The Sea Trout of R. Adur (Sussex): A Stock Description

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Acknowledgement must also be afforded to Graeme Harris of *Fish Skills* who produced the Stock Descriptions for sea trout in the rivers of Northeast, Southwest and Northwest England, and Wales **(1)**. Both the study presented here and the related study of River Ouse sea trout **(2)**, owe much to Graeme's study; the results are set out in a similar way and tables of results are presented with similar layouts to enable direct comparison between sea trout from the two Sussex rivers and those of other rivers in England and Wales.

Sea trout rod-capture data from 1992–2009, used in Table 1, reproduced by kind permission of the Environment Agency. Copyright © Environment Agency, 2010.

The Sea Trout of R. Adur (Sussex): A Stock Description

Results of a scale-reading study of 156 sea trout captured by anglers or found dead in R. Adur, Sussex, from 1988–2011, and a comparison with sea trout from R. Ouse (Sussex)

Clive L. Fetter

1 Introduction

This study began in 1988, as a by-product of the parallel study of R. Ouse sea trout, which began in 1985. The original purpose of R. Ouse study was to determine whether the large adult sea trout were young fish that had experienced rapid growth or older fish with slower growth. However, the results were so interesting that it was decided to persevere with the scale readings in order to get a statistically significant sample. When that study *The Sea Trout of R. Ouse (Sussex): A Stock Description* **(2)** was circulated recently, it attracted so much interest that it was decided to produce a similar report on the sea trout of R. Adur, albeit with a smaller sample.

This report is an attempt to assign a stock description to R. Adur (Sussex) sea trout and to make a comparison with sea trout from neighbouring R. Ouse, using data from the earlier report: *The Sea Trout of R. Ouse (Sussex): A Stock Description* **(2)** hereafter referred to as the *River Ouse* study. The data in the *River Ouse* study is laid out in a similar manner to those given in *Sea Trout Stock Descriptions: The Structure & Composition of Adult Sea Trout Stocks from 16 Rivers in England and Wales* **(1)**, hereafter referred to as the *16 Rivers* study.

R. Adur data is accompanied by the corresponding data for R. Ouse; in this case, the whole sample of scales from 600+ sea trout is used (1985–2009). In the *River Ouse* study, two subsamples of ~300 were examined separately: 1985–99 and 2000–09. Cross-references to both the *River Ouse* study **(2)** and *16 Rivers* study **(1)** are given where appropriate.

2 Fishery Details and Restrictions

Most sea trout featured in this study were captured by anglers from waters controlled by the Henfield and District Angling Society, comprising tidal waters in main R. Adur and in the Eastern and Western branches downstream of the weirs at the tidal limits. A few were captured further downstream on waters controlled by Pulborough Angling Society, and a few were captured upstream of tidal limits on the Eastern Branch. The open season for sea trout fishing on R. Adur is from 1 May until 31 October. An Environment Agency size limit of 38 cm has applied to R. Adur sea trout throughout this period.

R. Adur is not as well known for its large sea trout as R. Ouse but, as Table 1 below shows, catches can rival or even exceed those of R. Ouse. Like R. Ouse, catches can vary considerably from year to year. Table 1 gives reported whole river captures from 1992 onwards, recorded by the Environment Agency **(3)**. Catches have fallen off following a pollution incident in early September 2005 when an estimated 50 sea trout mortalities were recorded. A further incident in August 2011 resulted in estimated 30–40 mortalities.

Table 1 Sea trout rod catches (3): comparison of R. Adur with R. Ouse, 1992–2009

Yearly Catch	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09
R. Adur	7	†	†	†	†	74	61	†	34	38	52	53	44	8	5	3	11	5
R. Ouse	32	48	47	41	9	33	38	133	78	146	161	101	76	27	41	51	44	29

† Although returns were made during these years, sea trout reported captured in R. Adur were grouped together with other southeast rivers so R. Adur returns are indeterminate.

3 Sampling Success

Sea trout scales and data from R. Adur catches were first received in 1988, together with data relating to *other* captures in 1987/8. Further data and scales were received during the period 1991–2001 and a few sets in 2003.

In August 2011, a fish kill on the upper tidal river resulted in the mortality of 30–40 sea trout; of these 12 were recovered for scale reading. Scale readings showed a mixture of age groups, suggesting that the incident was indiscriminate and not restricted to older mature fish. The readings were therefore added to the scale-read sample to boost the number of summer fish.

Table 2 gives numbers of sets of scales, and data from *other* captures, for each year 1987–2011.

Table 2 Numbers of scale samples and/or data collected, R. Adur 1987–2011

Year	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04–10	11	Totals
Scales/Data	0	4	0	0	0	4	12	7	11	26	18	31	20	5	4	0	3	0	11	156
Data only	11	5	0	0	9	0	7	7	2	13	2	1	0	0	0	0	0	0	1	58

Sections 6.2 is based on data from scale readings *and* anglers catches (*n* = 202), Section 6.3.1 contains data with length measurements (*n* = 187) and Section 6.3.2, data from weight measurements (*n* = 202). Sections 6.4–6.10 contain data from the scale-read sample (*n* = 156). The sample size for scales reading is significantly smaller than those used in the *River Ouse* study **(2)**, so the results in Sections 6.4–6.10 where small sub-samples are described are probably not as representative.

4 Methods and Terminology

Scale readings were carried out according to the traditional method developed by Nall **(4)** and with the amended terminology in Elliot and Chambers **(5)**. Scale samples were prepared in a similar manner to that described in the *River Ouse* study; up to 16 scales were mounted into each slide then viewed through a microscope, a slide scanner or by using a slide projector. Photomicrographs were prepared using all of these methods.

4.1 Measurements Accuracy

The large majority of fish featured in this survey had measurements supplied of fork length in inches and weight in lb. A minority used metric measurements. In most cases, fish were measured to the nearest quarter inch and weighed to the nearest 4 oz. This probably introduces some error but no more than those in both *River Ouse* and *16 Rivers* studies.

4.2 Scale Reading Issues

In general, the same scale interpretation issues were encountered as those described in the *River Ouse* study:

- the possibility of false spawning marks at whitling stage;
- the possibility that sea trout with 2+ year smolt history (S2+) have been misinterpreted as 3 year smolt history (S3) or vice versa;
- the possibility that heavy spawning marks have eroded earlier spawning marks and/or sea years. This would mean that the age and number of spawning marks has been underestimated by 1, perhaps 2 years;
- the possibility that fish with S2 history having enhanced parr growth during the second parr year have been misinterpreted as S1 or vice versa.

A discussion of these problems is given in the *River Ouse* study, *p.*4.

5 Presentation of Results

The results are presented in a similar manner to those presented in the *River Ouse* study. This enables not only a direct comparison between aspects of stock description for R. Adur and R. Ouse but also a comparison with the rivers featured in the *16 Rivers* study **(1)**. In most cases, tables and figures contain data for both Rivers Adur and Ouse.

6 Baseline Stock Description

6.1 Introduction

The principle results of the study are presented in tabular form in this section. The tables provide details of month of capture, length and weight characteristics, smolt age, sea age structure, maiden group composition, spawning frequency and sea age categories. Most tables also contain the corresponding data for R. Ouse sea trout **(2)** and cross-references to the corresponding tables in the *16 Rivers* study **(1)** are given where appropriate.

6.2 Month of Capture

Numbers and proportions of fish captured in each month for Rivers Adur and Ouse are given in Table 3. The results in Table 3 are to be compared with Table 7.2.1, *p.*42 in the *16 Rivers* study. As described in the *16 Rivers* study **(1)** *p.*41, the 'month of capture' is not necessarily the same as the month of entry into a river.

Table 3 Month of capture of sea trout: comparison of R. Adur and R. Ouse sea trout catches

Sample	Month of Capture												Totals
	May		June		July		August		September		October		
	No	%	No	%	No	%	No	%	No	%	No	%	
Adur 87–03	0	*0*	4	*2.0*	22	*10.9*	22	*10.9*	72	*35.6*	82	*40.6*	202
Ouse 85–09	12	*1.9*	173	*27.4*	176	*27.8*	78	*12.3*	103	*16.3*	90	*14.2*	632

Table 3 suggests that runs of sea trout in R. Adur are much later than those in R. Ouse, with 76.2% captured during the *last* two months of the season compared with 30.5% for R. Ouse; none were caught during May and very few in June. In contrast, June is one of the best two months for R. Ouse sea trout catches, along with July.

There are, however, good reasons that suggest Table 3 underestimates actual numbers of sea trout in R. Adur during the summer months when very few sea trout anglers are fishing:

- the lack of angling pressure reflects difficulties encountered in summer months, which include thick bankside vegetation, treacherous banks and algal blooms during periods of low flow and high temperature. At these times, the tidal reaches become unfishable,
- almost half of the data featured in the Table 3 was supplied by R. Ouse anglers participating in the study during 1995–2001. Sea trout fishing in R. Adur was mostly restricted to September and October. This introduces a definite bias towards later *captures*.

An angler who exclusively fished R. Adur supplied details of his catch returns for the years 1988–2000; these are set out in Table 4, below.

Table 4 Month of capture of sea trout: comparison of *one* angler's catches with his effort data

Sample: R. Adur 1988–2000 Angler '*F*' only	**Month of Capture**						
	May	**June**	**July**	**August**	**September**	**October**	**Totals**
Catches	0	4	16	13	21	39	93
Rod Days = Effort	36	60	97	85	93	139	510
= 100 × Catch/Effort	*	6.7	16.5	15.3	22.5	28.1	18.2

His catches show a more even monthly distribution and, when combined with effort data, suggest that there are more sea trout present in July and August than Table 3 suggests. This point was emphasised, in mid-August 2011, when a fish kill resulted in estimated 30–40 adult sea trout mortalities, presumed to have resulted from low dissolved oxygen and high temperature. Small groups of sea trout are sometimes seen close to the mouth of tidal tributaries in summer, where they remain throughout the season; electrofishing in July 1992, after a spate, revealed the presence of significant numbers of fresh-run sea trout as far upstream the non-tidal western arm as the A23 bridge.

Data for R. Adur displayed in Table 3 is better shown as the cumulative proportions captured each month, shown in Figure 1, below.

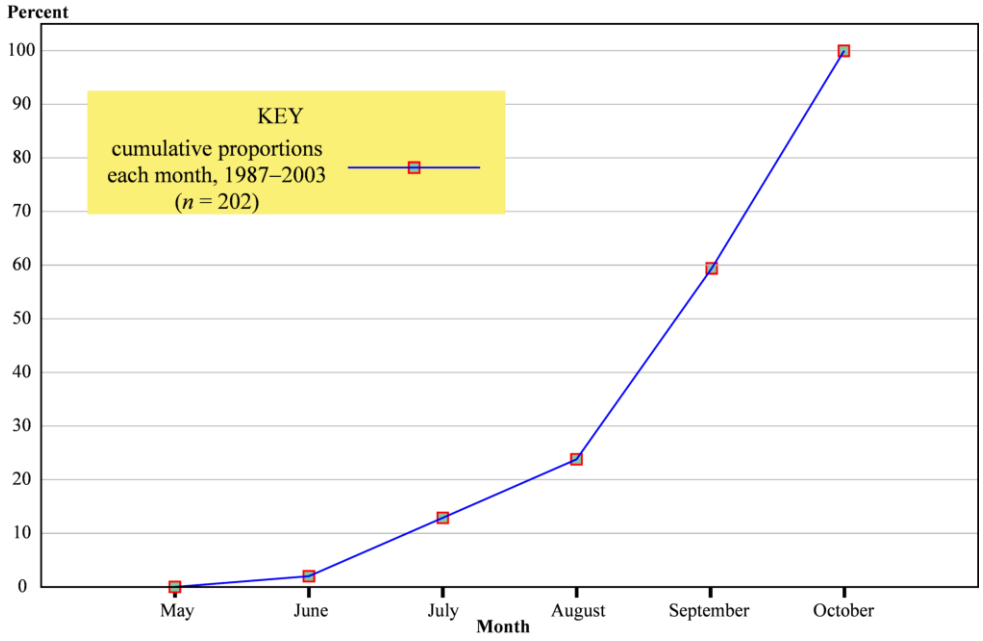

Figure 1 The cumulative proportions of R. Adur sea trout caught each month – rod catches 1987–2003

Notwithstanding any possible under-representation of sea trout in the months June–August, the form of Figure 1 shows a steep climb in the last two months, suggesting that sea trout continue to run the river after the season has closed. A similar conclusion was drawn for R. Ouse sea trout **(2)**. Observations and electric fishing surveys **(6)** have confirmed that backend runs can be substantial. The existence of a significant winter return means that this stock description applies only to that proportion of the sea trout stock that are resident in the river between 1 May and 30 October; sea trout running the river after 1 November have not been sampled. However, scale readings of mature sea trout often suggest that summer/autumn fish had been winter fish on *previous* return(s); these are usually the largest fish in *mature* sea age categories. Some of the largest sea trout in both samples are young singly-spawned fish with winter return during the previous year (**.**1+1SM+).

6.3 Length and Weight Characteristics

6.3.1 Length Characteristics

The numbers and proportions of fish in each 50 mm length class are set out in Table 5, which contains data for both Rivers Adur and Ouse. The data can be compared with Table 7.5.1, *16 Rivers*, *p*.48 **(1)**.

Table 5 The numbers and proportions of sea trout in each 50 mm length class interval: comparison of R. Adur and R. Ouse sea trout catches

	Length Frequency Class Interval (50 mm)																								Totals
	250-299		300-349		350-399		400-449		450-499		500-549		550-599		600-649		650-699		700-749		750-799		800-849		
Sample	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	
Adur 87–11	1	*0.5*	3	*1.6*	3	*1.6*	5	*2.7*	22	*11.8*	68	*36.4*	48	*25.7*	22	*11.8*	12	*6.4*	2	*1.1*	0	*	1	*0.5*	187
Ouse 85–09	1	*0.2*	2	*0.3*	2	*0.3*	7	*1.2*	77	*13.2*	185	*31.8*	174	*29.9*	75	*12.9*	36	*6.2*	18	*3.1*	5	*0.9*	0	*	582

The same data is plotted onto the graph in Figure 2 below.

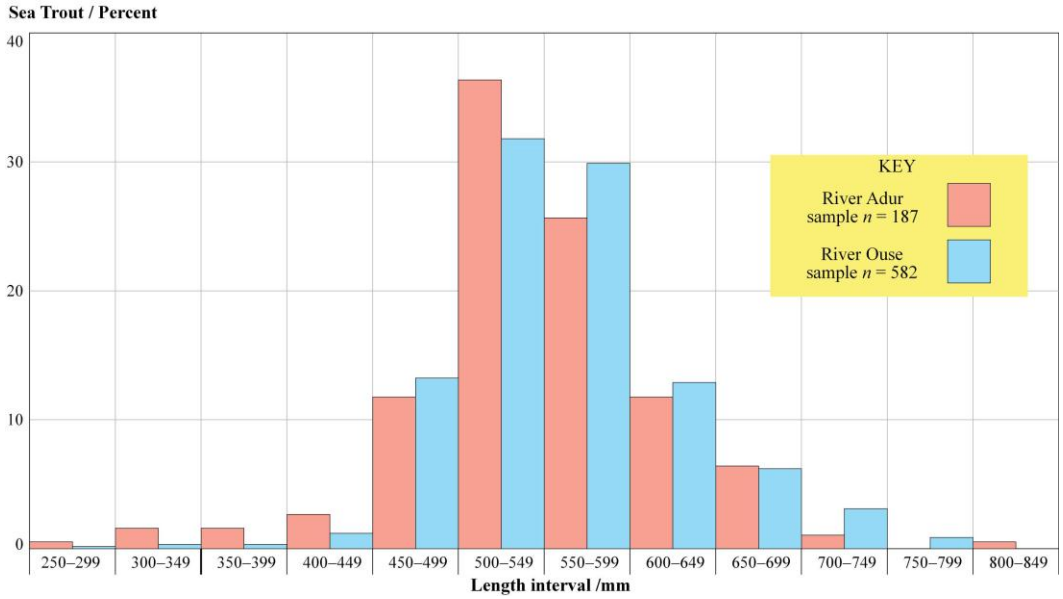

Figure 2 Proportions of sea trout in each 50 mm length class interval: comparison of R. Adur and R. Ouse sea trout catches

Comparison of R Adur data with the corresponding data for R. Ouse shows that the length profiles are broadly similar. The proportion >500 mm for R. Adur sea trout was 81.8% compared with 84.7% for R. Ouse sea trout. Both values are significantly higher than any reported in the *16 Rivers* study; the closest comparison is with the two Northeast rivers which have around 60% of fish >500 mm. All of the other rivers in the *16 Rivers* study have much smaller proportions of fish >500 mm; these vary from 4.8% for R. Tamar (Devon) to 42% for R. Dyfi (Wales). The mean length of R. Adur sea trout was 551 mm, which compares with 560 mm for the combined 1985–2009 R. Ouse sample. These values can be compared with 531 mm for R. Coquet and 538 mm for R. Wear (derived from Tables 7.10.1 and 7.10.2, *16 Rivers*, *p*.56).

6.3.2 Weight Characteristics

The numbers and proportions of fish in each 1 kg weight class interval are set out in Table 6, which contains data for both Rivers Adur and Ouse.

Table 6 The number and proportions of sea trout in each 1 kg weight class interval: comparison of R. Adur and R. Ouse sea trout catches

Sample	Weight Frequency Class Interval (1 kg)												Totals
	0<1		1<2		2<3		3<4		4<5		5<6		
	No	%	No	%	No	%	No	%	No	%	No	%	
Adur 87–09	17	*8.4*	91	*45.0*	67	*33.2*	21	*10.4*	3	*1.5*	3	*1.5*	202
Ouse 85–09	6	*1.0*	190	*30.5*	283	*45.4*	100	*16.1*	37	*5.9*	7	*1.1*	623

The same data is plotted onto the graph in Figure 3 below.

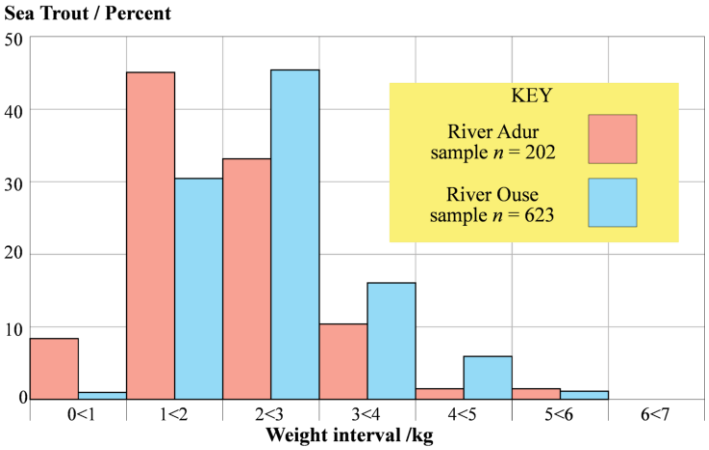

Figure 3 Proportions of sea trout in each 1 kg weight class interval: comparison between R. Adur and R. Ouse sea trout catches

The differences between the two sets of results are immediately apparent. The largest R. Adur weight class is 1 < 2 kg, while the largest R. Ouse weight class is 2 < 3 kg. Only 46.5% R. Adur sea trout are >2 kg, compared with 68.5% for R. Ouse. R. Adur result is, however, much higher than for any of the rivers featured in the *16 Rivers* study **(1)**. The two Northeast rivers featured in the *16 Rivers* study had approx. 27% of sea trout >2 kg; other rivers featured in the *16 Rivers* study had much smaller proportions of fish >2 kg; these vary from 1.5% for R. Tamar up to 20.1% for R. Dyfi.

The mean weight of R. Adur sea trout (2.07 kg) is also significantly lower than that for R. Ouse (2.48 kg). This may be due to the higher proportion of fish <1 kg in R. Adur sample, probably all whitling. If these are excluded, the mean weight increases to 2.21 kg – still significantly less than R. Ouse value.

Since the length profiles and mean lengths are similar, the lower weights of R. Adur sea trout suggest that they are slightly *slimmer* than those of R. Ouse. This may be due to the majority of catches being made in the last two months of the season when sea trout have lost condition. This is certainly the case in R. Ouse; sea trout caught in the earlier part of the season generally have higher condition factors then those caught in the last two months, whether they are fresh run with sea lice or stale fish from earlier runs.

Notes from anglers, which accompanied scales, suggest that a slight majority of sea trout are fresh-run with sea lice in *every* month of the season. These are accompanied by a significant minority of stale fish during late September/October – presumably remnants of earlier runs.

6.4 Age at Smolt Migration

Numbers and proportions of each smolt age group are set out Table 7, which contains data for both Rivers Adur and Ouse. Table 7 can be compared with Table 7.6.1, *p.* 50 in the *16 Rivers* study **(1)**.

Table 7 Numbers and proportions of adults in each smolt age group – maiden and mature fish: comparison of R. Adur and R. Ouse sea trout catches

Sample	Age at Smolt Migration (winters)								Totals
	S1		S2		S3		S4		
	No.	%	No.	%	No.	%	No.	%	
Adur 88–03	17	*11.0*	132	*85.7*	5	*3.2*	0	*	154
Ouse 85–09	50	*8.3*	469	*78.2*	73	*12.2*	8	*1.33*	600

A large majority of smolts migrated as S2 in both river samples but the proportion that migrated as S3 was significantly smaller in R. Adur sample. There were, however, difficulties assigning S3 history in both river samples so it would be unwise to attach much significance to this result.

Table 7 shows that Rivers Adur and Ouse have higher proportions of S1 than any of the rivers in the *16 Rivers* study. Almost all S1 fish in both samples show a short period of spring ('*B Type*') growth during the second spring; 51.5% of S2 fish in R. Adur sample showed spring growth during the third spring, the remaining 48.5% appeared to migrate at the end of the second winter.

6.5 Sea Age Structure: maiden and mature sea trout

Numbers and proportions of *maiden* and *mature* sea trout are given in Table 8, which contains data for both Rivers Adur and Ouse. Table 8 can be compared with Table 7.7.1, *p.* 52 in the *16 Rivers* study **(1)**.

Table 8 Numbers and proportions of *maiden* and *mature* fish: comparison of R. Adur and R. Ouse sea trout catches

Sample	Sea Age Group				Totals
	All Maiden Fish		All Mature Fish		
	No.	%	No.	%	
Adur 88–03	107	*68.6*	49	*31.4*	156
Ouse 85–09	332	*55.3*	268	*44.7*	600

Although both samples show relatively high proportions of mature fish, the values are strongly influenced by numbers of fish bearing weak spawning marks at whitling stage. Experience with R. Ouse sea trout **(2)** suggests that most spawning marks at whitling stage are false. If all such marks are *assumed* false then **.**0+1SM+ fish will be reclassified as maiden (**.**1+), and **.**0+*n*SM+ fish as **.**1+(*n*–1)SM+. The proportions of mature fish would then be around 24% for R. Adur and 28% for R. Ouse. Proportions of mature sea trout reported in the *16 Rivers* study **(1)** showed considerable variation and there were no clearly defined regional characteristics; the two Sussex rivers are about average in this respect.

6.6 Maiden Group Composition

The maiden group compositions of both river samples are presented in Table 9. Around 86% of maiden fish were in the **.**1+ sea age group and 6.5% in the **.**2+ age group. Comparison with results given in the *16 Rivers* study **(1)** Table 7.8.1, *p*.53 shows that Rivers Adur and Ouse stock have a higher proportion of 2-sea-winter fish than rivers in the Northwest, Southwest and Wales. The closest comparison is with the Northeast rivers, R. Coquet, 2.4%; R. Wear, 6.0%.

Table 9 Numbers and proportions of fish in each sea age group: comparison of R. Adur and R. Ouse sea trout catches

Sample	Maiden Sea Age Group								Totals
	.0+		.1+		.2+		.3+		
	No	%	No	%	No	%	No	%	
Adur 88–11	8	*7.5*	92	*86.0*	7	*6.5*	0	*	107
Ouse 85–09	8	*2.4*	284	*85.5*	38	*11.4*	2	*0.6*	332

Of scale read fish, no 1+ (or older) sea year fish is less than 1 kg in weight and no whitling is more than 1 kg so it is clear that unexamined fish <1 kg are predominately whitling. Comparison of Table 9 with Table 6 suggests that the whitling numbers might be under-represented in the scale-read sample. Scale readings show 5.1% whitling while the breakdown of weights in Table 6 shows that 8.4% weighed <1 kg. The disparity is no-doubt due to most sea trout <1 kg being weighed and released without a scale sample being retained. The higher figure is, however, a much smaller value than for any river in the Northwest, Southwest and Wales. Only the Northeast rivers, Wear and Coquet have smaller proportions of whitling in catches. Electric fishing surveys carried out on R. Adur **(6)**, however, have established that considerable numbers of whitling are present during some winters.

6.7 Spawning Frequency

The numbers and proportions in each class of previously spawned fish in each sample are presented in Table 10A, which contains data for both Rivers Adur and Ouse. Data in Table 10A can be compared with those given in the *16 Rivers* study **(1)** (Table 7.9.1, *p*.54).

Table 10A Numbers and Proportions in each class of previously spawned fish: comparison of R. Adur and R. Ouse sea trout catches

Sample	Number of Spawning Marks								Totals
	1		2		3		4		
	No	%	No	%	No	%	No	%	
Adur 88–11	36	*73.5*	11	*22.4*	2	*4.1*	0	*	49
Ouse 85–09	191	*71.3*	59	*22*	15	*5.6*	3	*1.1*	268

R. Adur sample is, perhaps, too small to be representative but, nonetheless, Table 10A suggests similar proportions in spawning mark categories for Rivers Adur and Ouse. Proportions of multiple-spawned sea trout are broadly similar to those in rivers in the Northwest, Southwest and Wales; rivers in the Northeast have smaller proportions. However, as described in Section 6.5, the results were based on the assumption that spawning marks at whitling stage represent actual spawning. If we, again, assume that spawning marks are false and reclassify readings **.**0+*n*SM+ to **.**1+(*n*–1)SM+ we get Table 10B, which although giving slightly different proportions, supports the same conclusions.

Table 10B Numbers and Proportions in each class of previously spawned fish: comparison of R. Adur and R. Ouse sea trout catches – with.0+*n*SM+ fish reclassified as .1+(*n*–1)SM+

Sample	Number of Spawning Marks								
	1		2		3		4		
	No	%	No	%	No	%	No	%	Totals
Adur 88–11	25	*67.6*	11	*29.7*	1	*2.7*	0	*	37
Ouse 85–09	120	*71.4*	37	*22.0*	9	*5.4*	2	*1.2*	168

6.8 Sea Age Categories

Tables 11A and 11B (next page) present summaries of numbers, maximum and minimum lengths, and mean length in each sea age category for both R. Adur sample and for the combined R. Ouse sample; they are to be compared with Tables 7.10.1 – Tables 7.10.16 in the *16 Rivers* study (pp.56–61).

6.8.1 Comparison of River Adur and R Ouse Samples

There are some differences between Tables 11A and 11B but the smaller R. Adur scale-read sample is less robust than those used for R. Ouse study; sub-samples in the former consist of too few fish to give representative proportions of multiple-spawned fish. Rarer members of sea age groups with multiple spawning marks represented in small numbers in R. Ouse samples are either absent in R. Adur sample or represented by a single fish so it would be unwise to ascribe any real differences between the samples.

In most respects, however, the results suggest strong similarities between Rivers Adur and Ouse sea trout:

- the existence of significant late runs, after the season has closed on 31 October,
- similar length profiles, high mean lengths and proportions >500 mm,
- significant proportions of adults with S1 history,
- significant proportions of multiple-spawned fish, and
- significant proportions of multi-sea-winter fish.

There are also a number of differences between the two samples:

- lateness of catches in R. Adur compared with R. Ouse,
- lower proportion >2 kg and slightly lower mean weight in R. Adur sample,
- higher proportion <1 kg in R. Adur sample.

The lateness of catches is partly explained by a bias due to reduced angling pressure in June/July/August when the tidal river is difficult or unfishable. There is strong evidence for runs of sea trout in summer months but not to the same extent as those of R. Ouse.

The lower proportion >2 kg and lower mean weight of R. Adur sea trout compared with those from R. Ouse is partly explained by the higher proportion <1 kg. It might also be partly explained by the lateness of R. Adur *catches* compared with those captured in R. Ouse. On both rivers, early season fish have higher condition factors than those caught in the last two months of the season.

The higher proportion <1 kg, presumably whitling, probably results from most of the angling taking place in September and October when there are more whitling in the tidal river.

Table 11A R. Adur (Sussex): Numbers, Maximum and Minimum Lengths and Mean Lengths (mm) of sea trout in each sea age category (*n* = 156). Numbers in brackets are numbers of measurements used to calculate Mean Lengths

Post Smolt Age	First Maturing after each Maiden Sea Winter																			
	Sea Age	as .0+				Sea Age	as .1+				Sea Age	as .2+				Sea Age	as .3+			
		No.	Min	Max	Mean		No.	Min	Max	Mean		No.	Min	Max	Mean		No.	Min	Max	Mean
0	.0+	8(8)	267	419	362															
1	.0+1SM+	12(12)	457	622	533	.1+	92(91)	432	622	534										
2	.0+2SM+	1	*	*	533	.1+1SM+	24(23)	457	749	612	.2+	7(7)	584	692	615					
3	.0+3SM+	1	*	*	686	.1+2SM+	10(10)	597	699	644	.2+1SM+					.3+				
4	.0+4SM+					.1+3SM+	1	*	*	813	.2+2SM+					.3+1SM+				
5	.0+5SM+					.1+4SM+					.2+3SM+					.3+2SM+				
6	.0+6SM+					.1+5SM+					.2+4SM+					.3+3SM+				

Table 11B R. Ouse (Sussex): Numbers, Maximum and Minimum Lengths and Mean Lengths (mm) of sea trout in each sea age category (*n* = 600). Numbers in brackets are numbers of measurements used to calculate Mean Lengths

Post Smolt Age	First Maturing after each Maiden Sea Winter																			
	Sea Age	as .0+				Sea Age	as .1+				Sea Age	as .2+				Sea Age	as .3+			
		No.	Min	Max	Mean		No.	Min	Max	Mean		No.	Min	Max	Mean		No.	Min	Max	Mean
0	.0+	8(8)	254	432	369															
1	.0+1SM+	100(95)	445	625	532	.1+	284(272)	432	641	537										
2	.0+2SM+	29(28)	553	673	598	.1+1SM+	85(83)	457	762	590	.2+	38(38)	483	750	601					
3	.0+3SM+	7(7)	622	705	658	.1+2SM+	29(29)	560	762	657	.2+1SM+	6(6)	559	700	633	.3+	2(2)	724	724	724
4	.0+4SM+	1	*	*	686	.1+3SM+	8(8)	660	760	703	.2+2SM+	1	*	*	699	.3+1SM+				
5	.0+5SM+					.1+4SM+	2(2)	724	743	734	.2+3SM+					.3+2SM+				
6	.0+6SM+					.1+5SM+					.2+4SM+					.3+3SM+				

6.8.2 High Growth Rates in Sussex Rivers?

It is generally regarded that the main factor responsible for the very high mean size of sea trout in the two Sussex rivers is very rapid growth during marine migrations. A comparison with data from the *16 Rivers* study **(1)**, however, shows that this is not the whole story.

Table 12 gives mean lengths for selected sea age categories from Rivers Adur and Ouse, and compares them with mean lengths for other English and Welsh rivers taken from the *16 Rivers* study. It is noticeable that, while the two Sussex rivers have the highest values in the **.**1+ category, this is not repeated in other categories. In the case of the **.**2+ category, for example, Adur and Ouse samples have the *lowest* values. The results suggest that growth of Sussex sea trout slows after the first sea year, although individual specimens with single spawning marks (**.**1+1SM+) can be very large.

Table 12 Mean Lengths (mm) of sea trout in selected sea age categories for Rivers Adur and Ouse: comparison with values for rivers in the Northeast, Wales and Southwest (1)

	Mean Lengths (mm) of sea trout in sea age category							
Category	**Adur**	**Ouse**	**Wear**	**Coquet**	**Dwyfor**	**Dyfi**	**Tywi**	**Taw**
.1+	534	537	515	509	490	487	527	510
.1+1SM+	612	590	583	627	584	590	603	607
.1+2SM+	644	657	642	629	775†	694	666	641
.2+	615	601	703	721	*	712	665	648

† single specimen

So it seems that a high growth rate for Sussex sea trout is not the only factor responsible for the high mean lengths and weights recorded. The results of this study suggest that the following factors also play a part:

- the high proportion of multiple spawners in Adur and Ouse samples. The two Sussex rivers have this attribute in common with rivers in the Southwest, Wales and Northwest, but the two Northeast rivers have much smaller proportions,
- the significant proportion of multi-sea-winter fish in Adur and Ouse samples. Proportions in rivers in the Southwest, Wales and Northwest are much lower but the two Northeast rivers have proportions approaching those of the two Sussex rivers,
- the very small proportion of whitling in Adur and Ouse samples compared with rivers in the Southwest, Wales and Northwest; only the two Northeast rivers have smaller proportions.

So the factors responsible for the high mean size for sea trout in the two Sussex rivers boil down to a *combination* of high growth rates, high proportions of multiple spawners and significant proportions of multi-sea-year fish, *without* the size penalty of having a significant proportion of the catch made up of whitling.

References

1 Harris, G.S. (2002), *Sea Trout Stock Descriptions: The Structure & Composition of Adult Sea Trout Stocks from 16 Rivers in England and Wales*, Bristol, Environment Agency R&D Report W224: 92pp.
This material is also reproduced as Harris, G. (2006) *Sea trout Stock Descriptions in England and Wales* in Harris, G. and Milner, N. (eds) *Sea Trout: Biology, Conservation & Management*, Singapore, Blackwell: 449pp. This excellent book contains the *Proceedings of the First International Sea trout Symposium*, Cardiff, July 2004. It contains 34 chapters of interest mainly to fisheries scientists but has some general appeal to river conservation workers and anglers.

2 Fetter, C.L. (2010) *The Sea Trout of R. Ouse (Sussex): A Stock Description*, Copyright © Clive L. Fetter, 12pp. E-copies available from: stelthian@yahoo.co.uk.

3 Source: Environment Agency web site, Fisheries Statistics for various years available at: http://www.environment-agency.gov.uk/research/library/publications/40719.aspx
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4 Nall, G.H. (1930) *The Life of the Sea Trout*, London, Seeley Service and Co.

5 Elliot, J.M. and Chambers, S. (1996) *A Guide to the Interpretation of Sea Trout Scales*, Bristol, National Rivers Authority R&D Report 22: 54pp.

6 Buckley, B., Southern Water Authority (1985) private communication.