats fishing for bass peaked in 1994 (2282) and again in 2002 (2328).

3.3.4 Landings per unit of effort (lpue)

Most lpue series for the UK fisheries in which bass are caught show a declining trend from 1985 to 1992, followed by a strong increase to a peak in 1994, then generally high but fluctuating catch rates until 2004. As indices of abundance, these series suggest that production of bass in Subareas IV and VII has remained higher in the mid-late 1990s than in the late 1980s, probably due to the recruitment of the very strong 1989 year class and several subsequent years of good recruitment.

3.4 Survey data

The 1989 year class is the most abundant in all the series and the year classes of 1992, 1993, and 1995 also appear to have been good, although possibly not so widespread. Overall, however, the available series indicate an increase in the frequency of good year classes since 1989 (Table 3.10).

3.5 Biological sampling

UK

Cefas continues to sample the lengths and ages of bass in commercial landings. Good length and age composition data are available for the main métier-groups in VIId and VIIe,h from 1986 to 2007, with the exception of lines in 1989. The winter offshore pelagic fishery in Subarea VII was also well sampled between 1996 and 2004. In the North Sea, sampling was largely confined to IVc, where gillnets have been well sampled since 1987 and lines since 1988, although demersal trawl catches have never been well sampled (the best was 154 lengths in 1994). Division VIIa has generally been poorly sampled and, because there appears to be a single west coast bass stock (see Section 4.2); the data have been combined for assessment purposes with those of VIIf and g, where sampling has been good since 1988 (except for lines in 1989, and trawls and nets in 1992). Over the period 1985–2007, annual UK sampling in each stock area averaged >500 age samples.

3.6 Biological parameters

No new information since WGNEW 2007.

3.7 Analysis of stock trends

In 2003, the ICES Bass Study Group (SGBASS) used the SURBA program with data on UK and French bass catch-at-age and fishing effort by métier groups (trawls, nets and

lines) for four stock areas (IVb, c; VIId; VIIe, h; VIIa, f, g) for which sufficient biological sampling information was available over the period 1985–2002 (ICES, 2004a). The assessments utilized a separable model with 12 datasets (three métiers for each of four stocks) to provide independent assessments of the status of each stock, and indicated common trends in spawning-stock biomass (SSB) within stocks, and similar recruitment patterns both within and between stocks. Estimates of fishing mortality using SURBA were considered to be less informative, largely because of a lack of independence between the selectivities of the fishery and that of the indices of catch per unit of effort (cpue) used. No biological reference points were proposed at this time.

No update on these assessments has been carried out using international data but a multi-métier, fully statistical, separable catch-at-age model based on the stage 1 stock synthesis framework of Methot, 1990 was used with UK data for the period 1985–2004 (ICES, 2006, Pawson *et al.*, 2007). This analysis covered the four 'stock areas' previously proposed, namely Divisions IVb,c, Division VIId, Divisions VIIe, h and Divisions VIIa, f, g. This assessment was subsequently updated to include data up to 2006. In addition, comparisons were made between the official catch and effort data and the 'best estimate' catch and effort data that is usually regarded as being a more realistic reflection of the fishery. The results are given in the working document (Kupschus *et al.*, 2007) in Annex 2.

The outputs from these updated assessments are in close agreement with the assessments carried out in 2006 and used as the basis for the Defra consultation on the bass MLS. Stocks levels are considered to be at, or close to, series maxima and trends in fishing mortality fairly level, with some peaks, throughout the time-series.

Recruitment was good during the mid to late 1990s and this has resulted in the current high landings and stock levels. Since 2000 the Solent survey suggests year classes have been of more average strength. This is in contrast to the latest stock assessment results which suggest that the 2002 year class may be quite strong. This has also been reported by anglers. The Solent index is not used in the assessment, but has been used to corroborate the results of the assessments in the past. Three interpretations are possible, (1) the index no longer produces the reliable results, because of a spatial shift in the recruitment dynamics of bass, (2) the assessment does not provide the necessary information at younger ages due to a shift in the selectivity pattern of one or more fleets, or (3) this is due to variance in either the survey or the catch data. Unfortunately, the implications of the three scenarios in terms of management are very different, and it is too soon to say which is most likely.

Predicted selectivity in the IVbc trawl fleet has changed to younger ages compared to previous assessments, suggesting that the fleet would now be more heavily impacted by the MLS than would have been the case in the past. The selectivity pattern is applied to the métier over the whole time-series. With less than 10% additional data such a dramatic change suggest that the assessment in this area is very sensitive to variation in catch data. However, the situation is complicated. The change in the trawl residual patterns of the two assessments probably indicates a rescaling of the selectivity component in the new assessment from a noisy variable one previously, to one with less noise, but increasing bias recently. Because catches for the trawl fleet are comparatively small in this area this has had little impact on the predicted stock dynamics, but will alter prediction of future yields for this fleet compared to previous assessments.

No assessment of stocks in other areas, such as the Bay of Biscay has been undertaken and the status of the stocks is unknown.

3.8 Management regulations specific to bass

No changes since WGNEW2007. In 2006 the UK government carried out a consultation on raising the MLS to 45 cm. After lengthy consideration, it was decided to keep the MLS at 36 cm. However, consideration of other management measures, such as expansion of the nursery areas is currently underway.

Given the fact that no assessments have been undertaken for other areas and stock status is unknown, the WG suggests that again effort should not be allowed to increase and that additional data that could be used for assessments should be collected.

3.9 References

Dunn, M., Potten, S., Radford, A., and Whitmarsh, D., 1989. An economic appraisal of the fishery for bass in England and Wales. CEMARE Research Report, R14. CEMARE, University of Portsmouth, UK. 217 pp.

Dunn, M. R., and Potten, S. D., 1994. National survey of bass angling, A report to the Ministry of Agriculture Fish and Food. University of Portsmouth. 45 pp. plus 7 Appendices.

Fritsch, M., Morizur, Y. Poulard, J.C., Coppin, F., and Bermell-Fleury, S. 2005. Le bar commun en Atlantique Nord : Quelles évolutions? Poster présenté au colloque Golfe de Gascogne, Brest, mars2005. http://www.ifremer.fr/gascogne/colloque2005/posters/P14fritsch.pdf.

Fritsch, M. 2005. Biology and exploitation of the sea bass *Dicentrarchus labrax* (L.) in the French fisheries of the English Channel and the Bay of Biscay. Thèse Université de Bretagne Occidentale -Ifremer, 258p + appendices.

ICES. 2002. Report of the Study Group on Bass. ICES CM 2002/ACFM: 11.

ICES. 2004. Report of the Study Group on Bass, Lowestoft, England, August 2003. ICES CM 2004/ACFM: 04. 73 pp.

ICES. 2004b. Report of the ICES Advisory Committee on Fishery Management and Advisory Committee on Ecosystem; ICES Advice 2004, Volume 1, No 2, Chapter 4.4.15. pp 380–393.

ICES. 2005. Report of the Working Group on the Assessment of New MoU species (WGNEW). ICES CM 2006/ACFM:11.

Jennings, S., and Pawson, M. G., 1992. The origin and recruitment of bass, *Dicentrarchus labrax*, larvae to nursery areas. Journal of the Marine Biological Association of the United Kingdom, 72: 199–212.

Kelley, D., 1986. Bass nurseries on the west coast of the U.K. Journal of the Marine Biological Association of the United Kingdom, 66: 439–464.

Kennedy, M. and Fitzmaurice, P. 1972. The biology of the bass, *Dicentrarchus labrax*, in Irish waters. Journal of the Marine Biological Association of the United Kingdom, 52: 557–597.

Lam Hoai T., 1970. Contribution à l'étude des Bars de la région des Sables d'Olonne. Trav. Fac. Sci. Rennes, Ser. Océanogr. Biol., 3: 39–68.

Methot, R. D. 1990. Synthesis model: an adaptable framework for analysis of diverse stock assessment data. In Proceedings of the Symposium on Application of Stock Assessment Techniques to Gadids, pp. 259–277. INPFC Bulletin, 50.

Morizur, Y., Tregenza, N., Heessen, H., Berrow, S., and Pouvreau, S. 1996. By-catch and discarding in pelagic trawl fisheries. DGXIV-étude bioéco/93/017, 124pp + annexes.

Pawson, M. G., 1992. "Climatic influences on the spawning success, growth and recruitment of bass (*Dicentrarchus labrax* L.) in British Waters". ICES Marine Science Symposia, 195: 388–392.

Pawson, M. G., Kelley, D. F., and Pickett, G. D. 1987. "The distribution and migrations of bass *Dicentrarchus labrax* L. in waters around England and Wales as shown by tagging". Journal of the Marine Biological Association of the United Kingdom, 67: 183–217.

Pawson, M. G., Kupschus, S., and Pickett, G. D., 2007. The status of sea bass (*Dicentrarchus labrax*) stocks around England and Wales, derived using a separable catch-at-age model, and implications for fisheries management. - ICES Journal of Marine Science, 64.

Pawson, M. G., and Pickett, G. D., 1996. The annual pattern of condition and maturity in bass (*Dicentrarchus labrax* L) in waters around the UK. Journal of the Marine Biological Association of the United Kingdom, 76: 107–126.

Pawson, M. G., Pickett, G. D., Leballeur, J. Brown, M., and Fritsch, M. 2007. Migrations, fishery interactions, and management units of sea bass (*Dicentrarchus labrax*) in Northwest Europe. ICES Journal of Marine Science, 64: 332–345.

Pawson, M. G., Pickett, G. D., and Smith, M. T., 2005. The role of technical measures in the recovery of the UK sea bass (*Dicentrarchus labrax*) fishery, 1980–2002. Fisheries Research, 76: 91–105.

Pickett, G. D. 1990. Assessment of the UK bass fishery using a log-book-based catch recording system. Technical Report, MAFF Directorate of Fisheries Research, Lowestoft, 90. 33 pp.

Pickett, G. D., Kelley, D. F., and Pawson, M. G. 2004. The patterns of recruitment of bass, *Dicentrarchus labrax* L. from nursery areas in England and Wales and implications for fisheries management. Fisheries Research, 68: 329–342.

Puente, E. 1993.- La pesca artesanal en aguas costeras vascas. Publicaciones del Gobierno Vasco. Colección Itsaso nº 11.Vitoria-Gasteiz, 1991. 191 p.

Stequert, B. 1972. Contribution à l'étude du bar *Dicentrarchus labrax* (L.) des reservoirs à poissons de la région d'Arcachon. Th. 3ème year: Faculté des Sciences.

Table 3.1 Summary of availability and quality of data on bass by area (for all métiers)-quality relates to how well landings in each area have been sampled.

		North Sea (IVb, c)		Channel (VIId,e,h)		Irish/Celtic Seas(VIIa,f,g)		Biscay (VIII)	
Data type	Quality	Year span	Quality	Year span	Quality	Year span	Quality	Year span	Quality
Effort		*	84-06	**	85-06	**	85-06	*	84-02
Landings	wt/Div	*	84-06	**	85-06	**	85-06	*	84-05
	wt/Rect	*	84-06	*	85-06	*	85-06	*	84-05
	value/Div	*	84-06	*	85-06	*	85-06	**	84-05
	price/grade	*	84-06	*	85-06	*	85-06	**	84-05
Discards	any data	*	84-06	*	85-06	*	85-06	*	95
Biological	length comp'	*	85-06	**	85-06	**	85-06	*	00-05
	age comp'	*	85-06	**	85-06	**	85-06	*	00-04
	fish wts	*	85-06	**	85-06	*	85-06		
	sex ratio	*	82-94	**	82-93, 99, 00	**	82-93		
	maturity	**	82-93	**	82-93, 99, 00	**	82-93		
	condition	**	82-93	**	82-93, 99, 00	**	82-93		
	growth	**	82-93	**	82-93	**	82-93		
	Recruit index	**	75-07	**	77-07	**	72-01		
Spawning	timing	**	81-84, 03	**	81-84, 89, 00	*	82-91, 99, 03		
	distribution	*	81-84, 89	**	81-84, 89	*	82-91(3yr)		

Quality Key: ** = good data quality; * = some data but poor quality; blank = no data available.

Table 3.2 Summary of nominal landings (t) of bass in the North East Atlantic by country of landing.

YEAR	CHANNEL ISLANDS[3]	DENMARK[1]	FRANCE	IRELAND[1]	NETHERLANDS[1]	PORTUGAL[4]	SCOTLAND[1]	SPAIN[1]	UK (ENGL. & WALES)[1]	UNALLOCATED[2]	TOTAL
1984	25		575					430	124	1063	2217
1985	18		1091					364	106	473	2052
1986	15		1765			181		388	129	493	2971
1987	14		2404	3		127		402	130	660	3740
1988	12		1871		8	351		451	190	394	3277
1989	48	1	1970		2	508		92	202	332	3155
1990	25	<0.5	1710			412		146	191	364	2848
1991	16	<0.5	2059			379		111	263	476	3304
1992	9	<0.5	2161			345		94	156	454	3246
1993	6		1933			289		104	246	914	3531
1994	15	1	1956			373		134	546	2202	5261
1995	10	1	2033			316	<0.5	112	661	873	4066
1996	20	1	2988		8	381	<0.5	158	576	680	4848
1997	17	1	2599		1	229	<0.5	184	572	1700	5360
1998	18	2	2446		48	273	<0.5	115	489	980	4432
1999	16	2	3312		32	308	<0.5	134	680	1083	5659
2000	17		3925		67	361	<0.5	299	406	974	6051
2001	15	na	3898		87	332	<0.5	256	355	919	5847
2002	21	na	3627		111	326	5	271	500	1047	5882
2003	25	na	4395		180	279	3	274	574	1153	6860
2004	19		4293		210		3	74†	613	1608	6818*
2005		1	5350		197		1	53†	509	1116	7225*
2006			5800*						554	957	
2007									675	-	

[1] **Source: Official Statistics** [2] **Landings estimated by the Study Group.** [3] **Source: 1984-1991 ICES Bulletin Statistique, 1992-2004, States of Jersey Fisheries Department.** [4] **Revised figures**

*** Provisional**

[†] **Basque data only**

Table 3.3 Nominal landings (t) of bass by country in Divisions IVb,c and VIId.

YEAR	DENMARK[1]	FRANCE	NETHERLANDS[3]	SCOTLAND[1]	UK (ENGL. & WALES)	UNALLOCATED[2]	TOTAL
1984		21			77	577	752
1985		175			76	170	496
1986		151			92	149	485
1987		85			86	194	451
1988		104	8		102	211	527
1989	1	147	2		91	150	482
1990	<0.5	131			71	185	459
1991	<0.5	161			168	212	709
1992	<0.5	180			83	253	599
1993		262			145	346	898
1994	1	260			356	915	1888
1995	1	298		<0.5	413	367	1492
1996	1	417	4	<0.5	318	267	1325
1997	1	290	1	<0.5	321	688	1622
1998	2	369	32	<0.5	282	323	1290
1999	1	628	32	<0.5	335	598	1594
2000		695	61	<0.5	217	378	1351
2001		772	76	<0.5	202	160	1210
2002		914	105	5	242	457	1718
2003		1100	169	2	268	277	1814
2004		937	197	<0.5	307	657	2098
2005	1	1260*		0	273	596	
2006					250	459	
2007					256	-	

[1] Source: ICES Bulletin Statistique [2] Landings estimated by the Study Group. [3] Official statistics

*** Provisional.**

Table 3.4 Nominal landings (t) of bass by country in Divisions VIIe,h.

YEAR	CHANNEL ISLANDS[3]	DENMARK[1]	FRANCE	NETHERLANDS[1]	SPAIN[1]	SCOTLAND[1]	UK (ENGL. & WALES)	UNALLOCATED[2]	TOTAL
1984	25		171				39	283	518
1985	18		98				19	213	348
1986	15		128				22	99	264
1987	14		744				16	209	983
1988	12		228				30	103	373
1989	48	1	131				39	55	274
1990	25		157				91	59	332
1991	16		202				45	80	343
1992	36		337				40	54	467
1993	45		252				50	88	435
1994	49		163				66	422	700
1995	69		269				100	112	550
1996	56		959	4		<0.5	162	49	1230
1997	74		774				150	439	1437
1998	79		580	16			162	88	925
1999	108		756			<0.5	311	94	1269
2000	19		684	<0.5	1		139	172	1015
2001	15		786	4			72	233	1110
2002	44		624	2		<0.5	127	206	1003
2003	49		1050	5			233	310	1647
2004	19		1225				230	275	1749
2005			1550*		<0.5†		160	156	
2006							186	303	
2007							252	-	

[1] **Source: ICES Bulletin Statistique** [2] **Landings estimated by the Study Group.** [3] **Sources: 1984-1991 ICES Bulletin Statistique; 1992-2004, States of Jersey & Guernsey Fisheries Department.**

Provisional.

Basque data only.

Table 3.5 Nominal landings (t) of bass by country in Divisions VIIa,f&g.

YEAR	FRANCE	IRELAND[1]	SCOTLAND[1]	UK (ENGL. & WALES)	UNALLOCATED[2]	TOTAL
1984	1			8	203	212
1985	13			11	90	114
1986	2			11	245	258
1987	24	3		23	257	307
1988	7			43	80	130
1989	14			62	127	203
1990	14			27	120	161
1991	75			27	184	286
1992	43			24	147	214
1993	14			32	480	526
1994	9			110	735	854
1995	40		<0.5	141	264	445
1996	41		<0.5	82	234	357
1997	31		<0.5	88	443	562
1998	195		<0.5	42	439	676
1999	28		<0.5	32	391	451
2000	70		<0.5	50	424	544
2001	53			81	410	544
2002	80			131	213	424
2003	40		<0.5	73	382	495
2004	53		2	74	676	805
2005	113		1	73	364	551
2006				118	316	
2007				167	-	

[1] **Source: ICES Bulletin Statistique** [2] **Landings estimated by the Study Group. *Provisional.**

Table 3.6 Nominal landings (t) of bass by country in Divisions IVa, VIa, VIIb,c,j&k and XII.

YEAR	DENMARK[1]	FRANCE	IRELAND[1]	NETHERLANDS[1]	PORTUGAL	SCOTLAND[1]	SPAIN[1]	SPAIN (BC)	UK(ENGL. & WALES)	TOTAL
1984		1							0	1
1985		<0.5							<0.5	<0.5
1986		<0.5							0	<0.5
1987		<0.5	1						0	1
1988		<0.5		3					0	3
1989		0.5	1						0	1.5
1990	<0.5	<0.5	1						0	1
1991	<0.5	1							0	1
1992		1.5							0.5	2
1993		0.7							<0.5	1
1994	<0.5	<0.5							0	<0.5
1995	<0.5	<0.5				<0.5			<0.5	<0.5
1996		0.5			3	<0.5			1.5	3.5
1997	<0.5	<0.5							<0.5	<0.5
1998	<0.5	0.5				<0.5	40		0.5	41
1999	<0.5	0				<0.5	1		0	1
2000		3				<0.5		<0.5	0	0.3
2001		1						<0.5	<0.5	1
2002							1	<0.5	10	11
2003						<0.5		<0.5	1	<0.5
2004						<0.5		<0.5	0	<0.5
2005							0		0	0
2006									0	0
2007									0	0

[1] Source: ICES Bulletin Statistique [2] Estimates for Spain (Basque Country). *Provisional.

Table 3.7 Nominal landings (t) of bass by country in Division VIIIa,b&d.

YEAR	FRANCE	SPAIN[1]	SPAIN (BC)[2]	UK (ENGL. & WALES)	UNALLOCATED[3]	TOTAL
1984	381	0		0		381
1985	805	0		1		806
1986	1478	0		4		1482
1987	1547	0		5		1552
1988	1512	0		15		1527
1989	1673	0		0		1673
1990	1407	0		0		1407
1991	1611	17		18		1646
1992	1601	14		5		1620
1993	1404	14		10		1428
1994	1393	17	60	5	130	1543
1995	1283	0	29	2	130	1415
1996	1344	0	51	1	130	1475
1997	1345	0	42	3	130	1478
1998	1142	27	50	1	130	1300
1999	1602	11	57	0		1670
2000	1824	50	58	0		1932
2001	1855	2	42	0		1899
2002	1618	15	50	<0.5		1683
2003	2300	39	38	2		2379
2004	2072		65	2		2139*
2005	2250*		43	0		2293*
2006				1		
2007				1		

[1] Source: ICES Bulletin Statistique [2] Estimates for Spain (Basque Country). [3] Landings estimated by the Study Group. *Provisional.

Table 3.8 Nominal landings (t) of bass by country in Division VIIIc.

YEAR	FRANCE	PORTUGAL	SPAIN[1]	SPAIN (BC)[2]	UK (ENGL. & WALES)	TOTAL
1984	0		180			180
1985	0		200			200
1986	5		206			211
1987	3		208			211
1988	12	<0.5	358			370
1989	1	1	325			327
1990	1		395			396
1991	9	1	300			310
1992	0		254			254
1993	0	<0.5	247			247
1994	0	1	306			307
1995	1	<0.5	334		<0.5	335
1996	1	<0.5	376			377
1997	0	<0.5	290			290
1998	0	<0.5	258			258
1999	9	<0.5	221			222
2000	20			5		25
2001	1		122	8		131
2002	1		107	14		122
2003	0		152	8		160
2004				8		>3
2005				9		
2006						
2007						

[1] Source: ICES Bulletin Statistique [2] Estimates for Spain (Basque Country).

Table 3.9 Nominal landings (t) of bass by country in Division IXa.

YEAR	PORTUGAL*	SPAIN	TOTAL
1984		250	250
1985		164	164
1986	181	182	363
1987	127	194	321
1988	351	93	444
1989	507	92	599
1990	412	146	558
1991	378	111	489
1992	345	94	439
1993	289	104	393
1994	372	134	506
1995	316	112	428
1996	378	158	536
1997	229	184	413
1998	273	115	388
1999	308	134	442
2000	361	83	444
2001	332	102	434
2002	326	49	475
2003	279	83	362
2004			
2005			
2006			
2007			

***revised dataset 2004.**

Table 3.10 Recruitment indices available for bass.

	NETHERLANDS	GERMANY	UK (ENGLAND AND WALES)						IRELAND
AREA	WESTER SCHELDE	CODS	THAMES ESTUARY	THAMES ESTUARY	SOUTH (SOLENT)	SOUTH (TAMAR)	WEST (CAMEL)	WEST (SEVERN)	
DIVISION	IVC	IVB	IVC	IVC	VIID	VIIE	VIIF	VIIF	VII
YEAR CLASS	0 GR BEAM TRAWL SURVEY	0-2 GROUP NO/TOW	0 GROUP PS SCREENS[2]	0-3 GROUP TRAWL SURVEY	2-4 GROUP TRAWL SURVEY	0-GROUP SEINE SURVEY	0-GROUP SEINE SURVEY	0 GROUP PS SCREENS[1]	0 GROUP SEINE/ STOP-NET SURVEY
1972	1							3	
1973	0							4	
1974	0							1	
1975	0		78					15	
1976	1		100					127	
1977	0		6		11			-	
1978	0		5		21			-	
1979	1		5		170			-	
1980	1		37		32			9	
1981	0		21		79		0.02	216	
1982	0	0	56		141		1.23	83	
1983	0	0	83		176		0.3	226	
1984	4	0	62		10		1.34	8	
1985	0	0	76		1	2.13	0.22	11	
1986	0	0	14		5	0.02	0.01	3	
1987	0	0	116		35	0.1	0.31	96	
1988	1	0	54		81	4.77	0.48	98	
1989	0	0	610		436	7.54	1.12	446	
1990	3	0	433		62	3.33	0.89	25	
1991	1	0	64		51	0.24	0.5	300	
1992	31	0	104		59	7.12	0.25	280	
1993	3	0	131		31	3.25	0.22	202	
1994	414	0	26		126	3.75	1.34	-	
1995	49	0	27	0.02	234	7.44	--		
1996	4	1			20	0.33	1.19	242	0.15
1997	15	0		0.23	323	3.59	1.02	-	0.01
1998	33	1		0.35	80	6.69	2.64		0.05
1999	156	0		1.31	146	3.9	0.56		0.02
2000	110	0		0.45	59	1.09	1.33		0
2001		1		1.32	48	1.13			
2002		1		2.03	77	6.74			
2003		2		1.66	81	3.1			
2004		1		1.30	57*	4.67			
2005				0.6*	44*	1.68			0.03
2006				1.59*		0.60			
2007				2.69*		1.52			

[1] discontinued 1998.

[2] discontinued 1996.

*** Provisional.**

4 Striped red mullet (*Mullus surmuletus*)

4.1 General biology

A detailed description of the biology can be found in the WGNEW 2005 report (ICES, 2005).

4.2 Stock identity and possible assessment areas

A study using the geometrical morphometry in the Eastern English Channel and the Bay of Biscay was presented in WGNEW 2007 (ICES, 2007). Moreover, according to these first results these studies should be supplemented by genetics studies for the identification of the stocks.

4.3 Fishery data

4.3.1 Catch and effort data by area and country

A description of the fisheries can be found in the 2005 and 2007 WGNEW reports. The landings by area and by country (France, UK, Spain and Netherlands) were presented in the 2007 WGNEW report. Tables 4.1 and 4.2 present a summary of the landings of France and UK. Table 4.3 presents the landings from 1996 to 2007 in Basque ports by area and gear. More details on landings in Basque Country are given in Figures 4.1–4.3.

4.3.2 Survey data

A detailed description of the Cefas surveys and French surveys in the eastern English Channel and the North Sea was presented in the 2005 and 2007 WGNEW reports. These data were updated and are presented in Tables 4.4 and 4.5 and in Figure 4.4–4.6.

The indices for the French EVHOE survey in the Bay of Biscay and the Celtic sea are presented in Table 4.6 and Figures 4.7 and 4.8.

A comparison of all indices (Number per 30 minutes) for all surveys demonstrates that the striped red mullet is primarily present in the Bay of Biscay and the Eastern Channel. The UK-Carhelmar survey is carried out close to the English coasts and is not representative of the Western English Channel.

4.3.3 Biological sampling

UK (England) and the Netherlands do not routinely carry out market sampling for this species. An inventory of the French data collected was updated in Table 4.7.

4.4 Population biology and a summary of other research

4.4.1 Length-weight relationships

The data were presented in the 2005 WGNEW report. Since 2003, the data are usually collected by France for the eastern English Channel and the southern North Sea. France started to collect data for VIIIa,b at the end of 2006.

4.4.2 Age structure and growth

The methods were presented in the 2005 WGNEW report. Since 2004, data are collected by France for the Eastern Channel and the southern North Sea (Tables 4.8 and

4.9 present the length/age key for 2006 and 2007). France started to collect data for VIIIa,b at the end of 2006.

In 2007–2008, a striped red mullet otolith exchange programme should optimize the age estimation between countries.

4.4.3 Comparison between scales and otoliths

The data are presented in the 2005 WGNEW report.

4.4.4 Maturity identification

Maturity stages are described in the report of WGNEW 2005. Since 2004, France collects data for the Eastern English Channel and the southern North Sea (Tables 4.10 and 4.11 present maturity ogives for 2006 and 2007).

4.4.5 Relation with the ecosystem

A model of the optimal habitat in autumn was presented in the 2005 WGNEW report. The spatial distribution of red mullet in the North Sea was strongly related with warm waters (ICES, 2007b).

4.5 Conclusions

The morphometric study demonstrates differences between the striped red mullet of the eastern English Channel and the Bay of Biscay (ICES, 2007). However, this study must be supplemented on the one hand by increasing the number of samples from these two areas and on the other hand by studying other areas (the central North Sea, IVb; Western English Channel, VIIe). The striped red mullet in the North Sea is that of a population with its large fish related with the Eastern English Channel and the small fish resident in the North Sea (ICES, 2007b). Moreover, the morphometric results must be supplemented by a genetic study for the stock identification.

For stocks assessment, the biological sampling information must be supplemented in the eastern English Channel and southern North Sea. Moreover, it is necessary to carry out consequent samplings in the other areas (Western English Channel, VIIe).

4.6 References

ICES, 2005, Report of the Working Group on Assessment of New MoU Species. Copenhagen, 13–15 December, 195pp.

ICES, 2007. Report of the Working Group on Assessment of New MoU Species, 9–11 January 2007, Lorient, France. ICES CM 2007/ACFM:01. 228 pp.

ICES, 2007b. Report of the Working Group on Fish Ecology (WGFE), 5–9 March 2007, Nantes, France. ICES CM 2007/LRC:03. 217 pp.

Table 4.1 Striped red mullet landings (in t) by France (Source: ICES statistics).

France	VIId	VIIe	VIIf	VIIg	VIIh	IVc	IVb	VIIIb	VIIIa	VIII
1973	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0
1975	140	70	0	0	0	0	0	0	0	182
1976	156	141	0	10	0	0	0	56	540	0
1977	272	234	1	0	0.3	7	0	43	176	0
1978	204	295	0.3	1	25	3	0	84	118	0
1979	206	157	1	3	15	6	0	21	213	0
1980	86	187	0.3	1	26	0	0	52	281	0
1981	44	98	6	0	0	0	0	0	0	277
1982	32	101	3	0	0	0	0	0	0	250
1983	206	226	1	0	0	26	0	119	361	0
1984	182	124	1	0	0	22	0	86	469	0
1985	128	123	1	1	29	7	0	156	552	0
1986	80	92	1	1	29	4	0	122	533	0
1987	35	177	2	2	20	5	0	187	586	0
1988	31	164	4	1	24	4	0	165	572	0
1989	34	111	2	0	21	3	0	154	530	0
1990	491	258	0	1	30	32	1	153	535	0
1991	185	261	6	3	53	23	0	107	582	0
1992	404	253	10	3	31	27	0	182	651	0
1993	456	327	9	2	25	60	0	85	443	0
1994	254	211	7	1	26	54	0	138	471	0
1995	1495	274	4	1	27	521	0	125	436	0
1996	1531	578	7	3	48	254	0	72	441	0
1997	606	525	12	7	58	123	2	71	454	0
1998	2230	560	8	8	69	365	3	75	342	0
1999	-	-	-	-	-	-	-	-	-	-
2000	1979	630	8	10	58	607	4	129	510	107
2001	1045	711	16	10	64	359	13	116	488	118
2002	1034	528	10	5	65	302	10	70	492	109
2003	2244	546	10	8	69	488	18	222	640	5
2004	3685	860	18	12	97	491	28	240	874	2
2005	3761	795	34	18	91	260	61	194	947	7
2006	851	510	25	3	78	111		149	599	33
2007	2814	574	31	3	76	494		200	532	19

Table 4.2 Striped red mullet landings (in t) by UK (Source: ICES statistics).

UK	IVa	IVb	IVc	VIa	VIb	VIIa	VIIb	VIIc	VIId	VIIe	VIIf	VIIg	VIIh	VIIj	VIIk	VIIIa	VIIIb	VIIId	VIIIc	XII
1982	0	2	0	0	0	0	0	0	1	15	1	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	1	49	2	0	0	0	0	5	0	0	0	0
1984	0	0	0	0	0	0	0	0	3	52	2	0	1	10	0	1	0	0	0	0
1985	0	2	0	0	0	0	0	0	2	53	2	0	1	0	0	0	0	0	0	0
1986	0	1	0	0	0	0	0	0	2	46	2	0	2	0	0	2	0	0	0	0
1987	0	0	0	0	0	0	0	0	4	36	3	0	4	0	0	1	0	0	0	0
1988	0	1	1	0	0	0	0	0	2	49	3	0	5	0	0	0	0	0	0	0
1989	0	1	1	0	0	0	0	0	3	46	4	0	2	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	13	86	2	0	10	0	0	0	0	0	0	0
1991	0	0	3	0	0	2	0	0	8	88	6	0	3	0	0	9	6	0	0	0
1992	0	1	2	0	0	2	0	0	11	51	5	2	5	1	1	14	16	0	0	0
1993	0	1	2	22	0	1	1	1	15	60	6	1	7	13	2	60	22	0	0	0
1994	0	1	3	2	4	1	0	9	10	50	7	3	23	21	4	3	31	0	0	0
1995	0	1	5	0	0	1	0	0	56	74	9	5	52	6	2	2	11	0	0	0
1996	0	4	3	0	3	0	1	0	26	92	7	3	25	6	1	0	10	0	0	8
1997	0	11	2	0	0	0	0	0	33	92	6	1	15	0	0	3	7	0	0	0
1998	0	17	2	0	0	0	0	0	75	60	5	0	10	0	0	2	6	0	0	0
1999	0	31	1	0	0	0	0	0	37	63	2	0	7	1	2	0	2	0	0	0
2000	0	36	3	0	0	3	0	1	52	106	8	1	6	1	1	0	0	0	0	0
2001	0	22	2	0	0	1	0	2	99	136	10	1	8	0	9	0	0	0	0	0
2002	0	18	1	0	0	0	0	0	23	104	11	1	12	0	5	0	0	0	0	0
2003	0	12	1	6	0	0	0	6	53	94	6	1	9	0	0	7	15	0	0	0
2004	0	14	1	0	0	0	0	0	51	144	6	1	10	6	0	6	38	0	2	0
2005	0	46	1	0	0	0	0	1	23	133	6	3	16	0	0	0	6	0	0	0
2006	0	9	2	0	0	0	0	0	10	132	14	0	14	0	0	0	0	0	0	0
2007	0	8	1	0	0	1	0	0	24	140	10	1	16	0	0	0	0	0	0	0

Table 4.3 Striped red mullet landings in Basque ports by area and gear in the period 1996–2007.

		1996			Total 1996	1997			Total 1997	1998			Total 1998	1999			Total 1999
Species	**Gear**	**VII**	**VIIIabd**	**VIIIc**		**VII**	**VIIIabd**	**VIIIc**		**VII**	**VIIIabd**	**VIIIc**		**VII**	**VIIIabd**	**VIIIc**	
Salmonetes europeos	Trawl	43	208592	1061	**209696**	1715	92218	1420	**95352**	511	91354	745	**92610**	518	202427	761	**203706**
(Mullus surmulletus)	Pair trawl	0	1539	48	**1586**	1	2207	40	**2247**	33	4052	38	**4122**	132	5645	9	**5786**
Red mullet	Long liners	0	0	339	**339**	0	0	1110	**1110**	0	3	3633	**3636**	0	0	1092	**1092**
	Gillnet	0	0	16656	**16656**	0	275	22615	**22890**	0	3168	15998	**19166**	307	2357	15190	**17854**
	Purseiner	0	0	44	**44**	0	0	945	**945**	0	0	9	**9**	0	0	517	**517**
	Others	0	0	792	**792**	0	0	686	**686**	0	0	397	**397**	0	0	141	**141**
Total		43	210130	18940	**229113**	1716	94699	26816	**123230**	544	98577	20820	**119940**	957	210429	17710	**229095**
		2000			**Total 2000**	**2001**			**Total 2001**	**2002**			**Total 2002**	**2003**			**Total 2003**
Species	**Gear**	**VII**	**VIIIabd**	**VIIIc**		**VII**	**VIIIabd**	**VIIIc**		**VII**	**VIIIabd**	**VIIIc**		**VII**	**VIIIabd**	**VIIIc**	
Salmonetes europeos	Trawl	380	284134	1438	**285952**	440	195146	0	**195587**	367	142770	313	**143450**	2323	350747	374	**353444**
(Mullus surmulletus)	Pair trawl	157	4492	92	**4741**	71	14790	136	**14996**	26	15169	58	**15253**	0	5712	287	**5998**
Red mullet	Long liners	0	8	2965	**2973**	0	171	969	**1139**	0	37	285	**322**	0	22	26	**48**
	Gillnet	63	2706	18755	**21524**	0	725	20541	**21265**	0	1152	17140	**18292**	59	723	13415	**14196**
	Purseiner	0	0	245	**245**	0	7	20	**27**	0	2	147	**150**	0	49	71	**120**
	Others	0	0	0	**0**	0	0	0	**0**	0	1	202	**203**	0	0	0	**0**
Total		600	291340	23495	**315435**	511	210838	21665	**233014**	393	159132	18144	**177669**	2382	357253	14172	**373807**
		2004			**Total 2004**	**2005**			**Total 2005**	**2006**			**Total 2006**	**2007**			**Total 2007**
Species	**Gear**	**VII**	**VIIIabd**	**VIIIc**		**VII**	**VIIIabd**	**VIIIc**		**VII**	**VIIIabd**	**VIIIc**		**VII**	**VIIIabd**	**VIIIc**	
Salmonetes europeos	Trawl	234	501712	1426	**503372**	2167	376815	2572	**381554**	1207	599177	1086	**601470**	1108	565331	5354	**571793**
(Mullus surmulletus)	Pair trawl	47	10386	469	**10902**	15	5088	402	**5504**	0	4681	678	**5359**	0	17325	1814	**19138**
Red mullet	Long liners	0	0	147	**147**			67	**67**	0	163		**163**	0	0	73	**73**
	Gillnet	0	192	20572	**20763**		22	19691	**19713**	0	17545	9761	**27306**	0	806	34987	**35793**
	Purseiner	0	15	55	**70**	0	44	62	**105**	0	44	106	**150**	0	46		**46**
	Others	0	0	132	**132**				**0**	0	0	25	**25**	0	0		
Total		281	512304	22800	**535386**	2181	381968	22793	**406942**	1207	621610	11656	**634473**	1108	583508	42228	**626844**

Table 4.4 The abundance index (Nb/hr) for Ifremer Surveys: International Bottom Trawl Survey (IBTS, IVb,c) and Channel Ground Fish Survey (CGFS, VIId).

YEAR	IBTS Q1	IBTS Q3	CGFS
1988	0.00		0.71
1989	0.00		46.11
1990	0.42		3.21
1991	0.00	0.14	1.53
1992	0.06	1.88	10.95
1993	0.00	0.56	3.56
1994	0.00	17.81	6.70
1995	0.05	8.75	11.02
1996	0.08	1.88	9.49
1997	0.04	27.71	26.14
1998	1.54	4.66	19.88
1999	0.25	3.82	6.45
2000	0.57	2.69	8.73
2001	0.23	1.50	2.62
2002	0.32	5.54	8.29
2003	0.67	21.20	57.86
2004	1.59	12.79	13.40
2005	2.76		7.09
2006	0.38		18.45
2007			48.92

Table 4.5 The average abundance (number caught per 30 minute tow) of striped red mullet annually for Cefas: Channel Beam Trawl Survey (VIId), English Ground Fish Survey (EGFS, IVb & c), Carhelmar (VIIe), Irish Sea Beam Trawl Survey (VIIa, f, & g).

Year	Channel Beam Trawl Survey	English GroundFish Survey	Carhelmar	Irish Sea Beam Trawl survey
1988	-	-	-	0,00
1989	0,52	-	1,48	0,10
1990	0,12	-	0,55	0,06
1991	0,04	0,57	0,47	0,01
1992	0,03	0,58	0,45	0,01
1993	0,11	0,01	0,70	0,02
1994	0,00	0,05	0,48	0,02
1995	0,02	7,76	0,86	0,06
1996	0,07	0,84	0,92	0,07
1997	0,01	0,19	0,80	0,11
1998	0,07	0,25	0,47	0,01
1999	0,09	0,23	2,14	0,22
2000	0,09	0,21	0,97	0,19
2001	0,05	1,37	1,99	0,16
2002	0,05	0,74	0,11	0,03
2003	0,17	0,55	3,72	0,39
2004	0,21	1,81	0,62	0,34
2005	0,02	0,58	1,32	0,54
2006	0,05	0,53	3,67	0,72
2007	0,15	3,83	1,04	0,21

Table 4.6 The average abundance (number and weight (kg) per 30 minutes) of striped red mullet annually for EVHOE survey in the Celtic sea (VIIg, h, j) and in the Bay of Biscay (VIIIa,b).

	Celtic Sea (VIIg, h, j)		Bay of Biscay (VIIIa, b)	
Year	Number/30minutes	W(kg)/30minutes	Number/30minutes	W(kg)/30minutes
1997	0,02	0,00	3,77	0,16
1998	0,02	0,00	4,68	0,09
1999	0,10	0,03	0,81	0,05
2000	0,16	0,03	3,13	0,14
2001	0,04	0,01	20,48	0,91
2002	0,29	0,08	2,85	0,08
2003	0,66	0,10	20,02	0,85
2004	1,40	0,26	1,16	0,15
2005	0,43	0,11	29,08	1,00
2006	0,14	0,01	4,89	0,24
2007	0,23	0,05	7,32	0,20

Table 4.7 Biological sampling in France.

			Length		Age		Maturity		Individual weight	
Year	Landings VIId (t)	Landings IV (t)	Fish number	Sample number	Fish number	Sample number	Fish number	Sample number	Fish number	Sample number
1985	128.65	16.25	-	-	-	-	-	-	-	-
1986	77.45	9.81	-	-	-	-	-	-	-	-
1987	31.37	5.33	-	-	-	-	-	-	-	-
1988	41.43	3.49	-	-	-	-	-	-	-	-
1989	37.99	3.86	-	-	-	-	-	-	-	-
1990	372.22	33.91	-	-	-	-	-	-	-	-
1991	202.93	23.96	-	-	-	-	-	-	-	-
1992	403.30	27.72	-	-	-	-	-	-	-	-
1993	479.45	60.66	-	-	-	-	-	-	-	-
1994	300.47	54.93	181	23	-	-	-	-	-	-
1995	1976.37	521.52	246	32	-	-	-	-	-	-
1996	1745.16	254.64	-	-	-	-	-	-	-	-
1997	693.96	126.37	-	-	-	-	-	-	-	-
1998	2652.38	367.34	-	-	-	-	-	-	-	-
1999	1038.87	211.10	-	-	-	-	-	-	-	-
2000	2354.54	582.04	-	-	-	-	-	-	-	-
2001	1185.47	353.56	-	-	-	-	-	-	-	-
2002	1151.89	290.88	65	9	-	-	-	-	-	-
2003	1282.89	342.66	147	17	-	-	-	-	-	-
2004	3685.74	500.42	142	17	372	12	620	12	1401	12
2005	2154	645	536	10	301	3	196	3	301	3
2006	851	111	1941	10	646	4	646	4	646	4
2007	2814	494	2991	47	740	4	740	4	740	4

Table 4.8 Age/length key of striped red mullet in the eastern Channel and southern North Sea in 2006.

	Group Age						
Length (cm)	0	1	2	3	4	5	6
6	1						
9	1						
10	2						
11	1						
13	3						
14	2						
15	6						
16	2						
17	1						
18		1					
19		21	3				
20		7	9	1			
21		11	22	8			
22		11	15	22			
23		7	16	16		2	
24		8	18	21	4		
25		2	5	14	3	1	
26		4	5	14	1		
27		2	5	14	2	1	
28		1	6	23	3		
29			5	19	1		
30			2	10	4		1
31			1	5	5		1
32				2	8		
33				1	9		
34					2	1	
35					2	2	

Table 4.9 Age/length key of striped red mullet in the eastern Channel and southern North Sea in 2007.

	Group Age					
Length (cm)	0	1	2	3	4	5
9	3					
10	5	2				
11	5	6				
12	4	12				
13	3	21				
14		21				
15		22	1			
16		20				
17	2	21				
18	8	30				
19	1	29	1			
20		40	1			
21		55	7			
22		46	10			
23		47	14	4		
24		31	19	8	2	
25		20	17	6	1	
26		12	11	8	2	
27		3	4	6	1	1
28		1	5	4	5	1
29			8	7	6	1
30			9	8	6	
31			1	4	6	1
32			1	2	8	2
33			2	5		
34				5	3	1
35				1		
36				2		2
38			1	1		1

Table 4.10 Striped red mullet maturity ogive in 2006 to the Eastern English Channel and the southern North Sea.

AGE GROUP	0	1	2	3	4	5	6
% Mature	10,53	98,67	97,32	99,41	100,00	100,00	100,00

Table 4.11 Striped red mullet maturity ogive in 2007 to the Eastern English Channel and the southern North Sea.

AGE GROUP	0	1	2	3	4	5
% Mature	35,48	91,8	97,32	98,59	100	100

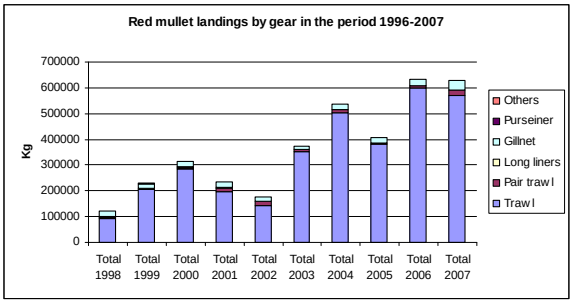

Figure 4.1 Red mullet landings in Basque Country by gear.

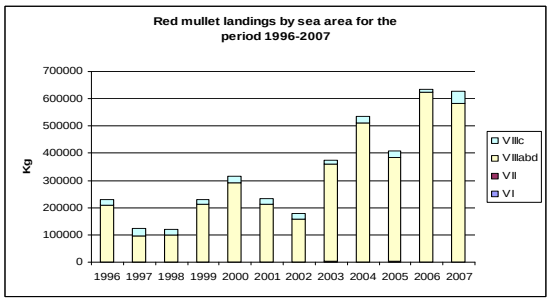

Figure 4.2 Red mullet landings in Basque Country by area.

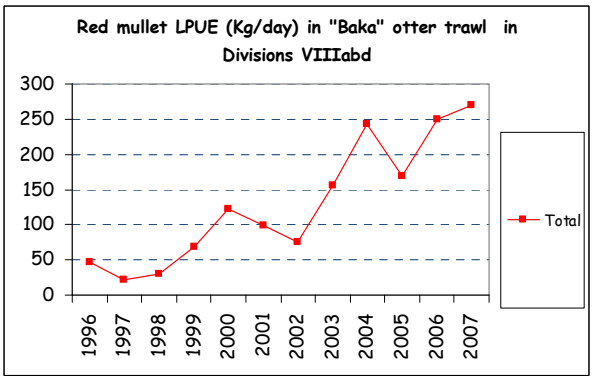

Figure 4.3 Red mullet lpue (kg/day) in single otter trawl in Divisions VIIIa,b,d.

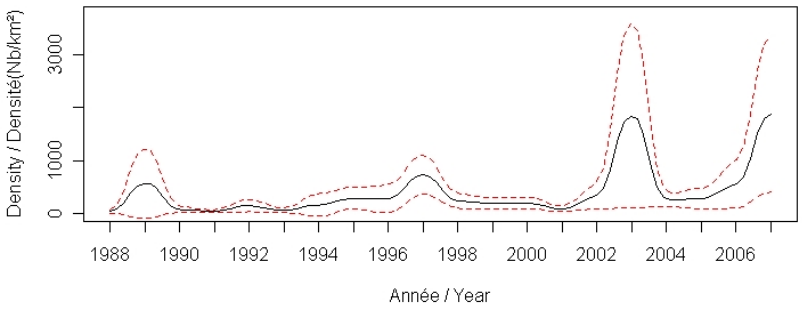

Figure 4.4 Time series of abundance of striped red mullet in the eastern Channel base on CGFS data (Nb/km²) from 1988 to 2007.

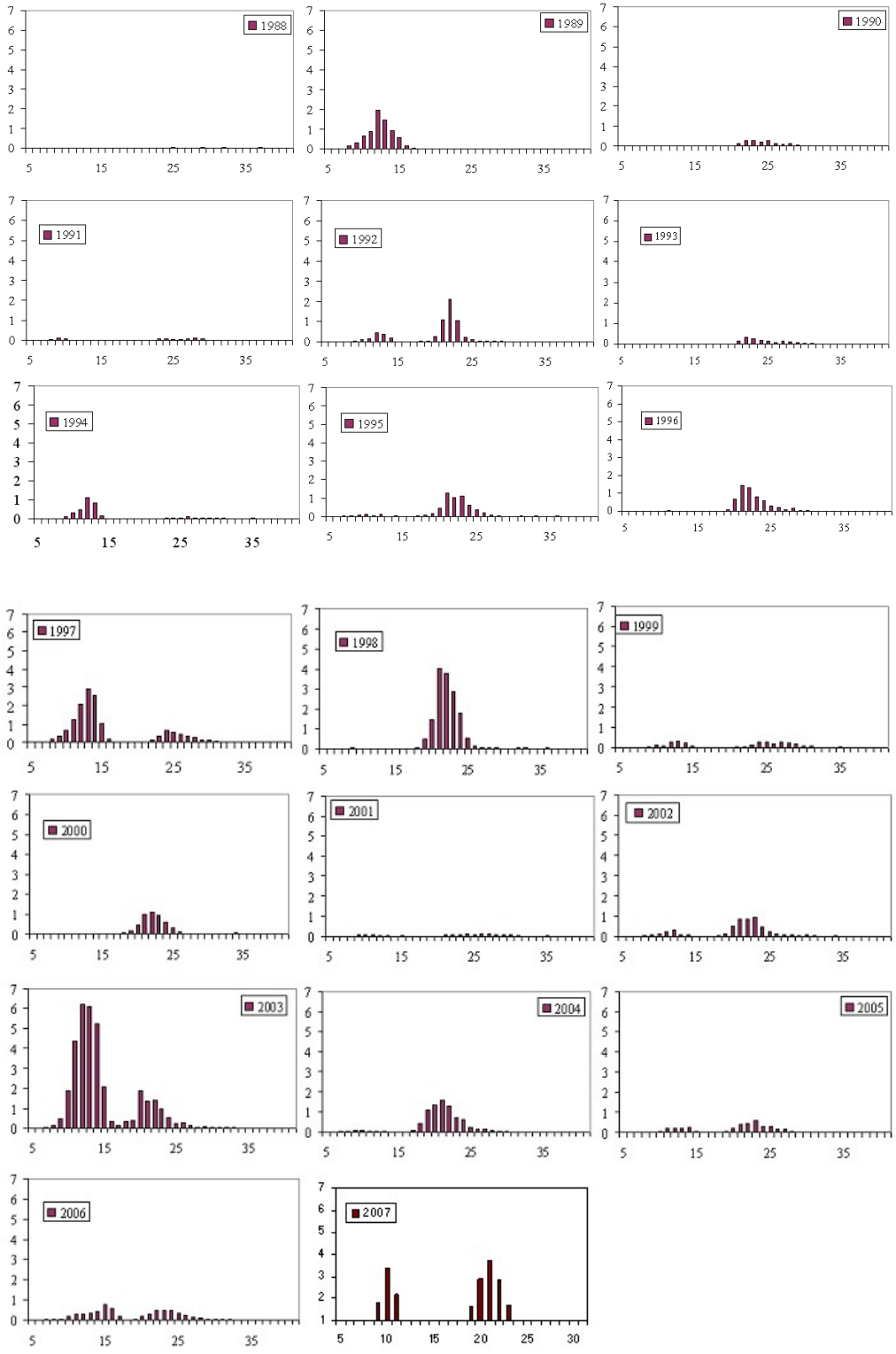

Figure 4.5 Abundance indices (Nb/30 min Trawl) of striped red mullet per size class (Length, cm.) during CGFS from 1988 to 2007.

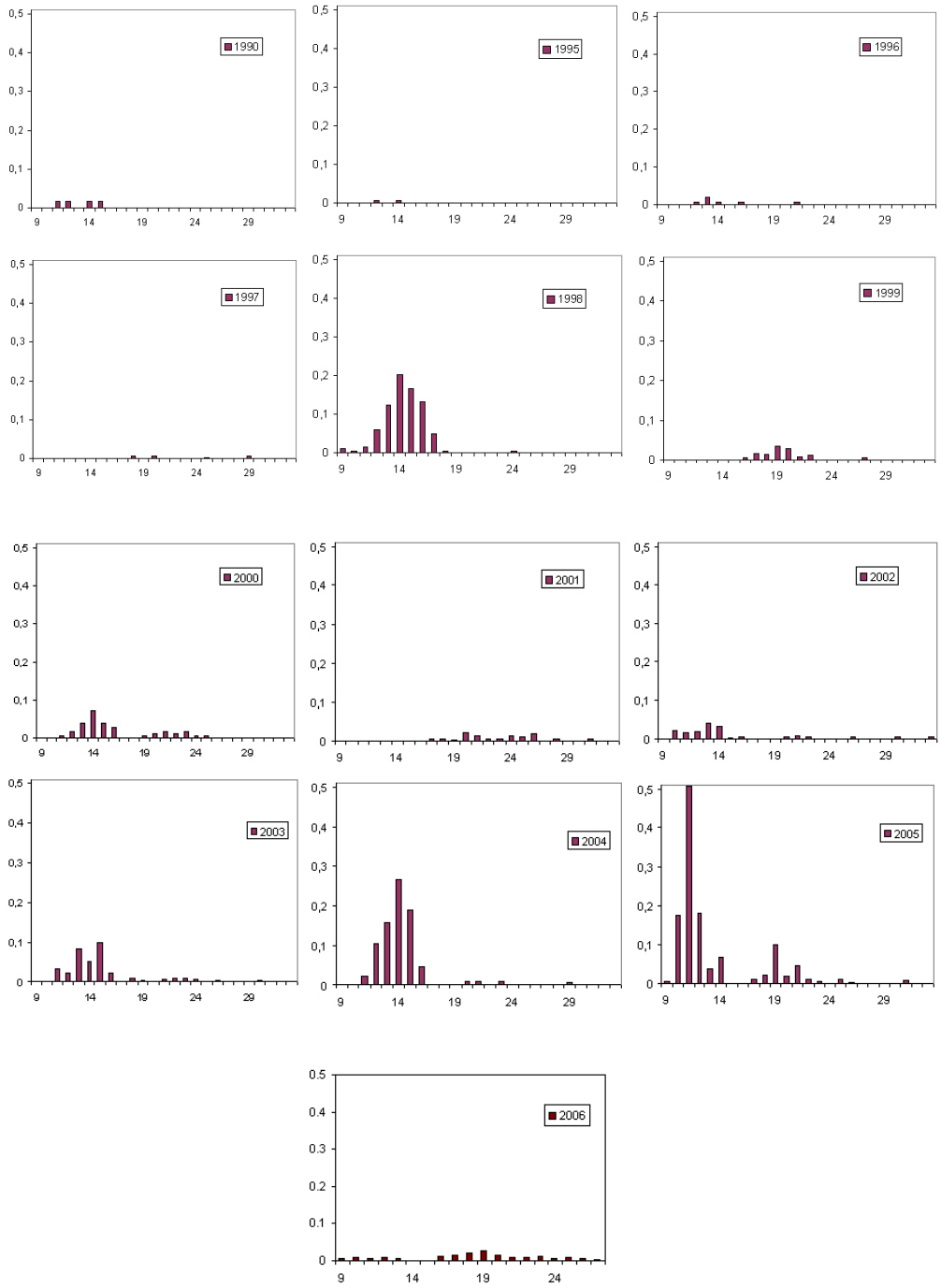

Figure 4.6 Abundance indices (Nb/30 min Trawl) of striped red mullet per size class (Length, cm.) during IBTS (Q1, all countries) from 1990 to 2006.

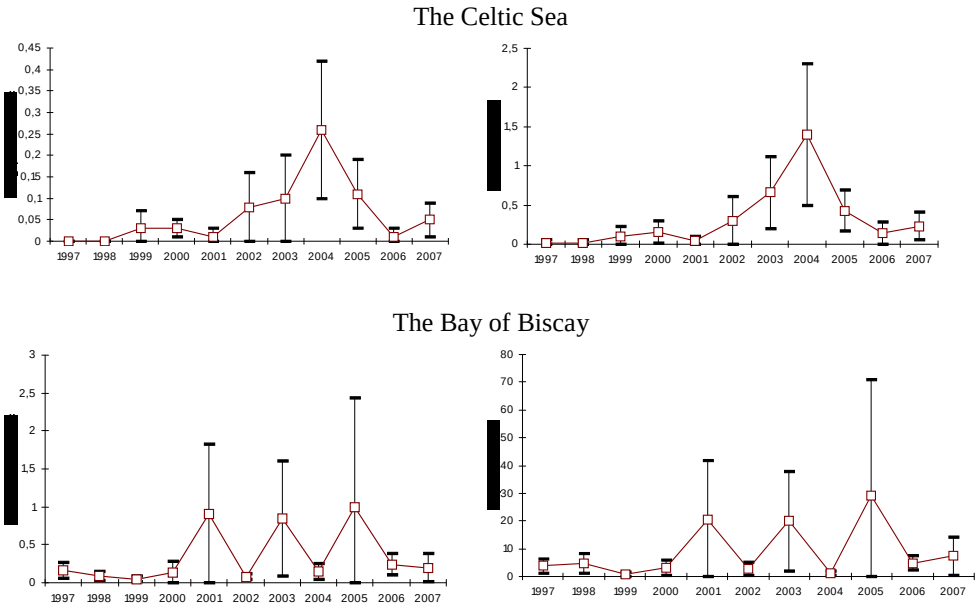

Figure 4.7 Time series of abundance (Nb and Weight (kg)/30 min Trawl) of striped red mullet in the Celtic Sea and in the Bay of Biscay during EVHOE from 1997 to 2007.

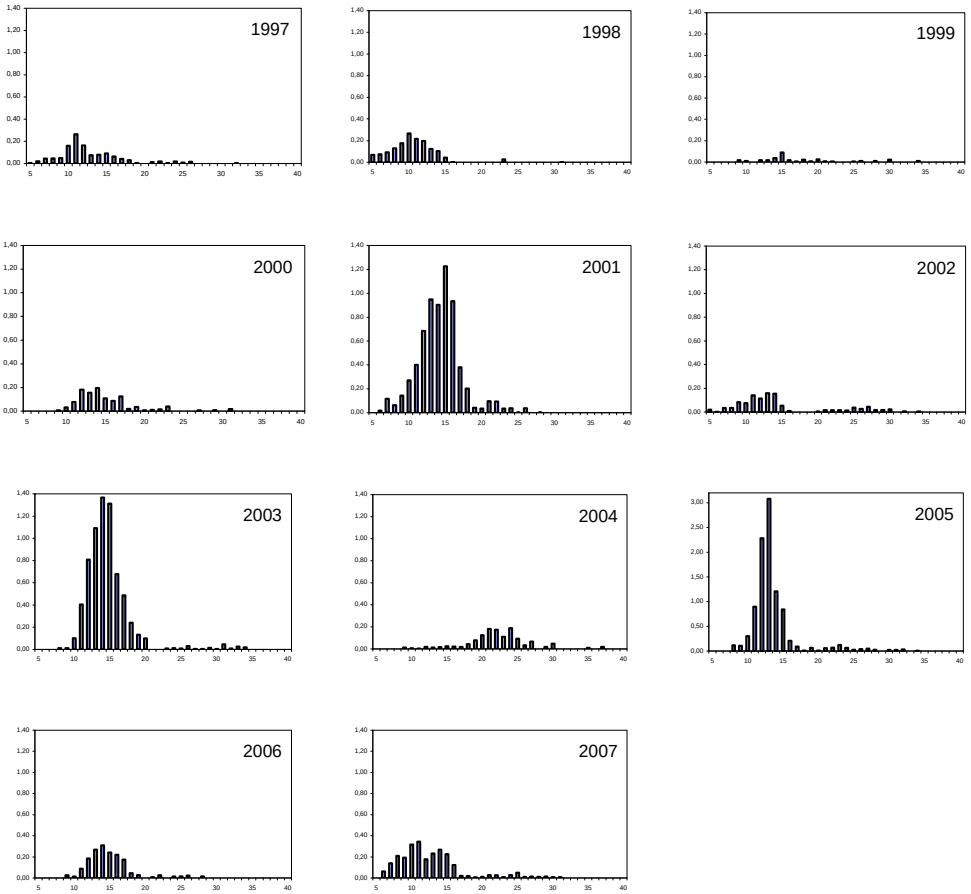

Figure 4.8 Abundance indices (Nb/30 min Trawl) of striped red mullet per size class (Length, cm.) during EVHOE (Bay of Biscay and Celtic Sea) from 1997 to 2007.

Annex 1: List of participants

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Annex 2: Working Document. An update of the UK bass assessments 2007

By S. Kupschus, M.T. Smith and S. Walmsley

Working Document for the ICES WGNEW 2008 (By Correspondence July 2008).

An update of the UK bass assessments 2007

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Introduction

In 2006 Cefas carried out a series of bass assessments for four (stock) areas (West Coast – VIIafg, Western Channel- VIIeh, Eastern Channel-VIId and North Sea- IVbc) to determine the status of stocks and to provide a basis for scenario testing potential future management options for bass fisheries in UK coastal waters. The assessments (Pawson et al, 2007) indicated that although the abundance of bass could not be determined on an absolute basis, for several reasons, relative stock indicators pointed to currently healthy stocks. The data used in the assessments were based on two data sources; the official Fishing Activity Database (FAD) and a logbook scheme developed by Cefas. FAD was used to estimate trawl catch and effort as trawlers are considered better sampled by this recording system. Net and line metiers are usually prosecuted by inshore vessels, less than 10m (<10m) in size, and were assessed using the Cefas logbook scheme because these data were generally poorly captured by the FAD system. The Cefas logbook scheme relies on a stratified survey of ports to assess the number of active boats and a set of participants of the scheme that provide information on the activity and catches of subset of the boats in each region. Rather than recording all catches, the logbook scheme estimates them on the basis of a relatively small sub-sample. Despite the small sample size the scheme is quite costly.

From 2007 and onwards, the logbook scheme was cancelled due to Defra spending cuts, and because there is a belief that the introduction of the ‘registration of buyers and sellers scheme’ has improved the performance of data collection in the official landings statistics. It is the aim of this study to (1) update the assessments to 2006, the last year for which logbook data is available and (2) to compare assessments using both datasets with those using only FAD data and examine the implications of using only FAD data for understanding of the bass fisheries and the provision of advice.

Management for bass has tended to consider the UK fishery as a whole, rather than focussing on different regional aspects. Summary results for updated assessments are therefore presented by metric for all fishery areas together, rather than presenting all metrics for each area in turn.

Methods

The data aggregation methods and fleet based separable model used in this study were described by Pawson *et al*., (2007). Data were essentially unchanged with the exception of the addition of data for two more years (2005 & 2006) and some minor revisions to logbook data for the nets and lines metiers. These revisions were most notably where vessels had been allocated to inappropriate fishing power categories and resulted in small changes to the estimates of landings and effort for these metiers.

The data are generally quite variable and consequently the model fitting algorithm may at times have difficulty finding a suitable solution, tending to converge to unreasonable estimates of virtually zero F with very large stock size. The problem is not one of a lack of a suitable solution, but one of finding it. In order to constrain the algorithm to search in a plausible solution space a penalty function is included in the model. The inclusion of 2 more years of data generally improved model behaviour with respect to convergence and it was therefore possible to reduce the weight of the penalty function (model constraint), compared with previous assessments.

For the comparison of assessments, catch and effort data for the net and line metiers, estimated from the Cefas logbook scheme, were replaced by corresponding data from the FAD. In addition, some experimenting with the weight of the penalty function was carried out for the new assessments, but in general it was found that convergence could be attained with very similar levels of constraint given either dataset.

Results

Results of the updated assessment were in good agreement with previous assessments for the period up to 2004. Observed and fitted landings (Figure 1) show that in all areas, other than VIIeh, observed landings have declined slightly since the peak in 2004. However, landings in all areas remain relatively high. As with previous assessments, fitted landings tend to be estimated slightly higher than observed landings in recent years.

Trends in fishing mortality (Figure 2) were relatively level over the complete time series, but peaks occurred at different times in the different areas, most notably in VIId in the early 1990s and in VIIeh in the late 1990s. Trends in F have been stable since 2004 for all but the VIIafg stock, where a slight rise is indicated.

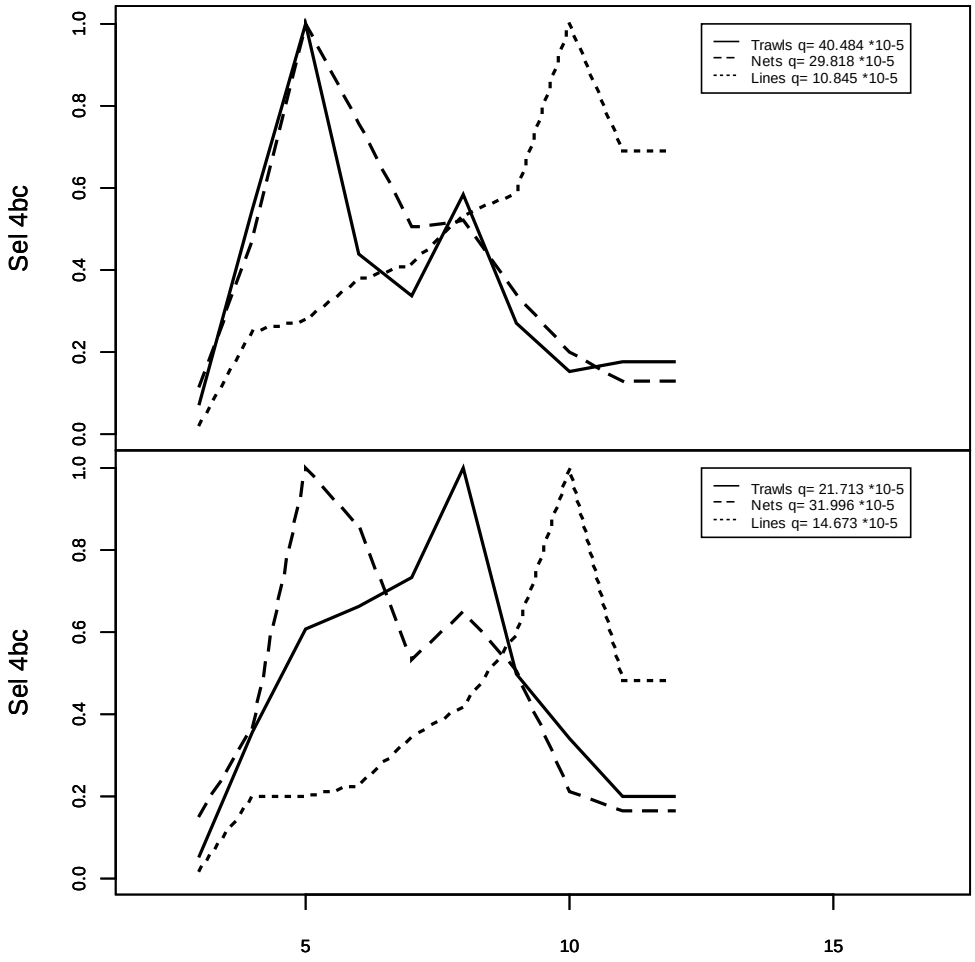
Year class strength was estimated to be relatively consistent between areas and was in close agreement with the independently derived Solent pre-recruit index (Figure 3). As might be expected given the spatial proximity, correspondence between the Solent index and estimates from the assessments was strongest for VIId followed by VIIe, with slightly poorer correspondence for IVb and VIIafg. The stock assessments for VIId and VIIe suggest that the 2002 year class may be quite strong in these areas, but this was not particularly apparent in the Solent index. However, assessment based estimates of recent year class strength have a high degree of uncertainty associated with them because there are relatively few data points in the catch matrix for these cohorts.

Spawning stock biomass (Figure 4) was estimated to be high in all areas and was at or close to the series maximum in most areas. Stock recruit plots (Figure 5) showed no obvious relationship between stock size and recruitment, which would be expected for a species such as bass where spawning success and juvenile survival are heavily dependent on climatic conditions, especially temperature.

Predicted selectivity patterns for VIId and VIIafg (Appendices 2 & 4) remained virtually unchanged from previous assessments. For VIIeh (Appendix 3) there was an apparent increase in the selectivity of all gears for older fish, although the relative

selectivity between gears was very similar. This may be an artefact caused by the change in the relative strength of the penalty function in these assessments compared to the old assessments, rather than an actual change in selectivity. One notable change in selectivity was for the trawl metier in IVbc. Maximum selectivity in previous assessments was predicted to be at age 8, whereas in the new assessments this was at age 6 (Figure 6).

Figure 6. Estimated selectivity patterns for the updated (2006) assessment (top) and the original 2004 assessment (bottom)



Discussion

The outputs from these updated assessments are in close agreement with the assessments carried out in 2006 and used as the basis for the Defra consultation on the bass MLS. Stocks levels are considered to be at, or close to, series maxima and trends in fishing mortality fairly level, with some peaks, throughout the time series.

Recruitment was good during the mid to late 1990s and this has resulted in the current high landings and stock levels. Since 2000 the Solent survey suggests year classes have been of more average strength. This is in contrast to the latest stock assessment results which suggest that the 2002 year class may be quite strong. This has also been reported by anglers. The Solent index is not used in the assessment, but has been used to corroborate the results of the assessments in the past. Three interpretations are possible, (1) the index no longer produces the reliable results, because of a spatial shift in the recruitment dynamics of bass, (2) the assessment does not provide the necessary information at younger ages due to a shift in the selectivity pattern of one or more fleets, or (3) this is due to variance in either the survey or the catch data. Unfortunately, the implications of the three scenarios in terms of management are very different, and it is too soon to say which is most likely.

Predicted selectivity in the IVbc trawl fleet has changed to younger ages compared to previous assessments, suggesting that the fleet would now be more heavily impacted by the MLS than would have been the case in the past. The selectivity pattern is applied to the metier over the whole time series. With less than 10% additional data such a dramatic change suggest that the assessment in this area is very sensitive to variation in catch data. However, the situation is complicated. The change in the trawl residual patterns of the two assessments probably indicates a rescaling of the selectivity component in the new assessment from a noisy variable one previously, to one with less noise, but increasing bias recently (Figure 7). Because catches for the trawl fleet are comparatively small in this area this has had little impact on the predicted stock dynamics, but will alter prediction of future yields for this fleet compared to previous assessments.

Comparison between hybrid logbook and FAD only based assessments and implications for management.

Summaries for the comparisons between hybrid and FAD only assessments for the four stocks are shown in appendices 1 to 4. What follows is a synopsis of the generalisations that can be made between the various comparisons.

In terms of stock dynamics such as recruitment and SSB there is little difference between the assessments. F levels are noisy and both assessments indicate a variable, but more or less stable level of F over the time period. It seems that the true underlying trend in effort (not that used in the assessment) contains much less contrast than the fluctuations in the year class strength, and the assessments are therefore robust to the annually differing patterns of effort provided by the two data sources. It is not possible to analytically distinguish which of the data sources provides the more realistic assessment, because it is not possible to separate bias and variance components of the residuals.

Although, as indicated above it is not possible to distinguish the more suitable data source from the assessment diagnostics, detailed research was carried during the development of the Cefas logbook scheme to ensure that it was representative of the bass fishery and the hybrid logbook data is therefore likely to be less biased than the FAD only data. This implies that FAD only data sources would take longer to average out their temporal biases, whilst hybrid data suffering from variance components only should average out more quickly. From a management perspective, neither data

source provides the basis for detailed annual catch projections as provided for TAC stocks, although the hybrid logbook scheme data should provide reasonable stock and yield projections over a time frame of 5 years, where as those from the FAD data may provide reasonable average yield projections only over longer periods, dependent on the periodicities in the biases in the FAD data.

In the model effort is assumed to be determined without error. Because, in the model, F is linearly related to effort, any errors in the determination of effort result in an increase in the size of catch residuals. Smoothing of the F trend, or some appropriate method of accounting for the variance in the estimate of effort would likely further increase the similarity of the hybrid and FAD only assessments in terms of F trends and should be investigated.

The hybrid assessments already use a FAD component, as all trawl catches are estimated using FAD data. The updated assessment for area IVbc indicates what can happen when using inappropriate FAD data. A detailed reconstruction of the data and investigation of the assessment diagnostics revealed an apparent change in the selectivity of the fleet (see above). The most likely cause is the decline of the North Sea demersal fleet in recent years. The metier is not homogenous, consisting of inshore and offshore components. Some inshore components are likely targeting bass at some time of the year, whereas bass are largely an incidental by-catch for the offshore components. Due to the TAC and effort restrictions associated with cod recovery measures there have been changes in the relative contribution of effort and landings between these components, which has resulted in a change in the selectivity of the metier as used in the assessment.

This violation of the separability assumption reduces the quality of the assessment, although in this case the problem is minor due to the comparatively small contribution of this (trawl) metier. However, such changes are inevitable when using aggregate data from FAD. Although, at least in theory, the problem is not limited to FAD data, stratification in the logbook scheme and detailed fisheries knowledge provided by correspondents does allow for much closer monitoring of the effects. In contrast, FAD data in terms of gear, location and targeting is collected on a much coarser scale, so offers much less opportunity for control of such instances. Investigating the scope for sub-setting FAD data for bass might provide some opportunities to improve their utility for assessment.

Conclusions

For recent ICES advice on bass the logbook scheme has provided little additional information that could not have been provided using FAD data alone. However, on the domestic front, the extra logbook scheme information has provided an improved basis for evaluation of potential management options. Projected stock trends based on FAD data alone are likely to have been broadly similar for the projections run last year, because selectivities for the various fleets are similar for the two data sources. However, yields differ significantly between the data sources and hence the estimates of the economic impact of the proposed measures would differ. In this case the logbook scheme is likely to provide better estimates than FAD.

In general the logbook scheme is variable, but unbiased so that errors will balance out over much shorter periods of time, so that shorter term projections will give more realistic results than projections based on the FAD data. The latter are likely to have less variance, due to the much larger sample sizes, but higher temporal biases associated with changes in the fleet components. This will provide more precise, but likely less accurate estimates of past landings and future yield.

References

Pawson,M.G., Kupschus, S. & Pickett, G.D., 2007. The status of sea bass (*Dicentrarchus labrax*) stocks around England and Wales, derived using a separable catch-at-age model, and implications for fisheries management. ICES J. Mar. Sci. 64:346-356.

Figure 1. Cefas ‘best estimates’ of landings (t) (solid bars), and fitted landings (open bars)

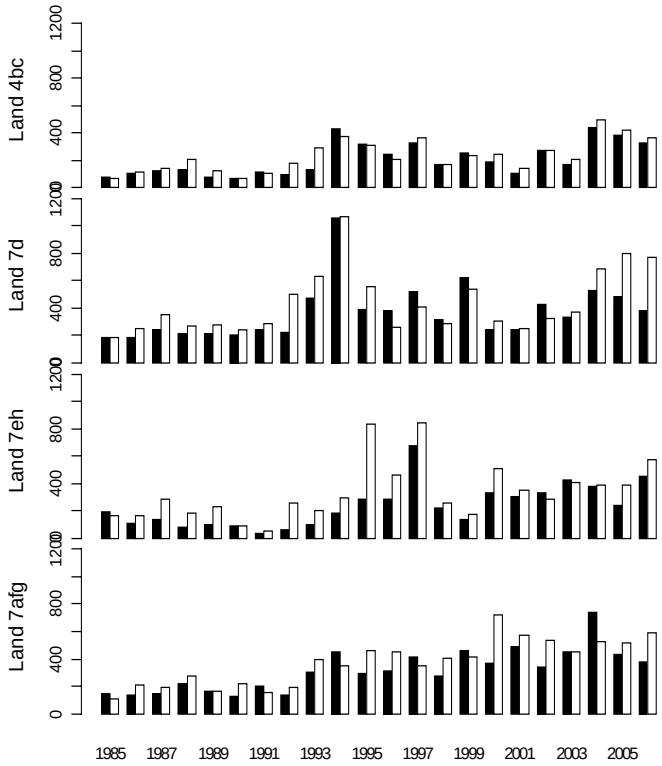


Figure 2. Trends in fishing mortality

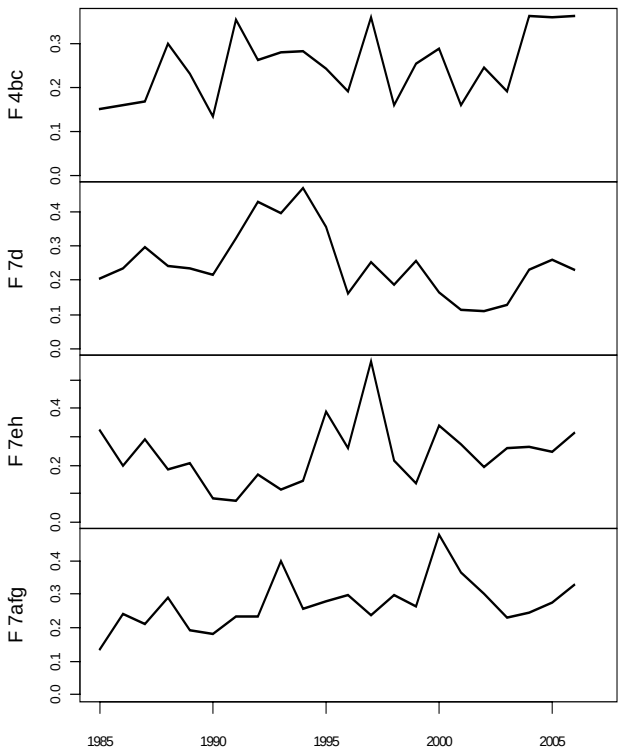


Figure 3. Year class strength as estimated by stock assessments (open bars) and independently estimated from the Solent pre-recruit survey

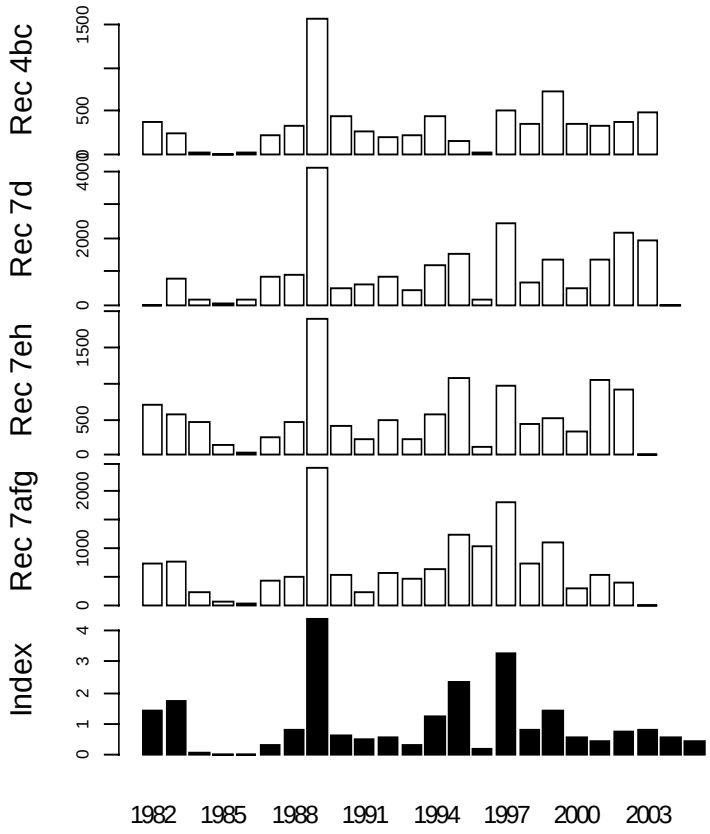


Figure 4. Time series of spawning stock biomass estimates

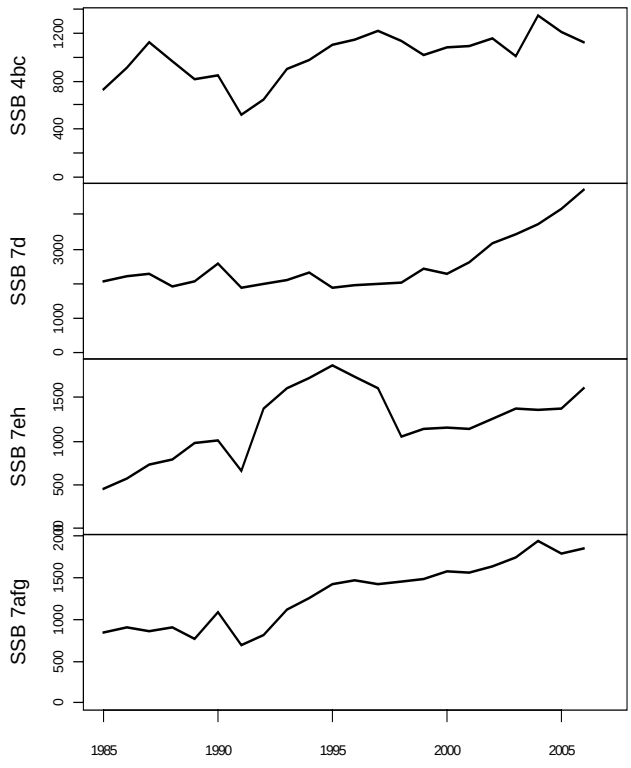


Figure 5. Stock and recruitment

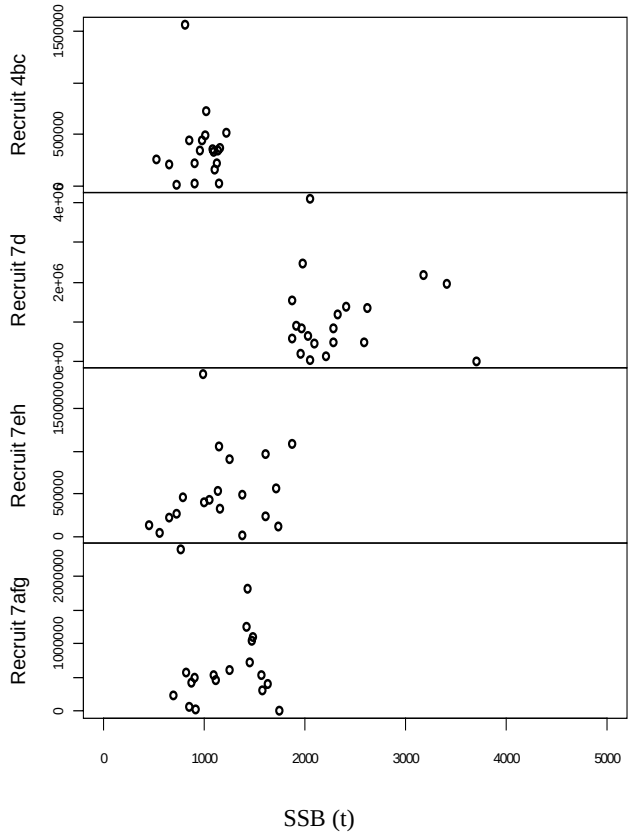


Figure 6. Estimated selectivity patterns for the updated (2006) assessment (top) and the original 2004 assessment (bottom)

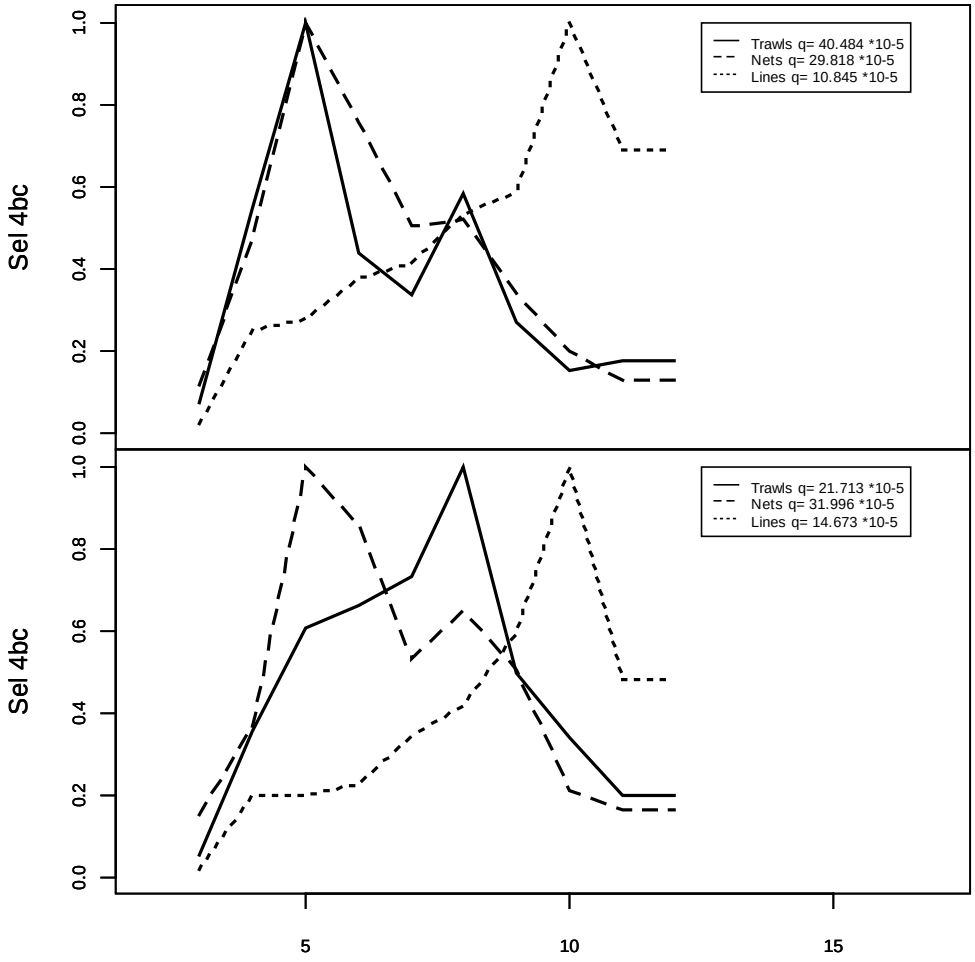
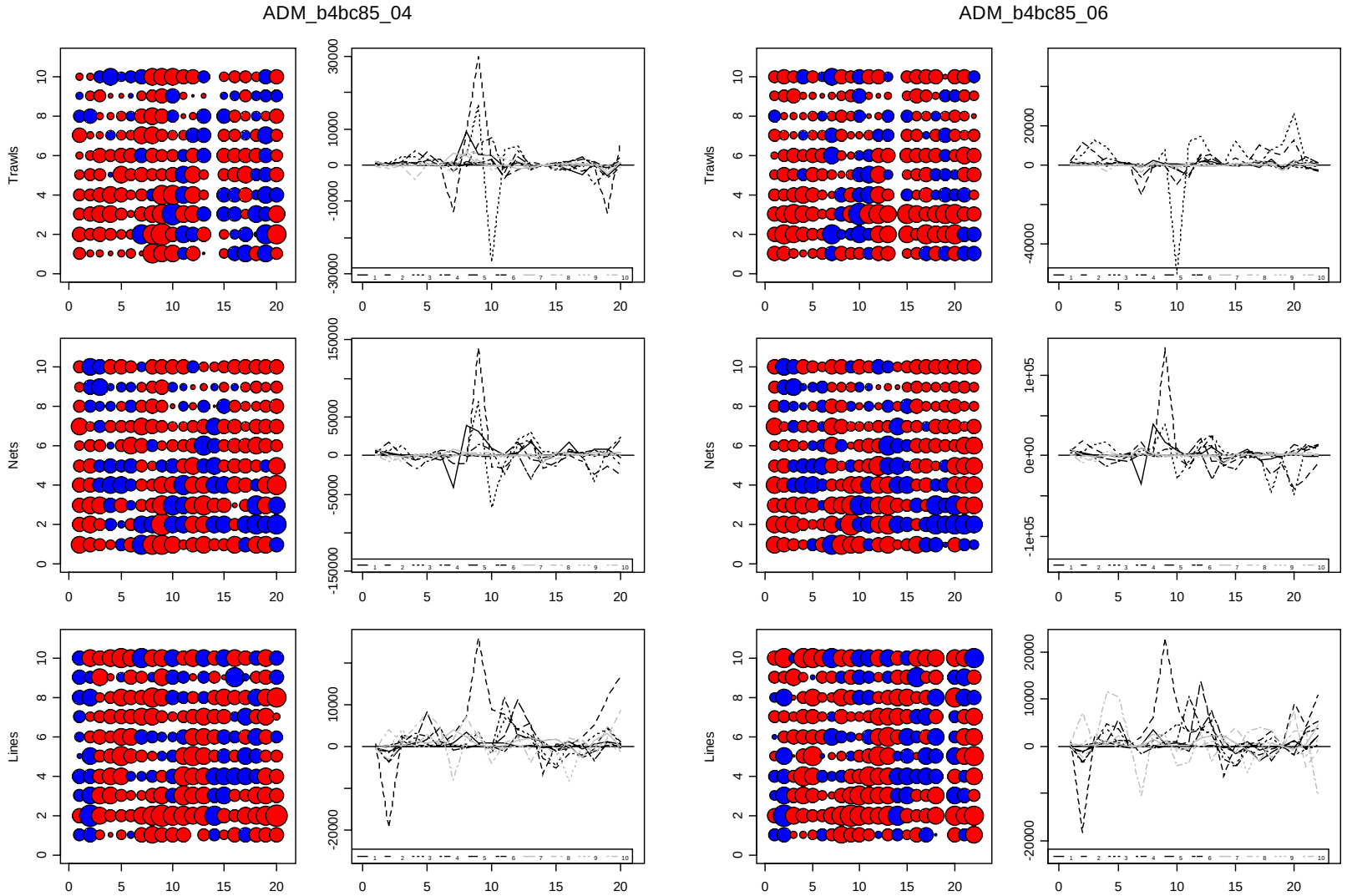


Figure 7. Residual Plots for the hybrid NS assessments produced for data up to 2004 and 2006 indicating the shift in the residual pattern of the trawl data, as a result of the violation of the constant catchability assumption



Red negative residuals, blue positive residuals
Labels from 1 to 10 correspond to ages 3 to 12

Appendix 1. North Sea, IVbc

Selection patterns for trawls and nets for the FAD only assessment in the North Sea are higher at older ages, which could be considered preferable when compared to the very peaked selectivity for the 'best estimate' assessment. The latter suggests that older fish are unavailable to the fishery, which could also be plausible, if they migrate out of the area of the fishery, for example to offshore areas where they are not fished, or to the western English Channel. The selectivity for lines based on the FAD only assessment is very low for the younger ages which seems rather unlikely. In general both sets of selectivity patterns appear plausible and it is difficult to select on this basis.

Residual patterns for the FAD only assessment are very similar to those for the 'best estimate' assessment, indicating that the poorer fitting points are largely the same. The FAD based assessment seems to show stronger under estimation of trawl catchability at younger ages in recent years, than the 'best estimate' assessment, and more defined year effects for lines than the 'best estimate' assessment.

Comparison of the landings data shows the difference in scale between the FAD and 'best estimates', but the relationships between observed and fitted data appear very similar for both assessments.

Trends in fishing mortality (F) in this assessment model are driven by the effort data and these differ between the two assessments, with the FAD assessment suggesting a peak in F in the middle of the time series, while the 'best estimate' F trend is fairly level, but noisy. The FAD effort data relate to all fishing effort for each of the three gear groups and therefore take account of non-bass directed effort. The decline in F since the mid 1990s could therefore be explained by a reduction in fishing effort by white fish fleets largely targeting gadoids. By contrast the Cefas logbook scheme measures directed effort for bass and the 'best estimates' of effort for nets and lines will be largely driven by this and influence the trend in F in the assessment. The logbook scheme is relatively under sampled in the North Sea, which would explain the variable nature of the signal.

Year class strength estimates from both assessments are very similar for most of the series and match the Solent pre-recruit index well. The major difference between assessments is in recent years where the FAD assessment suggests relatively high year class strengths, while the best estimate assessment and Solent index year class strengths are more average. However, in common with the FAD only assessment, the Thames pre-recruit index suggests the 2002 and 2003 year classes are particularly strong. The Thames survey may be more representative of recruitment in the North Sea, but its long-term reliability has yet to be proven, while historically the Solent survey has shown good agreement with catch data.

Both assessments indicate similar upward trends in spawning stock biomass (SSB), with the FAD estimates increasing rapidly in recent years in response to the strong estimated recruitments and declining F. In general terms the FAD scenario seems somewhat less likely than the more stable scenario given by the 'best estimates'.

Figure A1.1. IVbc selectivity patterns, FAD only above, combined below

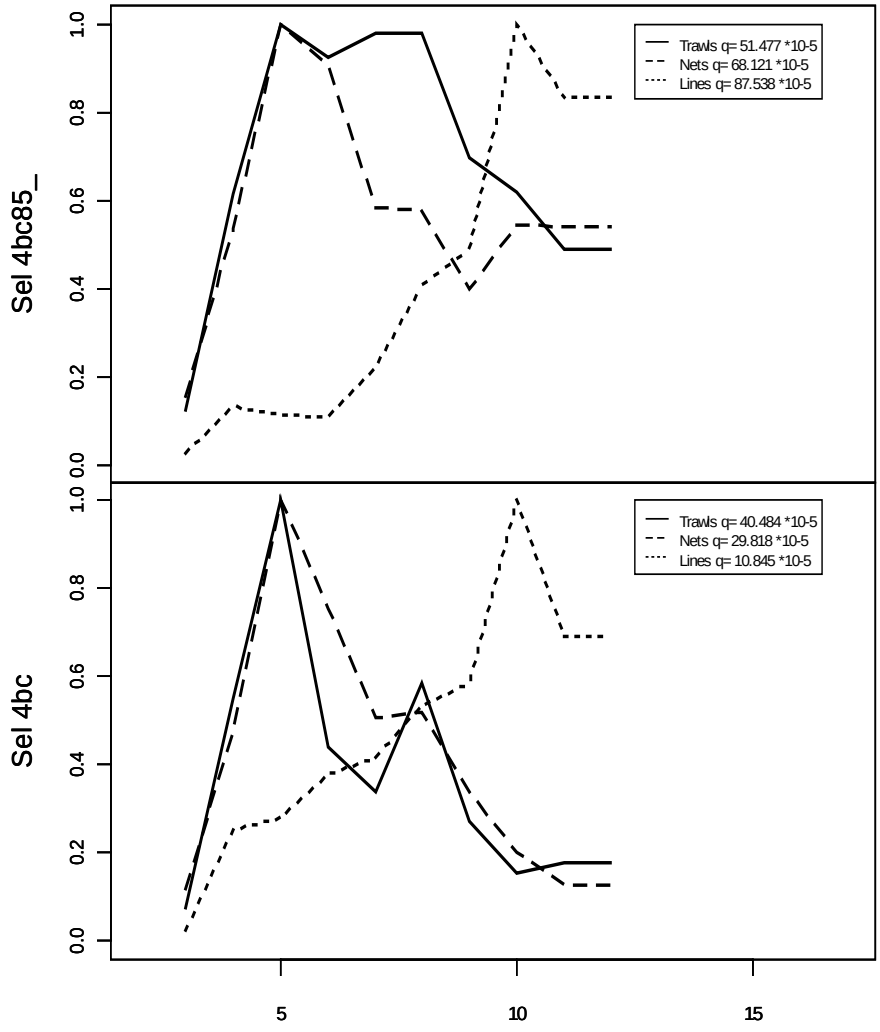
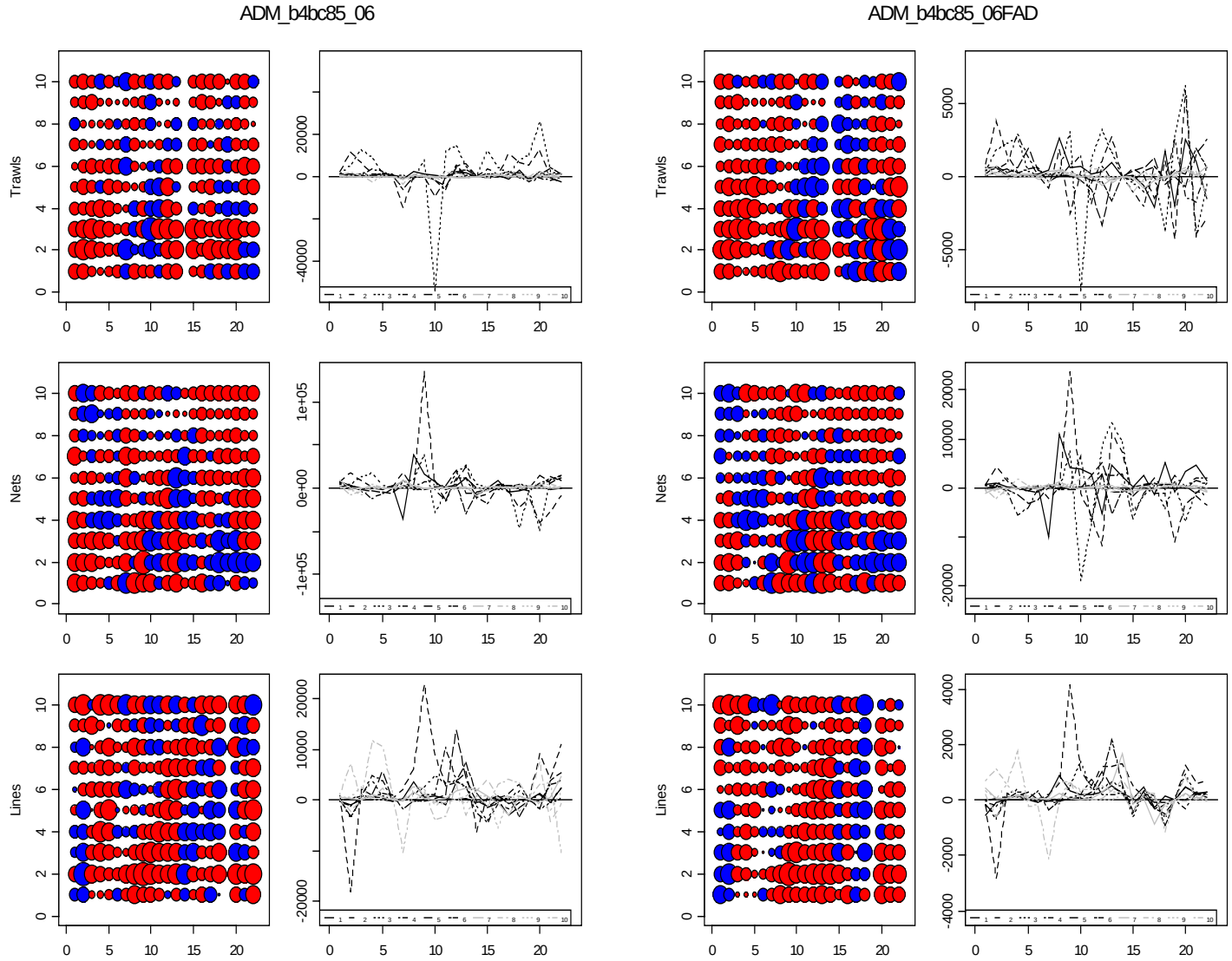


Figure A1.2. IVbc Update (left) and FAD (right) assessment catch residuals



Red negative residuals, blue positive residuals
Labels from 1 to 10 correspond to ages 3 to 12

Residual plots for IVb suggest some tendency to over estimate trawl catch for the younger ages in the early and later years of the assessment and underestimate during the middle years. This is more apparent in the update than the FAD only assessment, where the latter tends to underestimate catch at young age in several recent years. For nets there appears to be underestimation of catch for the younger ages in later years in both assessments. For lines overestimation of catch for young and moderate ages during the middle years of the assessment time series is apparent in both assessments with a negative year effect more apparent in the FAD assessment. However, in general the residuals do not show strong systematic patterns, despite the feeling that this fishery area is more poorly sampled than the others and has potentially seen more changes in the fishery than the other areas.

Figure A1.3. IVbc landings time series, open bars: output; solid bars: input, FAD only above, combined below

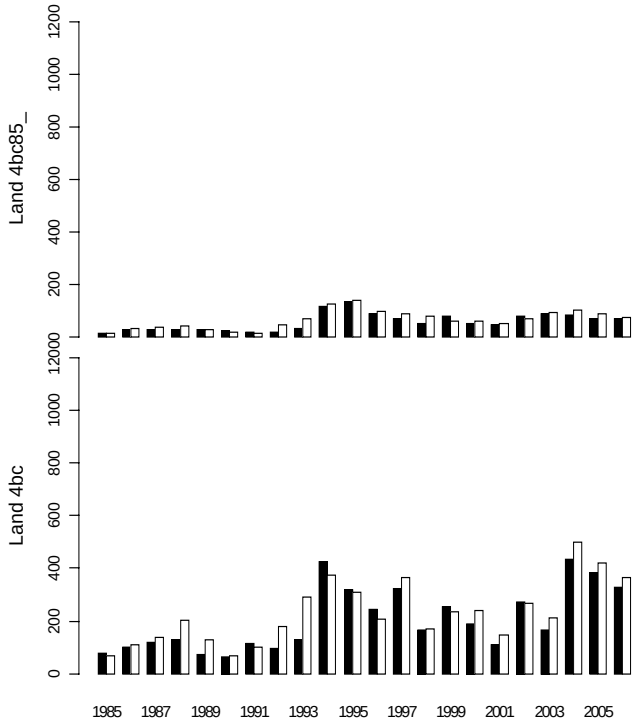


Figure A1.4. IVbc trends in fishing mortality, FAD only above, combined below

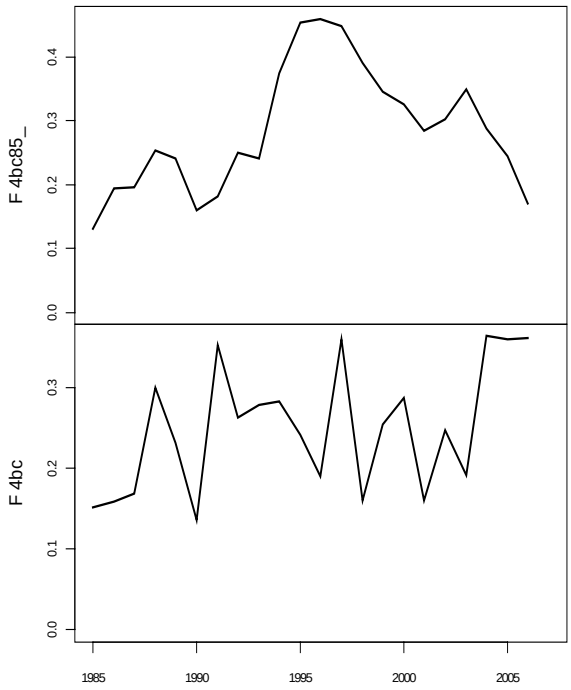


Figure A1.5. IVbc year class strength estimates, FAD only above, combined below

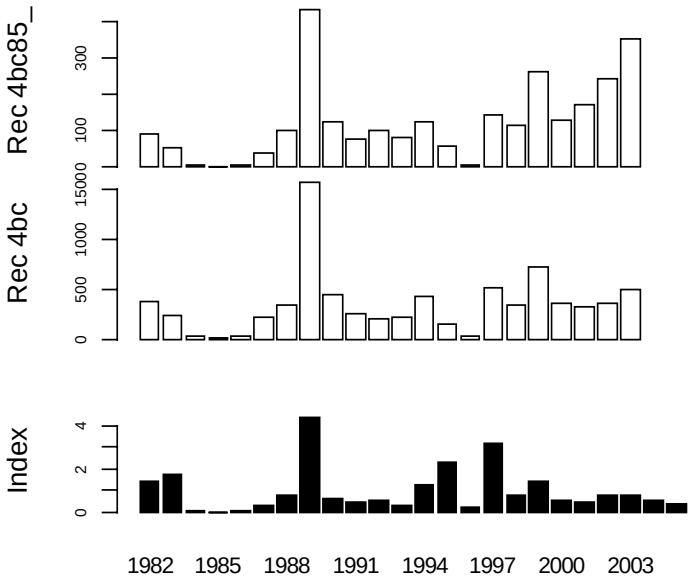


Figure A1.6. Thames pre-recruit survey index

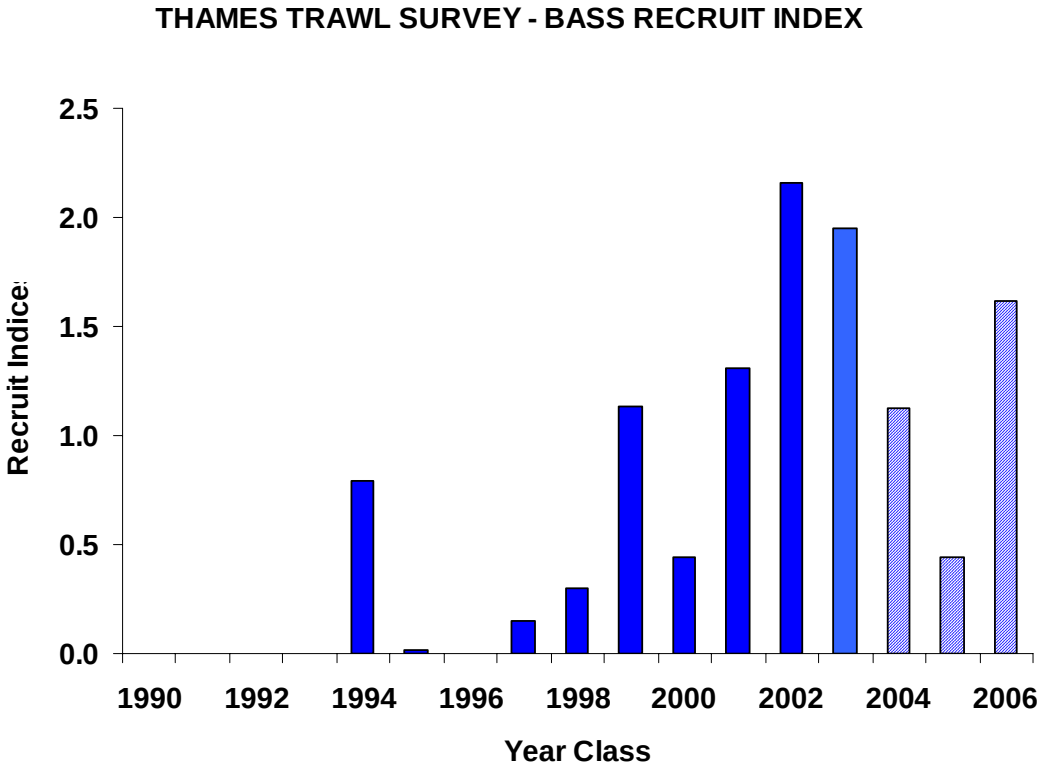
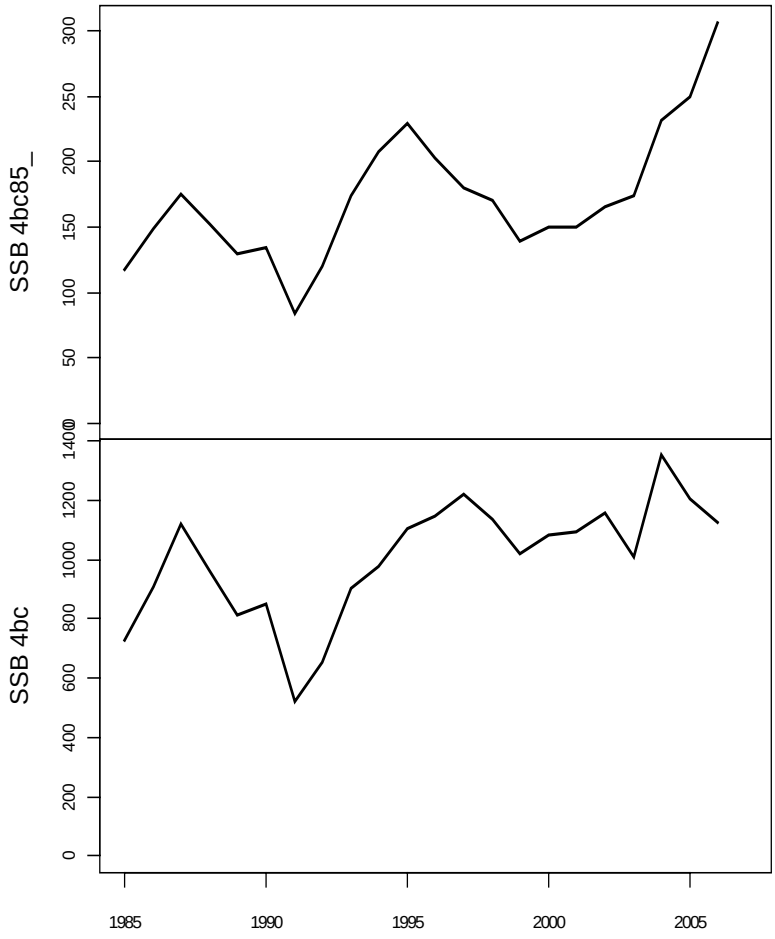


Figure A1.7. IVbc trends in SSB estimates, FAD only above, combined below



Appendix 2. Eastern English Channel, VIId

Selection patterns for all three gear groups tend to be more peaked for the FAD only assessment in the Eastern English Channel and the 'best estimate' patterns could be considered slightly preferable. The former suggest that older fish are unavailable to the fishery, which could also be a plausible scenario, if they migrate out of the fishery, for example to offshore areas where they are not fished, or to the western English Channel. In general both sets of selectivity patterns are plausible.

Residual patterns for the FAD only assessment are very similar to those for the 'best estimate' assessment, indicating that the poorer fitting points are largely the same. The FAD based assessment seems to show a slightly better fit for nets and worse for lines than the 'best estimate' assessment.

Comparison of the landings data shows the difference in scale between the FAD and 'best estimates' as well as more contrast in the best estimate data. The latter could be real, or could reflect the relatively low level of sampling in the Cefas logbook scheme, which is thought to reduce bias, but increase variability (noise). The relationships between observed and fitted data appear very similar for both assessments with fitted landings estimated higher than the input data in recent years.

Trends in fishing mortality are similar between the two assessments, with the FAD assessment suggesting a sharp peak in F as the very strong 1989 year class entered the fishery, while in the 'best estimate' assessment this peak in F is extended for several years. FAD would not be expected to capture changes in catch and effort as effectively as the Cefas logbook scheme where the fishery was prosecuted by small vessels, which could be the case in this area. Also it is thought that bass fishermen are able to target a strong year class over several years, which could give credence to the extended peak, with the exceptional 1989 year class forming the basis of the fishery for several years. Examination of the logbook fleet census data suggests this is not related to the 4-5 year rotational sampling design as the data change at a finer scale than this over this period, but relates to real increases in the numbers of vessels fishing for bass (Figure A2.5).

The pattern of year class strength estimates from both assessments are almost identical for the whole time series and match the Solent pre-recruit index well for all but the most recent years, where both assessments suggest relatively high year class strengths for the 2002 and 2003 year classes, while the Solent index year class strengths are more average. However, it should be noted that the most recent estimates of year class strengths in assessments tend to be more poorly determined because fewer catch data relating to these cohorts are available.

Both assessments indicate similar upward trends in SSB, with the 'best estimates' assessment increasing more rapidly in recent years in response to the strong estimated recruitments and a somewhat lower F. There are features of each assessment that could be more plausible and it is difficult to decide which is more reliable, however both give a very similar overall prognosis.

Figure A2.1. VIId selectivity patterns, FAD only above, combined below

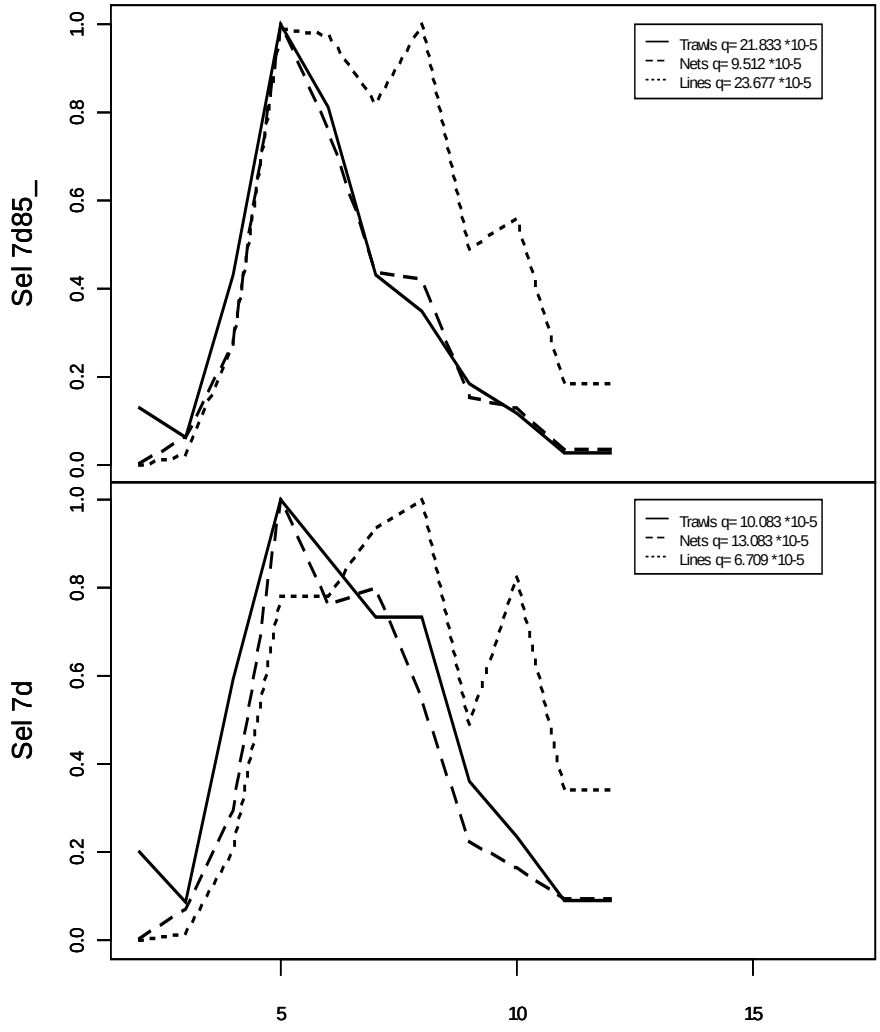
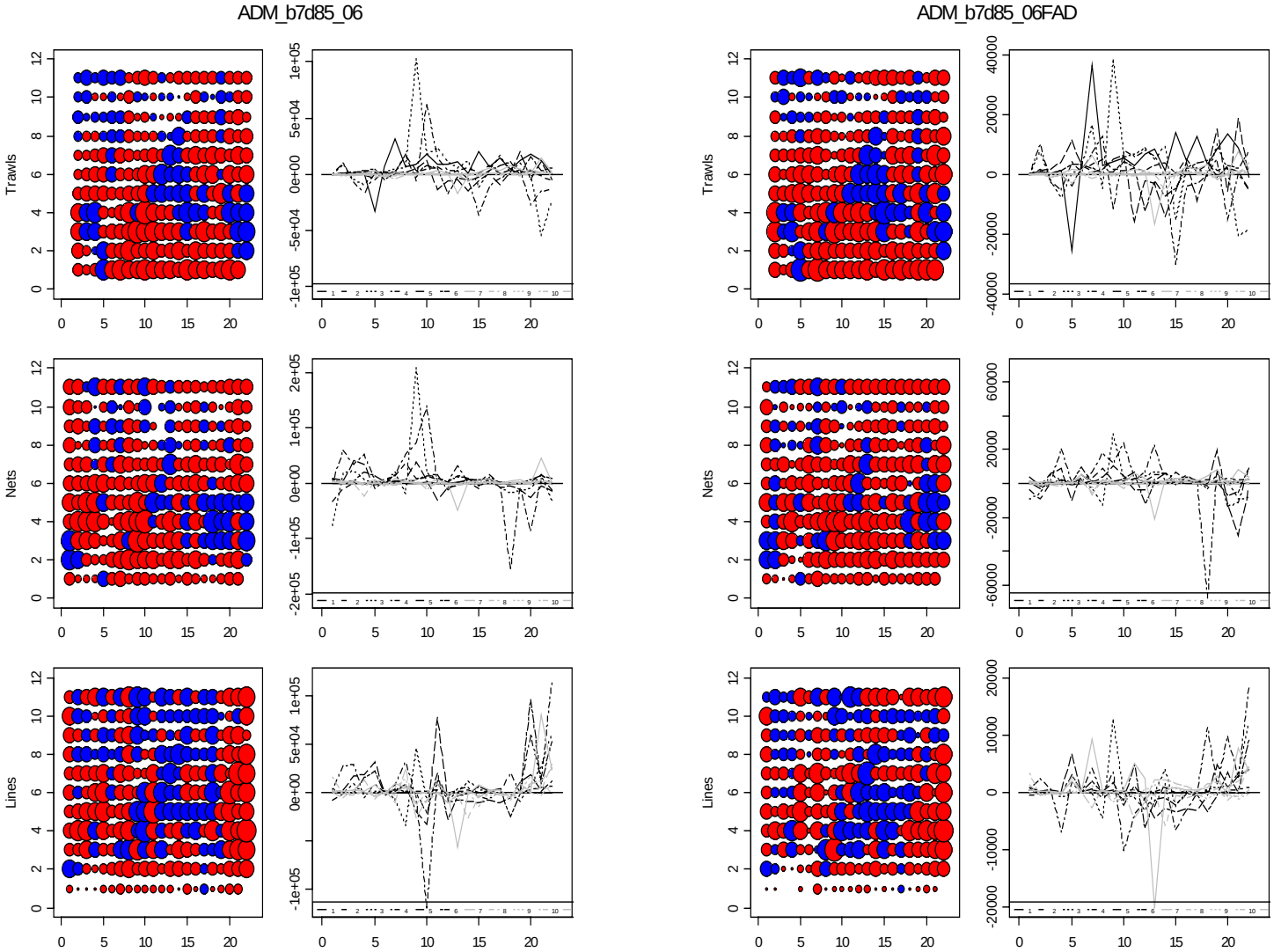


Figure A2.2. VIId update (left) and FAD (right) assessment catch residuals



Red negative residuals, blue positive residuals
Labels from 1 to 11correspond to ages 2 to 12

The residual patterns between for assessments based on the different data sets are very similar. Residual plots for VIId suggest some tendency to over estimate trawl catch for the younger ages in most with years of the assessment, with some underestimation of catch for the middle ages in the middle years of the time series. Trawl catch for ages 3, 4 and 5 is also underestimated in the most recent two years. For nets there appears to be some underestimation of catch for the ages 4, 5 and 6 in later years, with these ages overestimated earlier, while for lines there appears to be some overestimation of catch for all ages in the most recent two years. The bass fishery in this area is well established and the area is considered well monitored relative to the bass fisheries in other areas.

Figure A2.3. VIId landings time series, open bars: output; solid bars: input, FAD only above, combined below

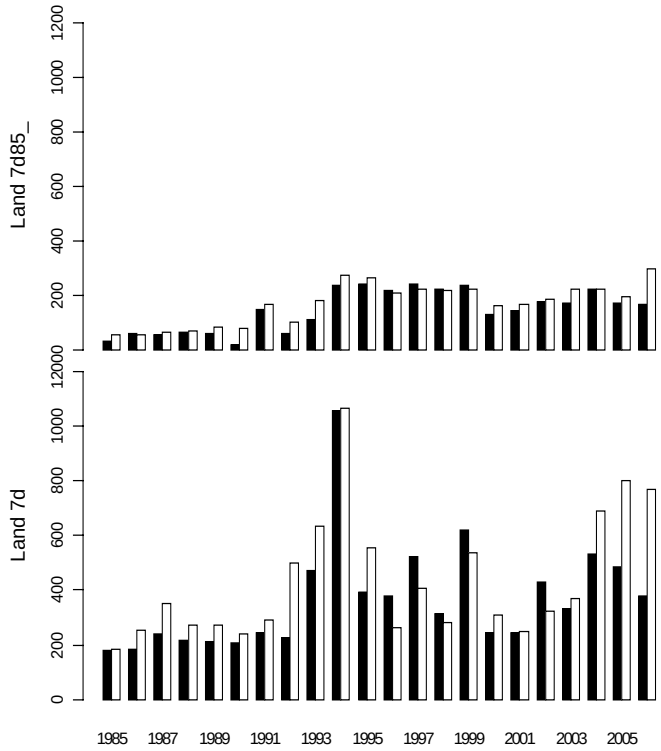


Figure A2.4. VIId trends in fishing mortality, FAD only above, combined below

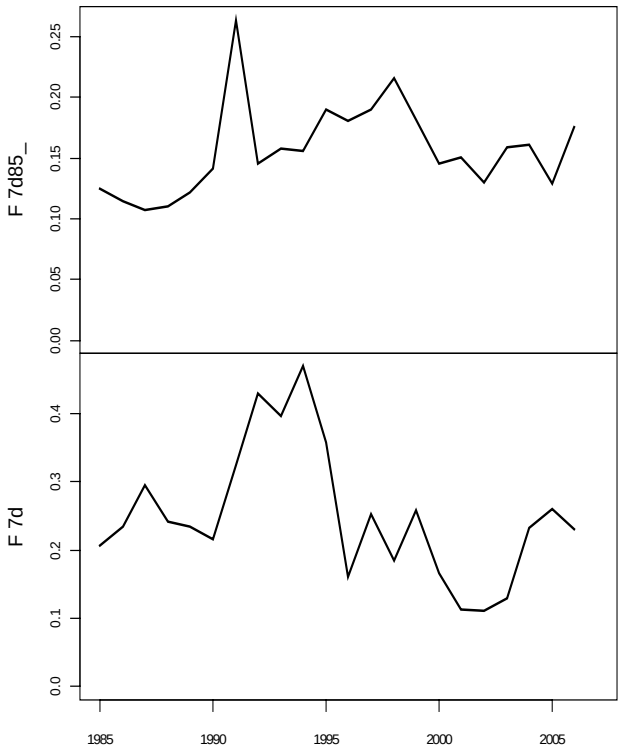


Figure A2.5. Cefas census of active bass vessels by gear group in VIId

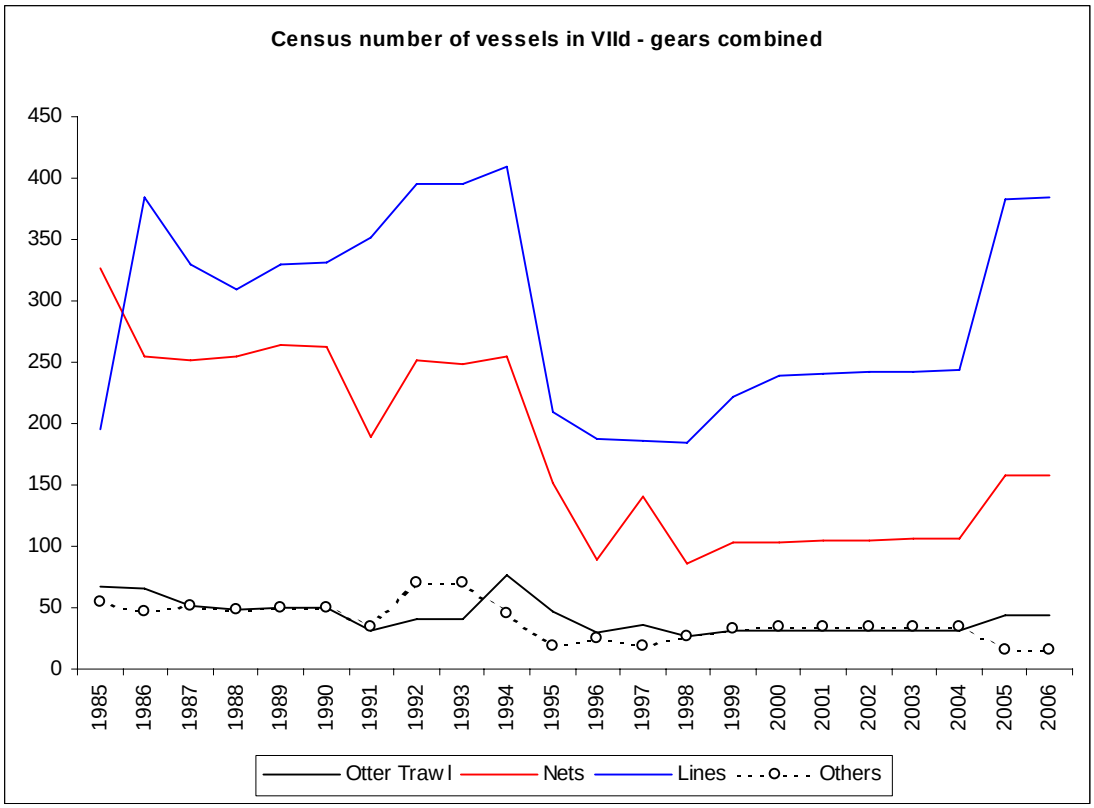


Figure A2.6. VIId year class strength estimates, FAD only above, combined below

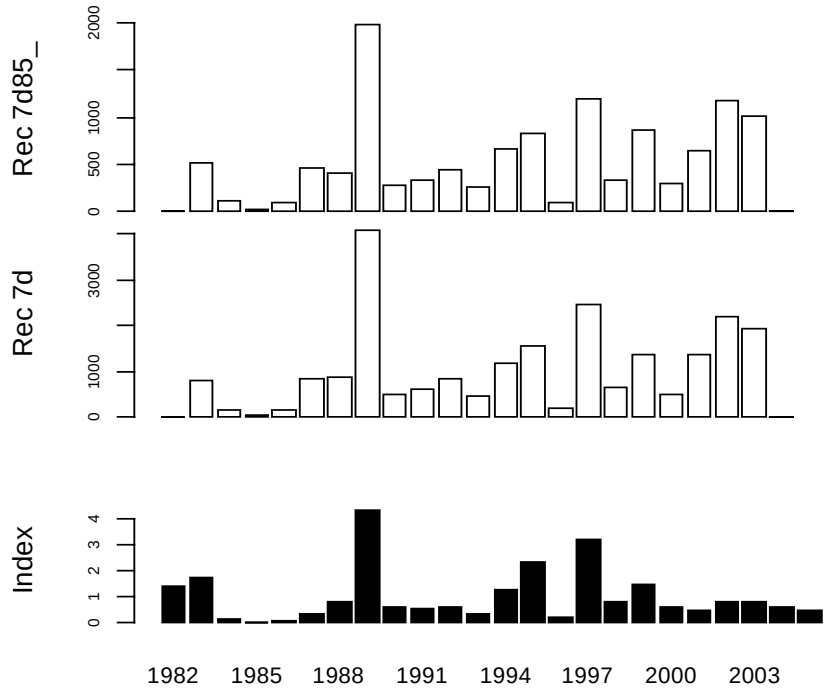
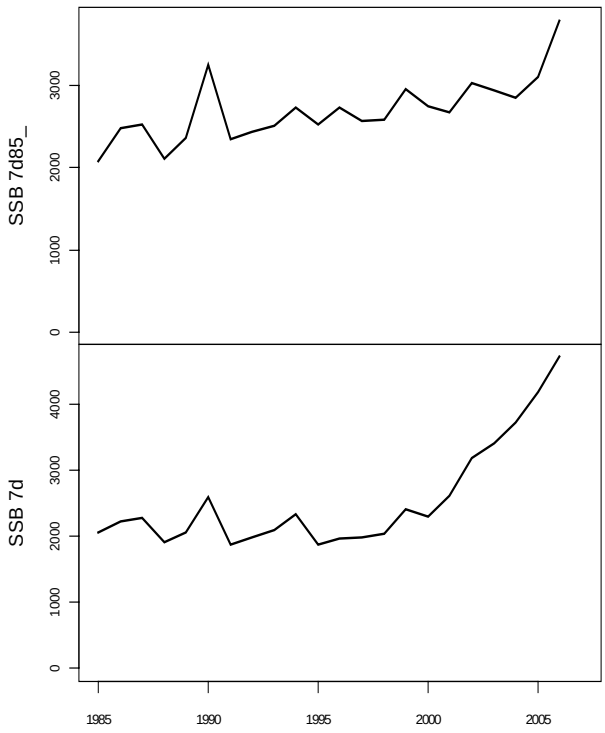


Figure A2.7. VIId trends in SSB estimates, FAD only above, combined below



Appendix 3. Western English Channel, VIIeh

Selection patterns for all three gear groups tend to be more peaked for the FAD only assessment in the Western English Channel and the higher selectivities at older ages exhibited by the 'best estimate' patterns are considered preferable, particularly in this area where relatively more commercial fishing targeting older bass takes place.

Residual patterns for the FAD only assessment are somewhat different to those for the 'best estimate' assessment with trawls showing an increase from negative to positive through the time series in the FAD only assessment and the opposite trend occurring in the trawl residuals in the 'best estimate' assessment. The FAD assessment shows some downward trends in residuals through the time series for both nets and lines whereas year effects are more apparent for these gears in the best estimate assessment.

Comparison of the landings data shows the difference in scale between the FAD and 'best estimates' and although the trends are broadly similar there are differences, most notably a broad plateau in observed landings in FAD occurring from1994-1999, while for the 'best estimates' the distribution over this time period is more peaked with the maximum value in 1997. Fitted landings in 1995 for the 'best estimate' assessment were considerably higher than observed landings, suggesting there may be a problem with the data consistency in this time period.

Trends in fishing mortality show some similarities and some differences between the assessments. F derived from FAD has a small peak in 1989, while in the 'best estimate' assessment F is declining for several years around this time. Both assessments show a peak in F 1997, subsequent decline but increase again by 2006.

The patterns of year class strength estimates from both assessments are very similar for most of the time series, with the notable exception of 2003, which is estimated as weak in the best estimate assessment, but strong in the FAD only assessment. However, it should be noted that the most recent estimates of year class strengths in assessments tend to be poorly determined because few catch data relating to these cohorts are available in the analysis.

Both assessments indicate similar general upward trends in SSB, with a dip in 1991 followed by a bulbous peak in the mid 1990s, which is less peaked but extends for longer in the FAD only assessment. Again there are features of each assessment that could be more plausible and it is difficult to decide which is better. Both give a similar overall prognosis of current high stock levels.

Figure A3.1. VIIeh selectivity patterns, FAD only above, combined below

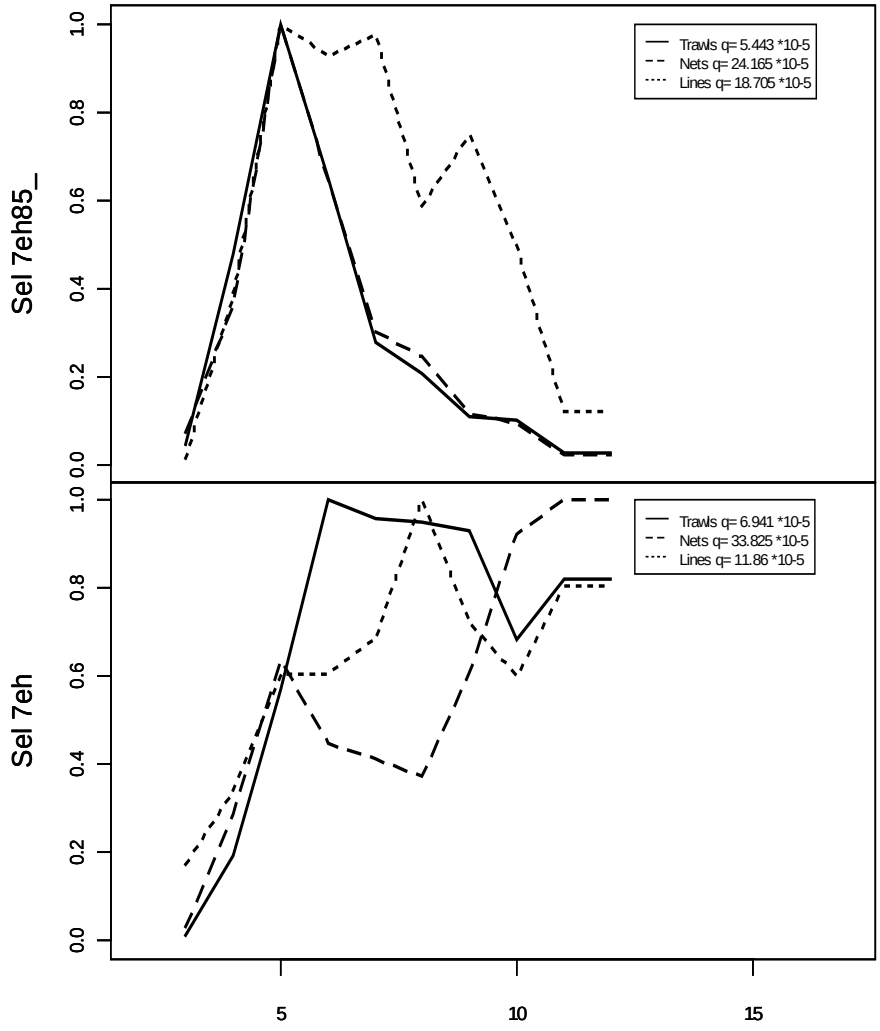
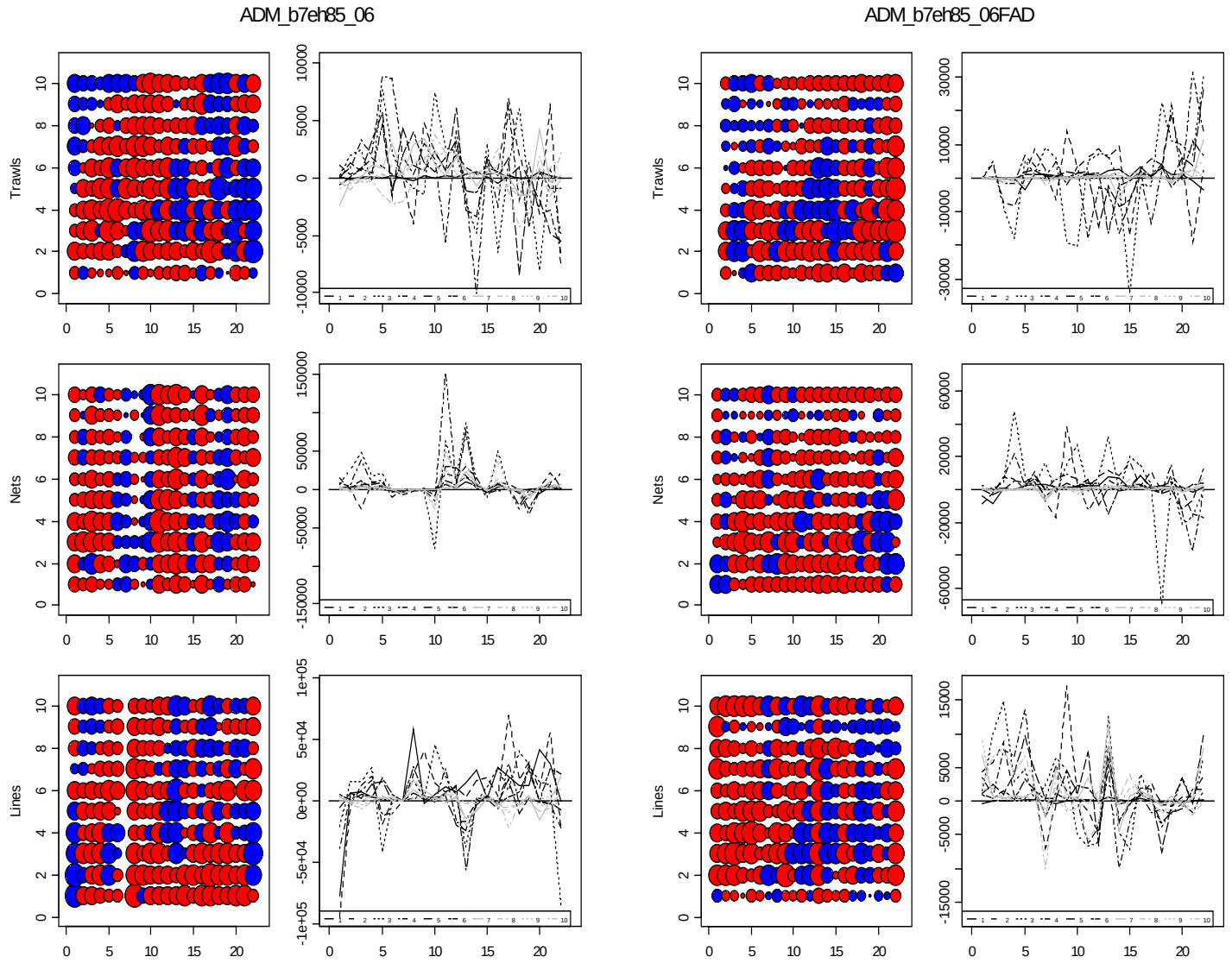


Figure A3.2. VIIeh Update (left) and FAD (right) assessment catch residuals



Red negative residuals, blue positive residuals
Labels from 1 to 10 correspond to ages 3 to 12

Residual plots for VIIeh suggest a tendency to underestimate trawl catch in the update assessment at ages 4-8 in the last 2 to 3 years and to overestimate at age 4 for much of the time series. In the FAD assessment by contrast catch is over-estimated at these ages in recent years. Diagonal year class effects occur in many of the residuals for this gear group in both assessments. Residuals for nets in the update assessment show alternating year effects (vertical), while for lines there appears to be some over-estimation of catch for younger ages in the more recent half of the time series ages with some underestimation of the young and middle ages in the first and last years of the series. The FAD assessment also shows some year effects for nets, while the residuals for lines suggest a negative trend through time for the main ages in the landings.

Figure A3.3. VIIeh landings time series, open bars: output; solid bars: input, FAD only above, combined below

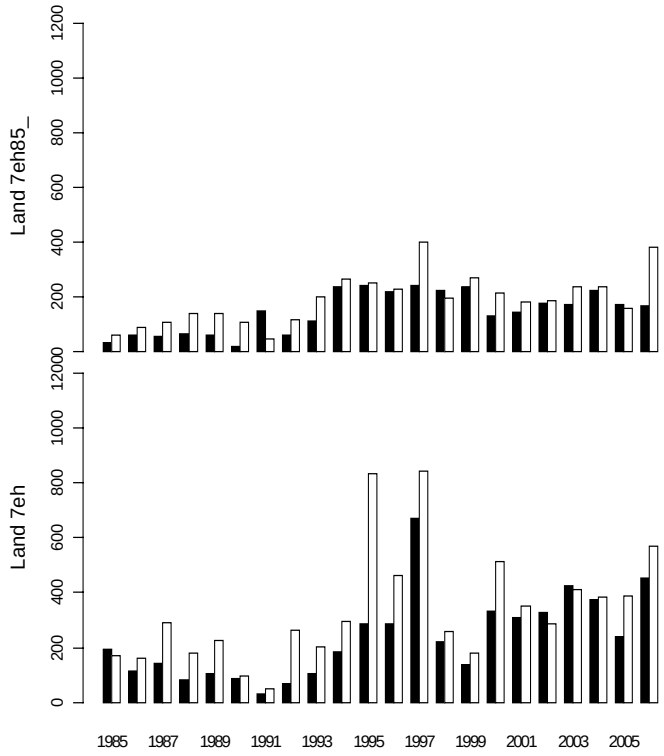


Figure A3.4. VIIeh trends in fishing mortality, FAD only above, combined below

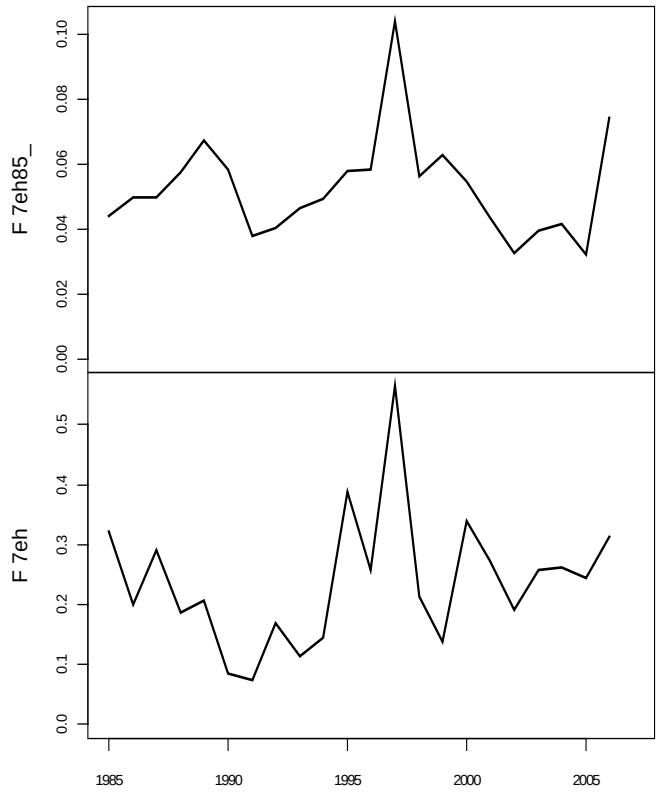


Figure A3.5. VIIeh year class strength estimates, FAD only above, combined below

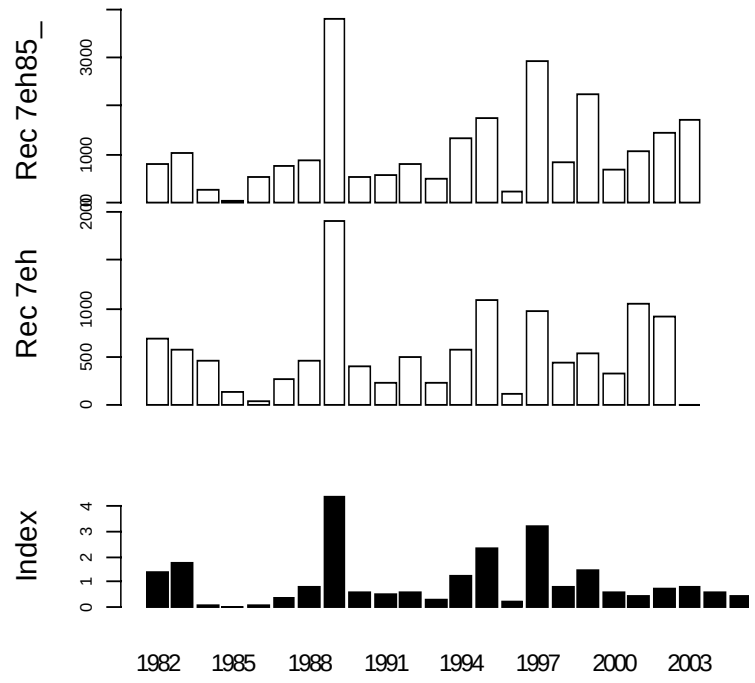
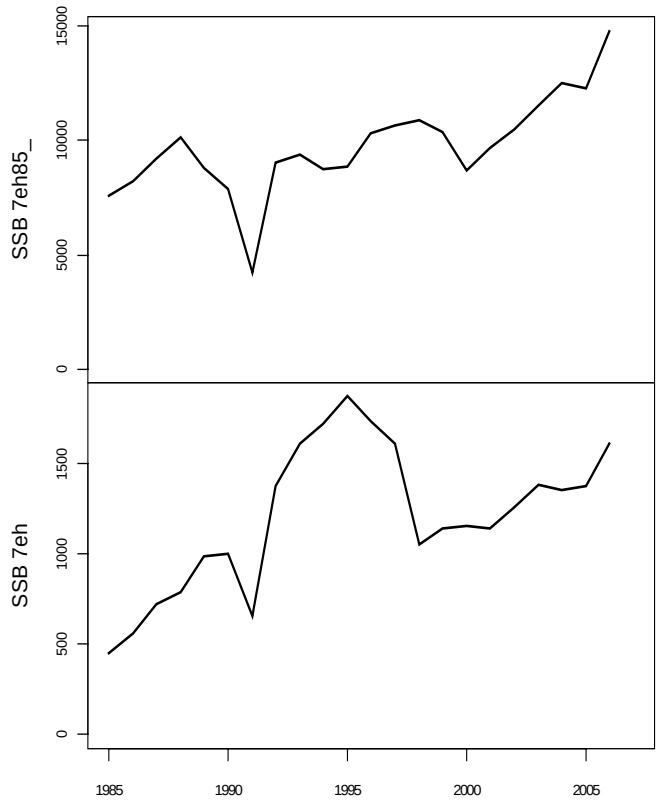


Figure A3.6. VIIeh trends in SSB estimates, FAD only above, combined below



Appendix 4. West Coast, VIIafg

Selection patterns for all three gear groups tend to be more peaked for the FAD only assessment and the higher selectivities at older ages exhibited by the 'best estimate' patterns are considered preferable, particularly as this may also be an area where relatively more targeting of older bass takes place in the commercial fishery. In particular, the reduction in catchability for the line fishery at older ages in the FAD only assessment is undesirable.

Residual patterns for the FAD only assessment are similar to those for the 'best estimate' assessment for trawls but differ slightly for nets and lines. The FAD based assessment seems to show fewer but stronger year and year class effects for nets, than the 'best estimate' assessment and to fit slightly better for lines. An underestimation of catchability at age 6 in the second part of the time series for nets, in particular, as well as lines, is more apparent in the FAD assessment.

Comparison of the landings data shows the difference in scale between the FAD and 'best estimates' and although the trends are somewhat different. A peak in observed landings in the 'best estimates' occurs in 2004 and this is not apparent in the FAD landings which peak in 1995 and again in 2002. There is also a large estimated landings figure in the best estimate assessment in 2000 that is not apparent in the assessment using FAD only data.

Trends in fishing mortality are quite different between the two assessments. F derived from FAD has a sharp peak early in 1988 and is thereafter fairly level with a small peak in the mid 1990s and slight rise in the last two years. The 'best estimate' assessment suggests F may be increasing through the time series, with peaks in the late 1980s, 1993 and 2000.

The patterns of year class strength estimates from both assessments are very similar throughout the time series and generally in good agreement with the Solent pre-recruit index.

Both assessments indicate similar trends in SSB, level over the first 5 years of the assessment and then increasing steadily, although the FAD assessment suggests a steeper increase. Both give a very similar overall prognosis of current high stock levels.

Figure A4.1. VIIafg selectivity patterns, FAD only above, combined below

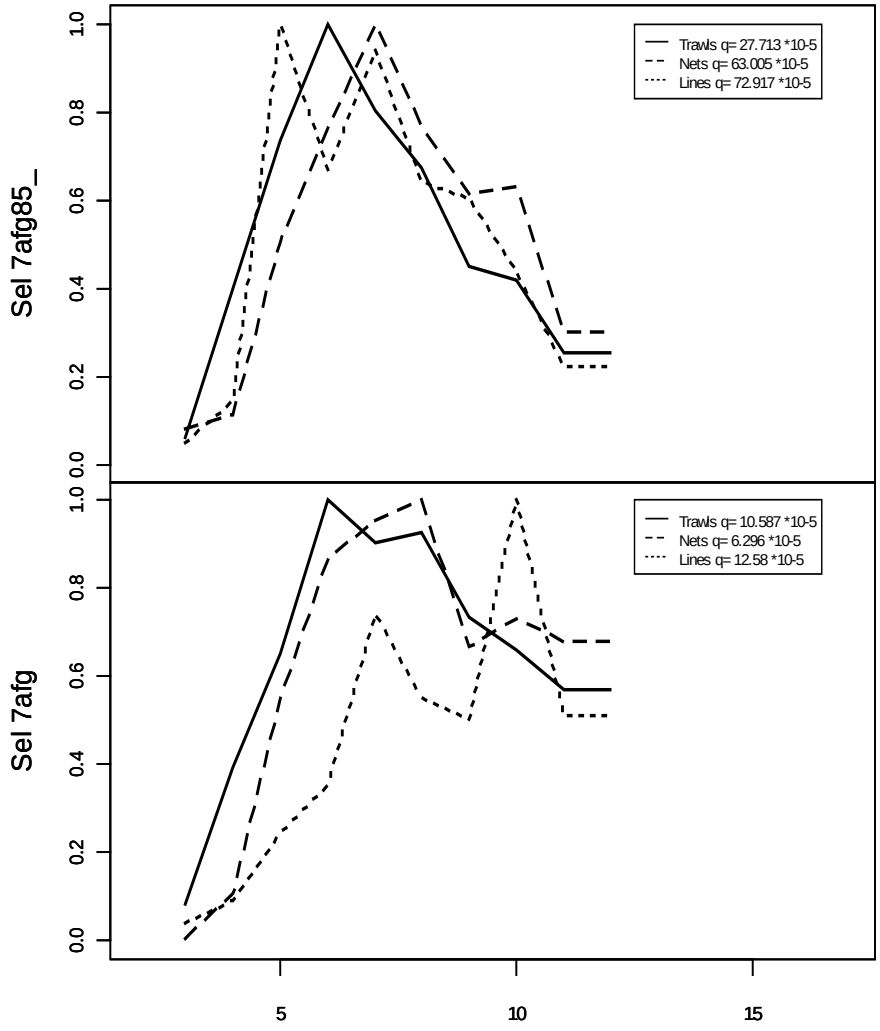
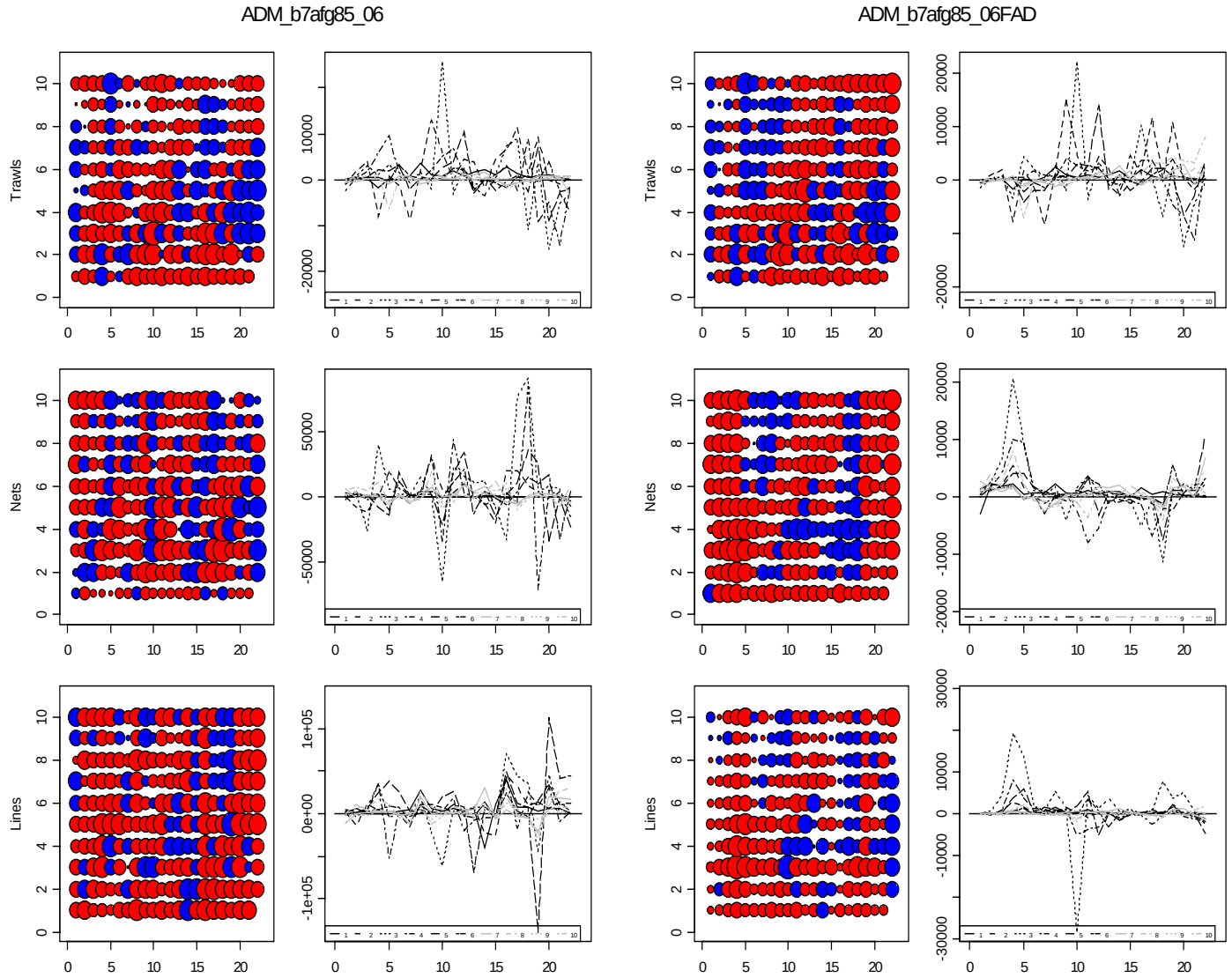


Figure A4.2. VIIafg Update (left) and FAD (right) assessment residuals



Red negative residuals, blue positive residuals
Ages labelled from 1 to 10 correspond to ages 3 to 12

Residual plots for VIIafg suggest a tendency to underestimate trawl catch for mid ages in the last 2 to 3 years and to overestimate at the youngest age for most of the time series and in both assessments. Residuals for nets in the update assessment show few strong patterns, although some year effects (vertical) are apparent for both nets and lines. The FAD assessment has more systematic patterns to the residuals with underestimation of age 6 during the middle of the time series and overestimation of age 3 for most of the series. The pattern of residuals for lines in the FAD assessment is heavily influenced by a large negative outlier in the middle of the time series and appears to show some tendency to underestimate catch in the most recent year for ages 4-9.

Figure A4.3. VIIafg landings time series, open bars: output; solid bars: input, FAD only above, combined below

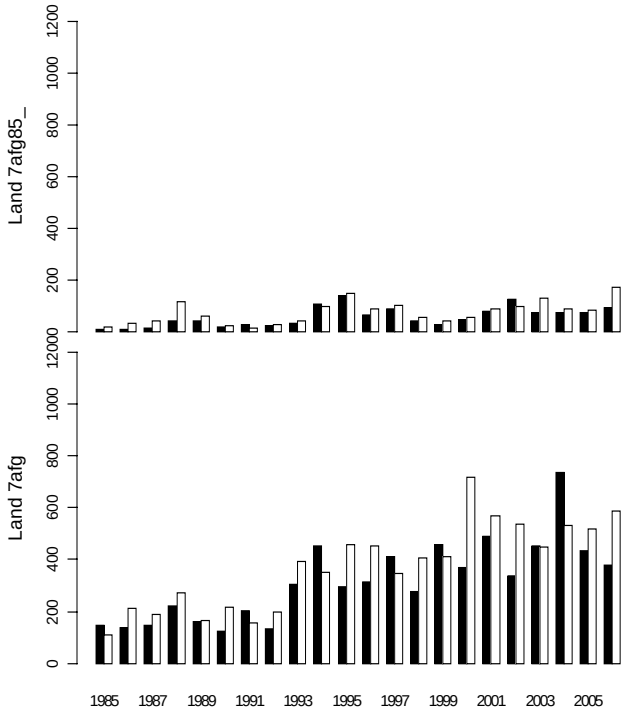


Figure A4.4. VIIafg trends in fishing mortality, FAD only above, combined below

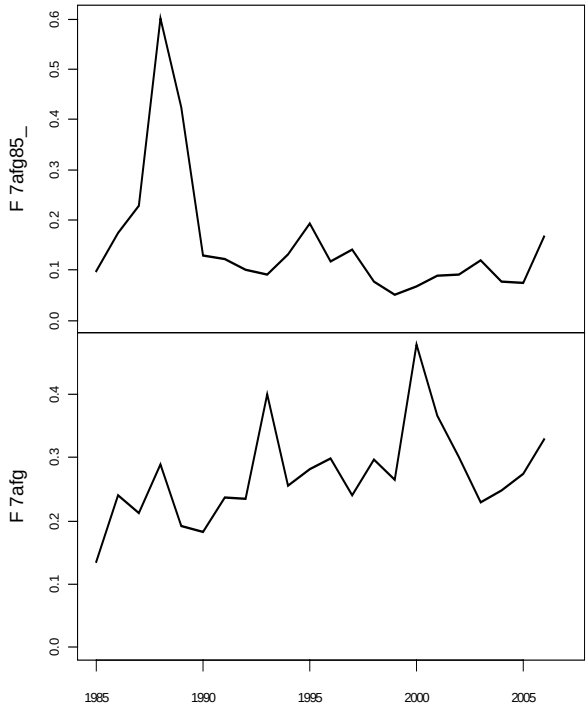


Figure A4.5. VIIafg year class strength estimates, FAD only above, combined below

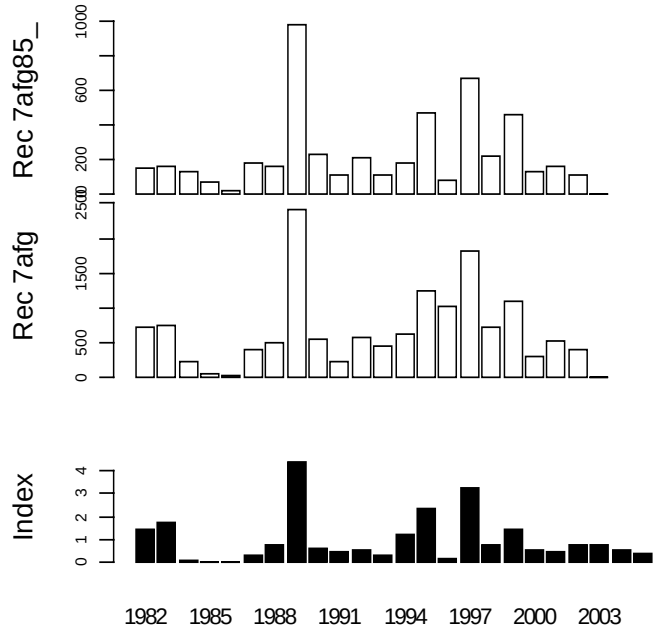
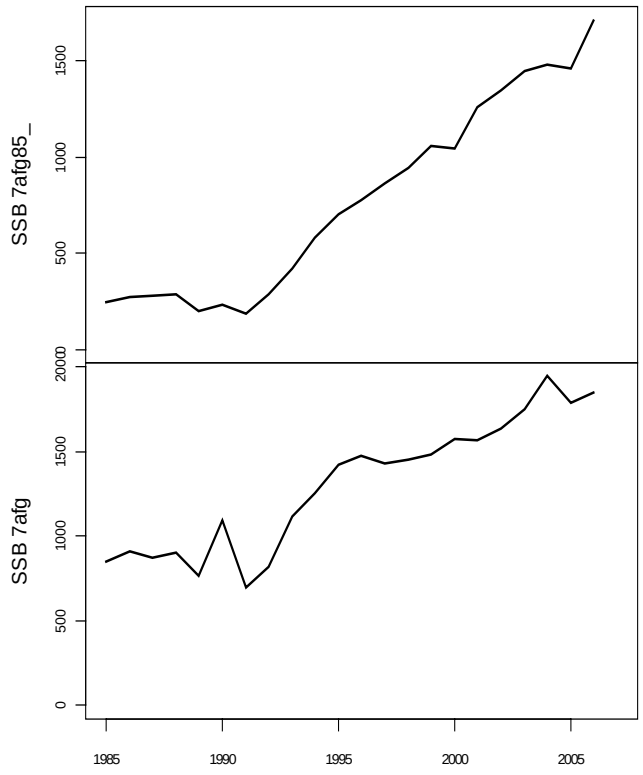


Figure A4.6. VIIafg trends in SSB estimates, FAD only above, combined below



Annex 3: Working Document. Lining in Audierne, France (area VIIe)

By Y. Morizur, C. Dromer, J. Huet, S. Martin and S. Walmsley

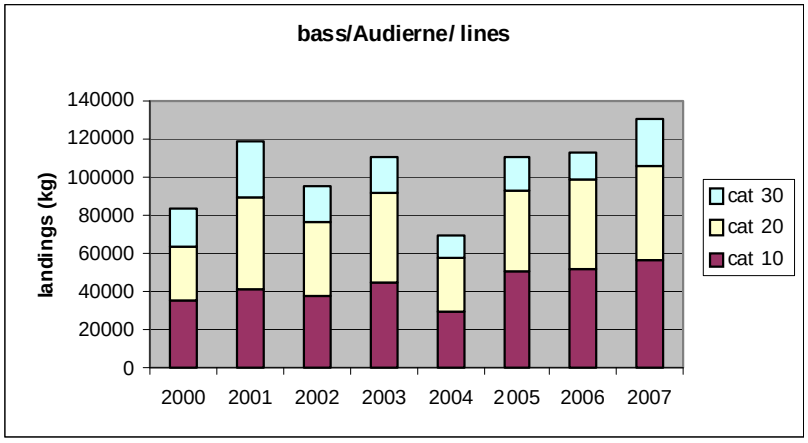
Lining for sea bass in Audierne is the most important métier for the vessels in that port. A lot of data have been compiled to study the 2000–2007 period.

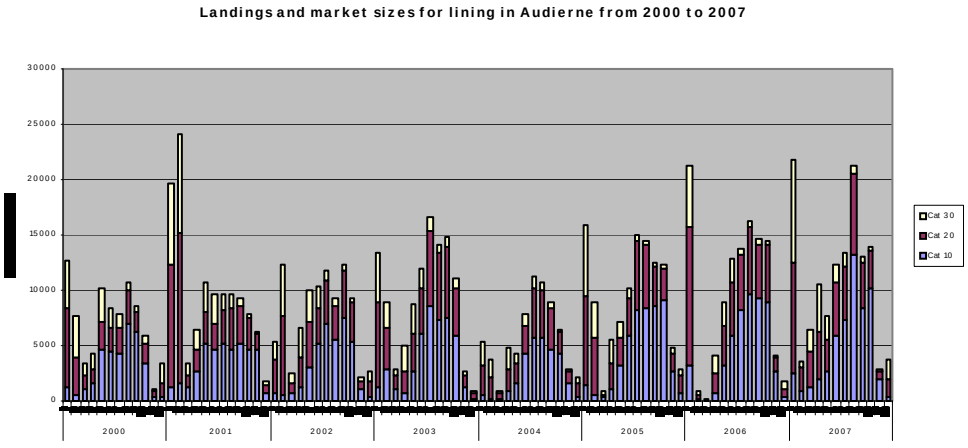
1. Commercial categories in the landings

The evolution of commercial categories landed by liners was studied from 2000 to 2007 in order to detect any recent change in the structure of catches. Category 10 concerns bass louder than 2 kg, category 20 concerns bass between 1 and 2 kg, category 30 concerns fish less than 1 kg.

The fishery is located in the area VII but the fishing area is close to ICES area VIII.

There is no trend in the fishing effort of lining at Audierne (fishing effort quite constant over the time-series 2000–2007). So the catches (landings as there is no discards) should bring a good abundance index.





a) there is an increase in the total landings between 2000 to 2007.

b) no decrease trend of the adult abundance (category 10 and a part of cat 20); may be there is an increasing trend. Please note that some French recreational fishers say that there is a strong decrease in the proportion of bass longer than 50 cm.

c) there is every year a decrease of catchability of adults to line due probably to the spawning season. The decrease appears in November or December.

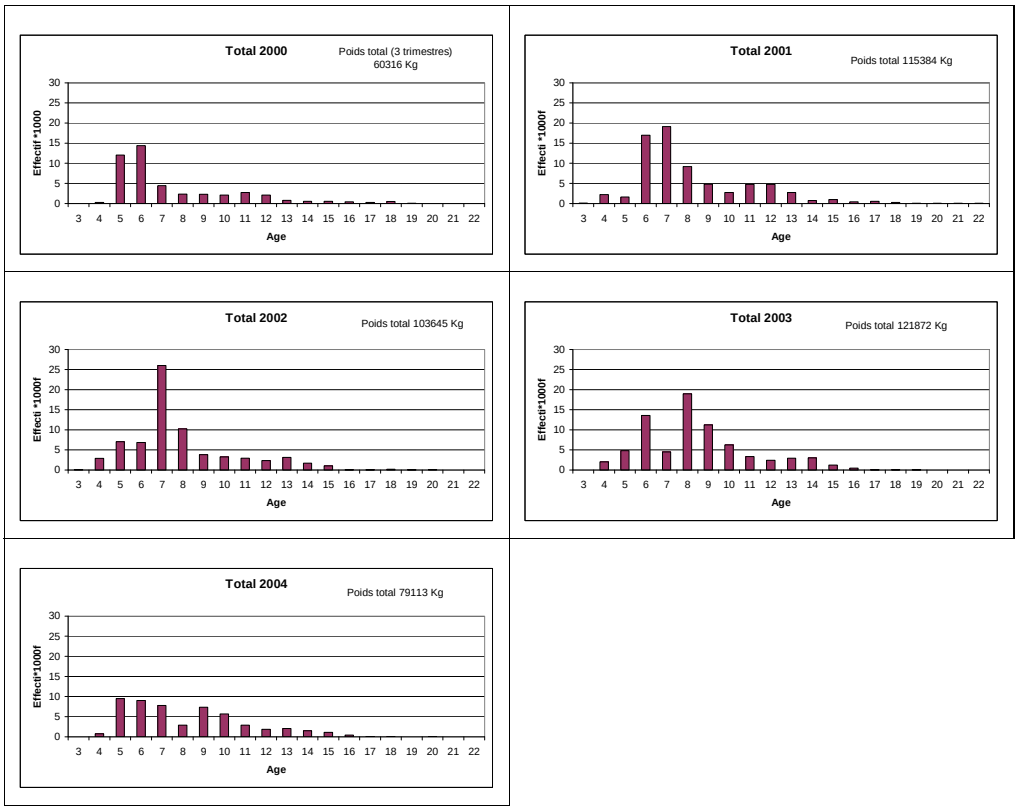
d) in January and February, the fishery target subadults or juveniles.

e) no decrease in the abundance of adults in Audierne while we have an increase of catches in 2005 and 2006 in the offshore fishery of area VII , this could indicate that these liners fish on a separate stock compared to the VII offshore fishery.

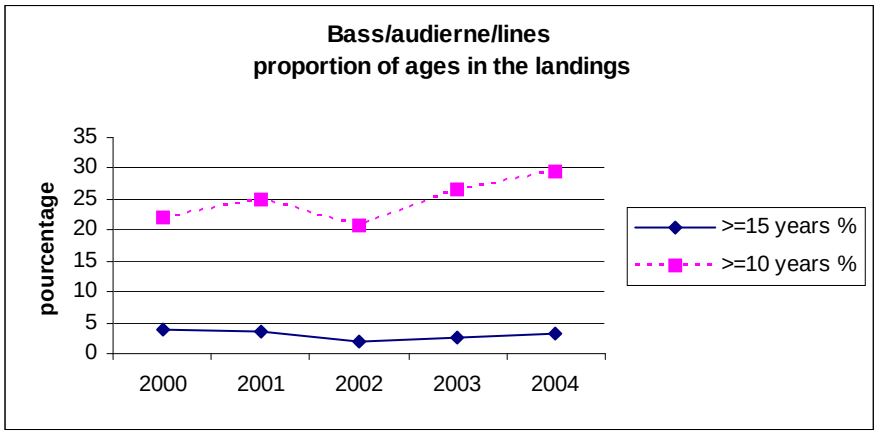
2. Demographical structure obtained from sampling

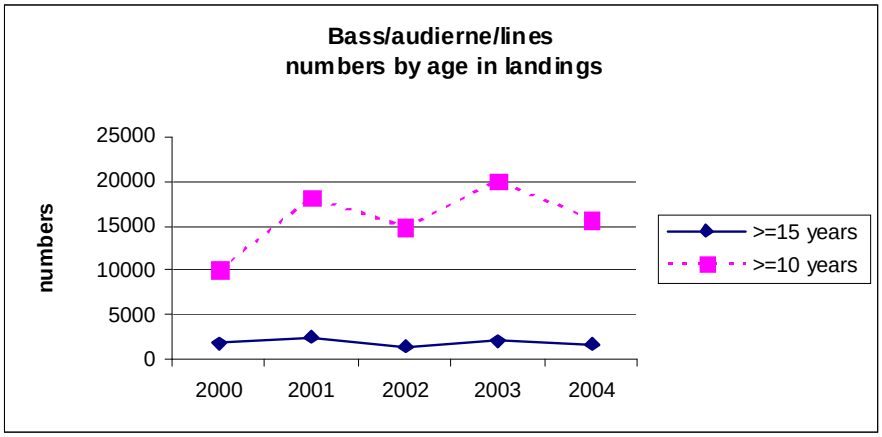
The age composition was obtained with a age-length key collected on lines in Audierne and based on 250 fish per quarter and length of fish were collected with one sampling day by month (around 7–10 boats per sampling day). The sampling took place between 2000 and 2005.

Demographical structure in landings in Audierne from 2000 to 2005.



The 1989, 1994, 1995 year classes were observed as very strong classes; the 1991, 1997, 1998 and 1999 year classes were good; the 1996 year class was the poorest of the time serie.



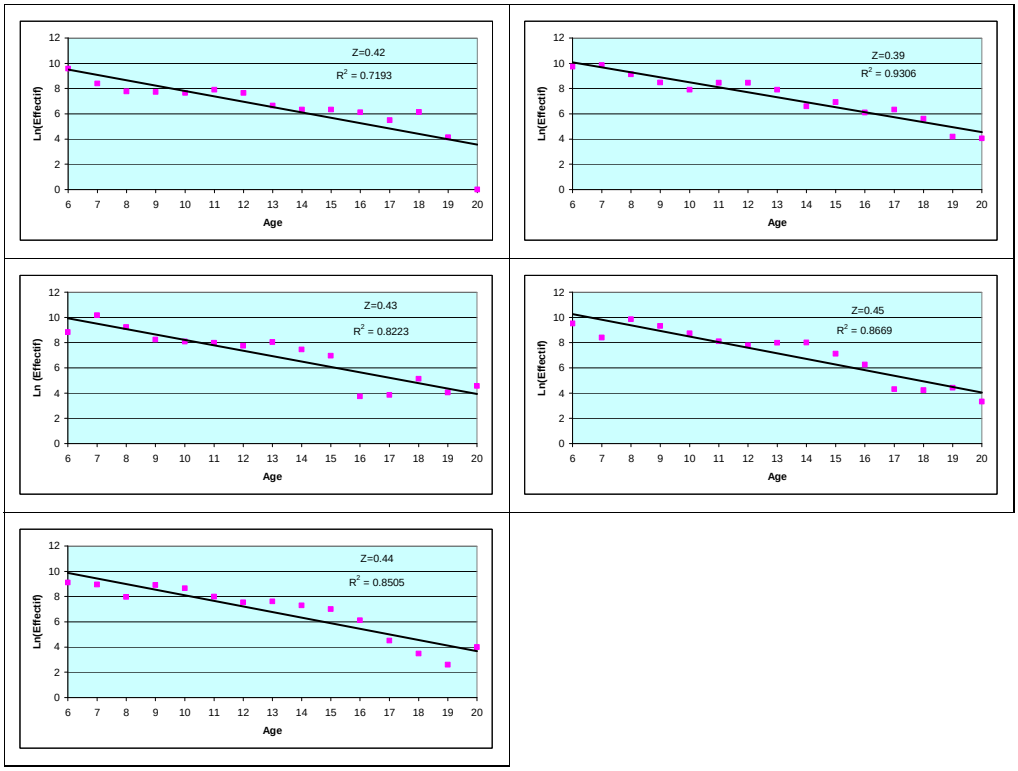


There is no decrease trend in the old animals. Fish older than 15 years varied between 2 and 4 % in the catches and fish older than 10 years between 21 and 30 %.

3. Estimate of total mortality

The age composition permits deriving the total mortality by using a log regression of the numbers by age. The age range [6–20] was determined by maximizing R^2, and minimizing the variations in the estimate of total mortality.

Estimate of the average total mortality in the age range [6–20 y] for each year from landings 2000 to 2005.



The values of total mortality are in the range 0.39 to 0.45. This mortality estimate takes into account all the fishing pressure on the stock including recreational activities as the evolution of the age structure is the result of all causes of mortality.

4. Conclusion

There is no decrease in the landings of old animals. Fish having >= 10 years old compounded between 21 to 30 % of the landings by numbers and fish having >=15 years are 2–4 % in the catches by numbers.

The increase in fishing pressure in the VII offshore fishery in 2004–2006 does not induce any decrease in the line fishery in Audierne at that period or one year later. The 2007 year is an increase landing in Audierne.

The total mortality was estimated around 0.40–0.45. This mortality estimate takes into account all the fishing pressure on the stock including recreational activities as the evolution of the age structure is the result of all causes of mortality. This value indicates that the fishing pressure is not excessively high in that population of bass.