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

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Results of a scale-reading study of over 600 sea trout captured by anglers fishing R. Ouse, Sussex, from 1985 until 2009

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Acknowledgement must also be afforded to Graeme Harris who produced the Stock descriptions for sea trout in the rivers of Northeast, Southwest and Northwest England, and Wales (1). The study presented here owes much to Graeme's study; the results are set out in a similar way, and tables of results are presented here with a similar layout to enable easier comparison.

1 Introduction

This study began in 1985, in a small way, to investigate the large size of R. Ouse Sea Trout. The aim was to discover whether the sea trout were young fish that had experienced rapid growth or older fish with slower growth. The available evidence at that time consisted only of several scale readings mentioned in Nall (2) of R. Ouse sea trout with 'very rapid' growth, and half dozen scale readings carried out by Dr Buckley of Southern Water Authority in 1983 (3), which also revealed rapid growth.

The scale readings I carried out on sea trout captured between 1985–7 substantiated the rapid growth, but also revealed the presence of large fish with multi sea winters or multiple spawning marks. Due to the interest shown by anglers, scales continued to be collected and the study continued. By 1995, the study had revealed a wide variety of life histories – different smolt ages, maiden years and numbers of spawning marks. Then in early 1997 the Ouse Angling Preservation Society (OAPS) and newly-formed Sussex Ouse Conservation Society (SOCS) were approached by the Environment Agency with a view to contributing to a scale-reading study of sea trout in a number of rivers in England and Wales being carried out by an Environment Agency contractor Graeme Harris of *Fish Skills*. Scales from R. Ouse sea trout were collected but alas not enough for a proper statistical study. The report (1), which was published in 2002, contained surveys of sea trout in 16 rivers in 4 regions: Northeast, Southwest and Northwest England, and Wales. This left a gap in the record in that there was no survey of a river in Southern England.

Since 1998, scales have continued to be collected and by 2004 over 500 sets had been read. So it was decided to produce a report which would at least provide a qualitative stock description of a Southern river. The report was duly written up and is available on our web site.

However, in 2006, when the study by Graeme Harris (hereafter referred to as the *16 Rivers* study) became available in book form (1), it was apparent that the manner in which Graeme had presented his results was much more informative than the layout of our existing report. So it was decided to produce a report which presented the data with a similar layout to the *16 Rivers* study; this would enable comparisons to be made between sea trout in R. Ouse and those in the 16 rivers located in Northeast, Southwest, and Northwest England, and Wales. It was decided to wait until 2009, when the sample was expected to exceed 600, so that two separate surveys could be prepared, one for the 15 year period 1985–99, the other for the 10 year period 2000–09. It was hoped that with *two* samples of approx. 300, the survey would be less qualitative and enable comparison between samples to see whether climate change driven effects had affected the stock description.

2 Fishery Details and Restrictions

Most sea trout featured in this study were captured by anglers from the OAPS waters downstream of Barcombe Mills which is the tidal limit. A small number were captured upstream of Barcombe Mills, together with a few captured in tidal waters downstream of Lewes. The open season for sea trout fishing on R. Ouse is from 1 May until 31 October.

Numbers of sea trout captured can vary considerably from year to year. Table 1 gives the reported, whole river captures from 1995–2008.

Table 1 Sea trout rod catches (4) in R. Ouse (1995–2009)

Year	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Yearly Catch	41	9	33	38	133	78	146	161	101	76	27	41	51	44

An Environment Agency size limit of 15 inches (38 cm) has applied to R. Ouse sea trout throughout this period; smaller fish must be returned by law. Before 2000 there were no restrictions on methods used for sea trout fishing – apart from statutory ones – and no bag limits. During the period 1985–99 the most successful anglers had annual bags of 20–30 fish in good years.

However, since 2000, the Ouse Angling Preservation Society has placed restrictions on both bags and methods on its waters:

- 2001: bag limits of 1 per day / 15 per season introduced – catch and release encouraged
- 2005: bag limits of 1 per day / 2 per week / 8 per season introduced, all sea trout to be returned after 15 September, barbless hooks only allowed and wire traces strongly recommended
- 2006: bag limits reduced to 1 per *week* / 8 per season
- 2007: bag limits further reduced to 1 per week / 6 per season
- 2009: bag limits further reduced to 1 per week / 3 per season, non-tidal stretches fishable only after 16 June.

It is difficult to make an assessment of the effects of the changes but, as Table 1 shows, rod catches have fallen from a high point of 161 in 2002 to 44 in 2008. In 2002/3/4, most anglers collected scales from returned fish as well as those retained. However, the practice has changed since around 2005; scales of returned fish are now rarely collected and anglers have tended to return smaller fish in favour of retaining larger ones. This has resulted in fewer scale sets and a bias towards the larger, older fish since 2005 the. However, this applies only to about 10% of the 2000–09 sample.

3 Sampling Success

Table 1 showed that annual sea trout rod catches can show considerable variations year-to-year; this has made the collection of scales rather frustrating at times. Tables 2A and 2B gives numbers of sets of scales read in each year 1985–2009.

Table 2A Numbers of scale samples collected, 1985–99

Year	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	Total
No	24	20	23	11	3	5	14	10	24	16	8	19	32	28	47	284

Table 2B Numbers of scale samples collected, 2000–09

Year	00	01	02	03	04	05	06	07	08	09	Total
No	52	67	103	47	20	3	4	4	8	11	319

As you will see there are some years with as few as 3 sets of scales, while others have yielded as many as 103 sets. A few dozen sets of scales from sea trout found dead were also collected during this period. Scale readings showed that there is a bias towards older multiple-spawned fish in these samples so they have not been included in this study.

In most cases a large number of scales were collected; this was rather fortunate due to the high proportion of replacement scales; returned fish usually yielded far fewer scales. In the vast majority of cases it was possible to read smolt history, sea age and spawning marks. In a number of cases, the smolt age was unclear and in a few cases scales were unreadable.

4 Methods and Terminology

Scale readings were carried out according to the traditional method developed by Nall (2) and with the amended terminology in Elliot and Chambers (5). Scale samples were prepared in a similar manner to that described in the *16 Rivers* study, save that scales were protected from future biological degradation by soaking in a dilute solution of an anti-dandruff shampoo before drying. When dry, scales were mounted in GEPE^{TM} 2 mm slide mounts with antinewton glasses. 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. Generally fish were measured to the nearest quarter inch and weighed to the nearest 4 oz. This probably introduces some error but probably no more than in anglers' catches described in the *16 Rivers* study. (See *16 Rivers*, Section 5.4.2, bottom *p.*19 for a discussion of measurement errors.)

4.2 Scale Reading Issues

In general, the same scale interpretation issues were encountered as those described in the *16 Rivers* study, *pp*.20–21. The most problematic were:

4.2.1 The possibility of false spawning marks at whitling stage

Although sea trout with spawning marks at whitling stage are described in tables as mature fish, our Sea Trout Watch data suggest that very few whitling actually do spawn; this scale reading problem was discussed in Le Cren (6). Among the collection of winter fish found dead there is only one whitling, a cock fish found dead in a tributary; scales showed spawning mark forming. For this reason separate tables have been prepared in Sections 6.7 and 6.9; the 'A' tables assume that spawning marks at whitling stage are correct; the 'B' tables assume they are incorrect, i.e. 'B' tables have the same data as 'A' tables but with **.**0+*n*SM+ reclassified as **.**1+(*n*–1)SM+

4.2.2 The possibility that sea trout with 2+ year smolt history (S2+) have been misinterpreted as 3 year smolt history (S3)

The majority of S2+ fish have but a short parr growth in third parr spring but some have growth which overlaps with third year growth in fish with 'S3' history. It is probable that Table 6, Section 6.6 overestimates proportions of fish with S3 history.

4.2.3 The possibility that heavy spawning marks have eroded earlier spawning marks

In a few cases, several scales only showed the extra year and spawning mark – the remainder having the previous year and spawning mark eroded away. Consequently, it is fair to assume that in a few cases the age and number of spawning marks has been underestimated by 1, perhaps 2 years.

4.2.4 The possibility that fish with S2 history having enhanced parr growth during the second parr year have been misinterpreted as S1

It was initially difficult to distinguish between fish with 2**.**1+ history *with* enhanced second year parr growth and fish with 1**.**2+ history. However, it became apparent that the large majority of sea trout with clear S1 history had '*B Type*' growth during the second parr spring, immediately before smolt migration and should therefore be read as 1+**…** fish. This made assignment of S1 history much easier.

5 Presentation of Results

The results are presented in a similar manner to those presented in the *16 Rivers* study. This enables a direct comparison to be made between aspects of stock description for R. Ouse and those for the rivers featured in the *16 Rivers* study. A novel aspect of this report is that I have been able to produce two set of results, one each for the temporal periods, 1985–99 and 2000–09. The two samples can be compared for temporal changes.

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, method of capture, sex ratio, length and weight characteristics, smolt age, sea age structure, maiden group composition, spawning frequency and sea age categories. Cross references to the corresponding tables in the *16 Rivers* study are given where appropriate.

6.2 Month of Capture

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

Table 3 Month of capture of sea trout in River Ouse for each sample (1985–1999 and 2000–09)

Sample	Month of Capture												Total No. Fish
	May		June		July		August		September		October		
	No	%	No	%	No	%	No	%	No	%	No	%	
Ouse 85–99	**7**	*2.3*	**75**	*24.9*	**82**	*27.2*	**42**	*14.0*	**44**	*14.6*	**51**	*16.9*	**301**
Ouse 00–09	**5**	*1.5*	**98**	*29.6*	**94**	*28.4*	**36**	*10.9*	**59**	*17.8*	**39**	*11.8*	**331**

The data displayed in Table 3 is better shown as the cumulative proportions captured each month – shown in Figure 1, below.

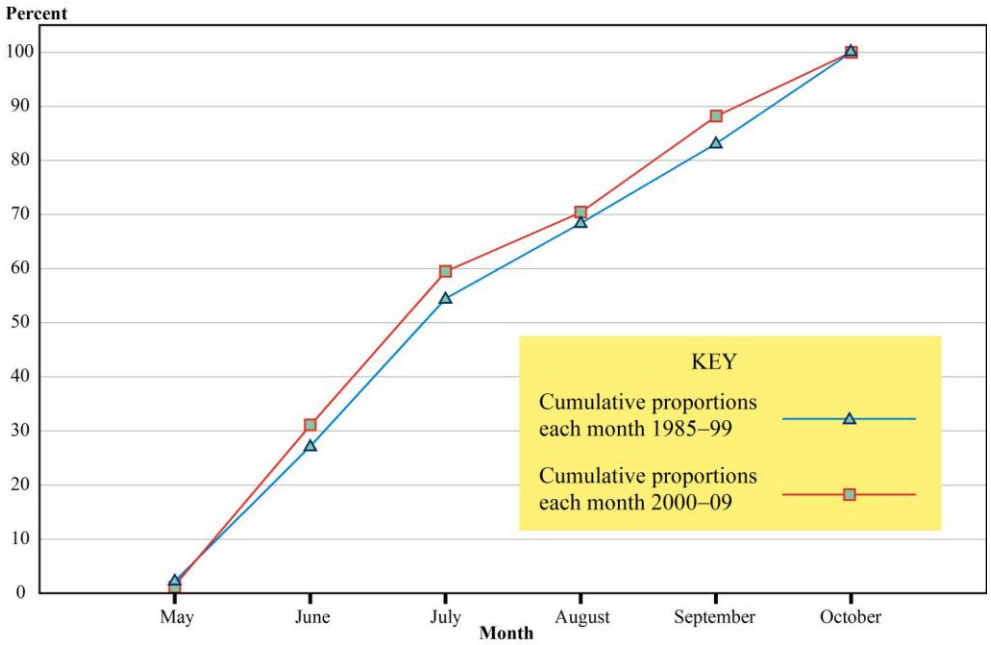

Figure 1 The cumulative proportions of fish caught each month for each sample

Comparison of Figure 1 with Figures 7.2.1–7.2.4, *p.*44 in the *16 Rivers* study shows that both R. Ouse samples have broadly similar monthly profiles, and similar to those for the Northeast rivers. The curves for rivers in the other Regions tend to approach 100% asymptotically towards the end of the season, suggesting that runs of sea trout are almost over for the year. By contrast R. Ouse curves (and those from the two Northeast rivers) show a steady climb towards the end of the season, suggesting that sea trout continue to run the river after the season has closed. This is supported by observations that runs of sea trout continue through November/December, and sometimes until early February. Reports from the Sea Trout Watch, carried out annually by SOCS, suggest that some of the largest fish run the river during winter.

6.3 Methods of Capture

The large majority of fish in this survey were taken on spinning baits. A small number were taken on fly and several on bait.

6.4 Sex ratio

Many anglers gave the 'sex' of the fish they caught, but in view of studies showing that *external* examination of sea trout for sex can be misleading it was decided to restrict the survey to fish that had been *internally* examined by an experienced game fisherman. His results for the period 1978–2004 gave 73 cock fish and 189 hens, a total of 262; the ratio of cocks : hens was 1:2.6. This result is similar to those for sea trout in rivers featured in the *16 Rivers* study (Table 7.4.1, *p.*46). It is possible that late runs of sea trout have different proportions of sexes than those caught by anglers during the season.

6.5 Length and Weight Characteristics

6.5.1 Length Characteristics

The numbers and proportions of fish in each 50 mm length class are set out in Table 4, to be compared with Table 7.5.1, *16 Rivers*, *p*.48. There are some differences between the two samples but overall the picture is one of very large fish with >80% of fish >500 mm. 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 for the 1985–99 R. Ouse sample was 558 mm; that for 2000–09, 562 mm. This 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).

Table 4 The numbers and proportions of fish in each 50 mm length class interval (two samples: 1985–99 and 2000–09)

Sample	Length Frequency Class Interval (50 mm)																						No of Fish
	250–299		300–349		350–399		400–449		450–499		500–549		550–599		600–649		650–699		700–749		750–799		
	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	
Ouse 85–99	0	*	0	*	2	0.7	4	1.4	47	16.7	88	31.3	72	25.6	38	13.5	15	5.3	13	4.6	2	0.7	281
Ouse 00–09	1	0.3	2	0.7	0	*	3	1.0	30	10.0	97	32.2	102	33.9	37	12.3	21	7.0	5	1.7	3	1.0	301

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

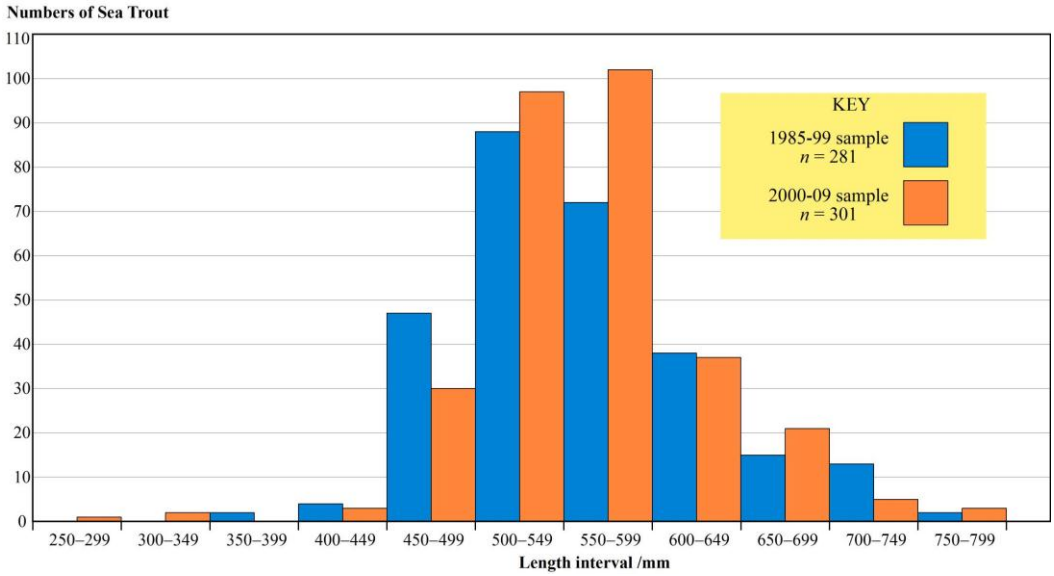

Figure 2 Numbers of sea trout in each 50 mm length class interval for each sample

6.5.2 Weight Characteristics

The numbers and proportions of fish in each 1 kg weight class interval are set out in Table 5, to be compared with Table 7.5.2, *16 Rivers*, *p*.48.

Table 5 The number and proportions of fish in each 1 kg weight class interval (two samples: 1985–99 and 2000–09)

Sample	Weight Frequency Class Interval (1 kg)												No of Fish
	0<1		1<2		2<3		3<4		4<5		5<6		
	No	%	No	%	No	%	No	%	No	%	No	%	
Ouse 85–99	4	1.4	91	30.7	128	43.2	51	17.2	19	6.4	3	1	296
Ouse 00–09	2	0.6	99	30.3	155	47.4	49	15.0	18	5.5	4	1.2	327

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

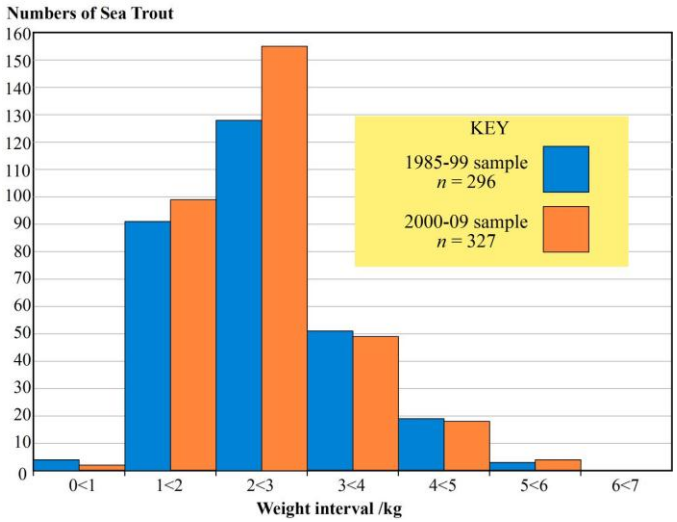

Figure 3 Numbers of sea trout in each 1 kg weight class interval for each sample

These results are even more impressive than those of Table 4; R. Ouse samples have about 68% of fish >2 kg compared with about 27% for the two Northeast rivers. All of the other rivers in the *16 Rivers* study have 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 for the 1985–99 R. Ouse sample was 2.49 kg; that for 2000–09, 2.47 kg. R. Ouse sea trout have a 'fat' appearance and are generally heavy for their length, having relatively high condition factors ($\boldsymbol{k = 100w/l^3}$, where ***w*** is measured in **grams** and ***l*** in **centimetres**). The mean value for condition factors was 1.34.

6.6 Age at Smolt Migration

Table 6 sets out the numbers and proportions of each smolt age group – to be compared with Table 7.6.1, *16 Rivers*, *p*.48. The results are broadly similar to those from the Northeast rivers.

Table 6 Numbers and proportions of adults in each smolt age group (two samples: 1985–99 and 2000–09) – maiden *and* mature fish.

Sample	Age at Smolt Migration (winters)								No of Fish
	S1		S2		S3		S4		
	No.	%	No.	%	No.	%	No.	%	
Ouse 85–99	**9**	*3.2*	**221**	*77.8*	**46**	*16.2*	**8**	*2.8*	**284**
Ouse 00–09	**41**	*13*	**248**	*78.5*	**27**	*8.5*	**0**	*0*	**316**

Both samples show high values for fish with S2 history which differ little from one another. However, the S1 and S3 smolt age groups show quite large differences between samples. The earlier sample shows a small proportion with S1 history, together with a modest proportion with S3 history and a few S4. The later sample shows a much larger proportion of S1, a significantly smaller proportion of S3 and no S4. The proportions with S1 history are probably real, but I have less confidence in the results for fish with S3 history for reasons discussed in Section 4.2, above.

These results are similar to those described in the *16 Rivers* study, where a comparison is made between results over a period of time (Table 7.12.1.1, *p*.67). The results show that since the 1930s the 1 year smolt age groups have increased while 3 and 4 year smolt ages have declined. Two different theories were put forward in the *16 Rivers* study for the increase of the 1 year smolt age group:

1 Climate change resulting in faster parr growth and earlier smolt age
2 Fewer sea trout parr in rivers means less competition for food so faster parr growth and earlier smolt age.

The second theory seems less likely for R. Ouse. Surveys have shown parr densities to be relatively low in the main river and tributaries. Back calculations on adult maiden fish suggest that the main factors adversely affecting first year parr growth in R. Ouse are high temperature and low rainfall. Surprisingly, dry years do not seem to be associated with poor returns of adults that would have been 0+ parr during that year.

Of some interest is the observation that scales from almost all S1 fish show a short period of spring ('*B Type*') growth immediately before migration; around 45% of S2 fish show spring growth, while only one S3 fish showed spring growth.

6.7 Sea Age Structure: maiden and mature sea trout

Table 7A gives the numbers and proportions of both *maiden* and *mature* sea trout – to be compared with Table 7.7.1, *16 Rivers*, *p*.52. The most noticeable feature is the very high proportion of mature fish in our sample compared to most other rivers in the survey.

Table 7A Numbers and proportions of maiden and mature fish (two samples: 1985–99 and 2000–09)

Sample	Sea Age Group				Total No. Fish
	All Maiden Fish		All Mature Fish		
	No.	%	No.	%	
Ouse 85–99	153	*53.9*	131	*46.1*	284
Ouse 00–09	179	*56.6*	137	*43.4*	316

Part of the reason for this is the high number of fish with a 'spawning mark' at whitling stage for the previous winter. We have, however, observed very few whitling on or near to redd sites during the annual Sea Trout Watch carried out by SOCS during the past 14 years; whitling appear to be confined for the main part to the tidal reaches of the river, with few observations upstream or in tributaries. Only one whitling in kelt condition was recovered dead during winter. This fish, which was recovered from a lower tributary, bore scales showing a spawning mark forming at the margin.

This apparent contradiction would be resolved if we assume that many of the spawning marks at whitling stage are false; spawning marks at whitling stage in our samples are mostly weak. If this is so then fish read as **.**0+1SM+ *mature* fish might instead have been **.**1+ *maiden* fish. Table 7B given the same breakdown as Table 7A, but with *all* fish with **.**0+1SM+ reclassified as maiden.

Table 7B Numbers and proportions of maiden and mature fish (two samples: 1985–99 and 2000–09) with .0+1SM+ fish reclassified as maiden fish

Sample	Sea Age Group				Total No. Fish
	All Maiden Fish plus .0+1SM+		All *Remaining* Mature Fish		
	No.	%	No.	%	
Ouse 85–99	202	*71.1*	82	*28.9*	284
Ouse 00–09	230	*72.8*	86	*27.2*	316

These figures are more in line with results from other rivers, but the proportions of mature fish are still higher than those in the Northeast. Spawning marks on sea trout at second sea winter or later are much more prominent than those at whitling stage and almost certainly do represent actual spawning.

6.8 Maiden Group Composition

The maiden group composition for each sample is presented in Table 8. Around 85% of maiden fish were in the **.**1+ sea age group, 11–12% in the **.**2+ age group and there was a single **.**3+ fish in each sample. Comparison with those given in *16 Rivers*, Table 7.8.1, shows that R. Ouse stock has a higher proportion of multi-sea-winter fish than any of the rivers in the *16 Rivers* study. The closest comparison is with the Northeast rivers.

Table 8 Numbers and proportions of fish in each sea age group (two samples: 1985–99 and 2000–09)

Sample	Maiden Sea Age Group								Total No Fish
	.0+		.1+		.2+		.3+		
	No	%	No	%	No	%	No	%	
Ouse 85–99	5	*3.3*	129	*84.3*	18	*11.8*	1	*0.7*	153
Ouse 00–09	3	*1.7*	155	*86.6*	20	*11.2*	1	*0.6*	179

The scarcity of whitling from catches is similar to results from the two Northeast rivers. Whitling size sea trout are, however, often *observed* in the tidal river below Barcombe Mills during the autumn, but they rarely feature in catches; larger numbers are sometimes observed in the tidal river in winter. It is probable that the spinning baits in use are less attractive to the noticeably smaller whitling than to the larger adult fish. There is not much difference between the two samples, suggesting minimal temporal change in the composition of maiden sea age groups.

6.9 Spawning Frequency

The numbers and proportions in each category of previously spawned fish in each sample is presented in Table 9A to be compared with those given in the *16 Rivers* study (Table 7.9.1, *p.*54).

Table 9A Numbers and Proportions in each category of previously spawned fish (two samples: 1985–99 and 2000–09)

Sample	Number of Spawning Marks								Total No Fish
	1		2		3		4		
	No	%	No	%	No	%	No	%	
Ouse 85–99	89	*67.9*	31	*23.7*	8	*6.1*	3	*2.3*	131
Ouse 00–09	102	*74.5*	28	*20.4*	7	*5.1*	0	*	137

Results show that the proportions of multiple-spawned sea trout are similar to those in rivers in the Northwest, Southwest and Wales; rivers in the Northeast have smaller proportions. However, as described in Section 6.7, the results are based on the premise that spawning marks at whitling stage represent actual spawning. If we assume that the spawning marks are false, and reclassify fish read as **.**0+*n*SM+ to **.**1+(*n*–1)SM+, we get Table 9B. The result is similar to Table 9A.

Table 9B The Numbers and proportions in each category of previously spawned fish (two samples: 1985–99 and 2000–09) with .0+1SM+ fish reclassified as maiden fish and .0+*n*SM+ fish reclassified as .1+(*n*–1)SM+

Sample	Number of Spawning Marks								Total No Fish
	1		2		3		4		
	No	%	No	%	No	%	No	%	
Ouse 85–99	54	*65.9*	21	*25.6*	5	*6.1*	2	*2.4*	82
Ouse 00–09	66	*76.7*	16	*18.6*	4	*4.7*	0	*	86

Both tables suggest that survival rates after first spawning were lower during the period 2000–09 than the earlier period, 1985–99, although the sample sizes are on the small side.

6.10 Sea Age Categories

Tables 10A and 10B (next page) present summaries of numbers, maximum and minimum lengths, and mean length in each sea age category for the two R. Ouse samples, 1985–99 and 2000–09; they are to be compared with Tables 7.10.1 – Tables 7.10.16 in the *16 Rivers* study. There are some differences between Tables 10A and 10B but both show that R. Ouse sea trout have high growth rates and proportions of multi-sea-winter fish. In these respects there are similarities to sea trout in the two Northeast rivers, Wear and Coquet. The tables, however, suggest higher survival rates after first spawning and so higher proportions of multiple-spawned fish in R. Ouse samples than those of the two Northeast rivers. Higher survival after first spawning is a marked characteristic of sea trout stocks in Southwest and Northwest England and in Wales.

The tables do not take into account the probability that some if not most spawning marks at whitling stage are false. However, this does not alter the above conclusions.

Table 10A R. Ouse (Sussex) : Numbers, Maximum and Minimum Lengths and Mean Lengths (mm) of sea trout in each sea age category (*n* = 284): sample 1985–99. 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+	5(5)	387	432	408															
1	.0+1SM+	49(47)	445	610	532	.1+	129(127)	451	641	529										
2	.0+2SM+	14(14)	533	673	599	.1+1SM+	39(39)	489	724	591	.2+	18(18)	540	730	608					
3	.0+3SM+	4(4)	635	705	670	.1+2SM+	17(17)	610	724	659	.2+1SM+	1	*	*	559	.3+	1	*	*	724
4	.0+4SM+	1	*	*	686	.1+3SM+	4(4)	689	760	726	.2+2SM+					.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+				

Table 10B R. Ouse (Sussex) : Numbers, Maximum and Minimum Lengths and Mean Lengths (mm) of sea trout in each sea age category (*n* = 316): sample 2000–09. 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+	3(3)	254	343	305															
1	.0+1SM+	51(48)	445	625	532	.1+	155(145)	431	635	544										
2	.0+2SM+	15(14)	533	660	596	.1+1SM+	46(44)	457	762	590	.2+	20(20)	483	750	595					
3	.0+3SM+	3(3)	622	686	643	.1+2SM+	12(12)	560	762	653	.2+1SM+	5(5)	610	700	648	.3+	1	*	*	724
4	.0+4SM+					.1+3SM+	4(4)	660	692	679	.2+2SM+	1	*	*	699	.3+1SM+				
5	.0+5SM+					.1+4SM+					.2+3SM+					.3+2SM+				
6	.0+6SM+					.1+5SM+					.2+4SM+					.3+3SM+				

7 Other rivers in Southern England

A quick look through the Environment Agency Fisheries Statistics (4) reveals the mean weights of sea trout captures in a number of rivers in Southern England. A selection is given in Table 11 along with mean weights of sea trout captured in Northeast rivers for comparison.

Table 11 Mean weights and size limits of sea trout captured in given years from rivers in the Northeast and the South of England (figures in brackets show numbers in samples)

River	Mean Weights (kg) for each year				Size limits /cm
	2000	2002	2003	2007	
Aln (Northumberland)	1.69 (*60*)	1.6 (*101*)	1.8 (*179*)	–	25.4
Coquet (Northumberland)	1.58 (*634*)	1.6 (*456*)	1.8 (*146*)	1.5 (*254*)	25.4
Tyne (Northumberland)	1.99 (*1465*)	1.8 (*2349*)	1.6 (*1569*)	2.0 (*1657*)	25.4
Wear (Durham)	1.97 (*1328*)	1.8 (*2337*)	1.8 (*1433*)	1.9 (*1249*)	25.4
Tees (Durham)	1.12 (*86*)	1.6 (*62*)	1.8 (*52*)	2.0 (*50*)	25.4
Esk (Yorks)	1.73 (*563*)	1.7 (*519*)	1.4 (*479*)	1.6 (*672*)	25.4
Gt Stour (Kent)	–	0.6 (*16*)	0.5 (*12*)	–	38
Adur (Sussex)	1.84 (*34*)	2.0 (*52*)	1.9 (*53*)	–	38
Ouse (Sussex)	2.16 (*78*)	1.9 (*161*)	2.3 (*101*)	–	38
Itchen (Hants)	0.83 (*481*)	0.9 (*865*)	0.9 (*676*)	1.1 (*213*)	38
Test (Hants)	1.37 (*147*)	1.3 (*260*)	1.2 (*357*)	1.1 (*121*)	38
Beaulieu (Hants)	1.46 (*19*)	1.6 (*48*)	2.0 (*53*)	–	38
Lymington (Hants)	1.77 (*20*)	1.2 (*25*)	1.3 (*31*)	–	38
Avon (Hants)	0.54 (*638*)	0.7 (*758*)	0.5 (*1412*)	0.7 (*151*)	35
Stour (Dorset)	1.43 (*20*)	2.2 (*13*)	0.5 (*12*)	–	35
Piddle (Dorset)	–	0.9 (*34*)	1.1 (*57*)	–	35
Frome (Dorset)	0.79 (*111*)	0.9 (*207*)	0.9 (*241*)	0.9 (*118*)	35
Axe (Devon)	1.32 (*261*)	1.1 (*419*)	1.1 (*287*)	1.2 (*294*)	25

Table 11 shows that estimated mean weights for R. Ouse sea trout are similar to those of the Northeast rivers. Of other Southern rivers, only neighbouring R. Adur consistently shows values as high as R. Ouse. The only other Southern river (having a reasonable sample) with mean weights approaching those for R. Ouse is R. Beaulieu. Sea trout returns from the chalk rivers Itchen, Test, Avon, Piddle and Frome have significantly smaller mean weights as does R. Axe.

Several dozen scale sets were received from anglers fishing neighbouring R. Adur. Scale readings were broadly similar to those of R. Ouse with similar growth rates, multiple spawning marks and maiden multi sea winters; a single set from a very large fish from R. Arun (Sussex) showed 4 or 5 spawning marks. Large fish are also reported from the other Sussex rivers Eastern Rother, Brede and Cuckmere, not featured in Table 11, although catches are fewer. So it seems likely that all of the Sussex rivers share a similar stock description.

The conclusion is that the rapid growing, high average weight characteristics of R. Ouse sea trout can be extended to rivers Adur and Arun, and probably also to rivers Cuckmere, Brede and Eastern Rother. The chalk rivers Itchen, Test, Avon and Frome further west, and R. Axe in Devon have significantly lower average weights; either these rivers have slower growing sea trout or a high proportion of catches consists of whitling. So the stock description will be different in some respects. R. Beaulieu, however has mean weights approaching those of R. Ouse. Moreover, it was reported in the *16 Rivers* study (*p*.70) that R. Beaulieu, Hants, has periodic capture of large multiple-spawned sea trout that are atypical of any river along the entire south coast. This study has shown that this description applies also to R. Ouse and other Sussex rivers, and it is possible that R. Beaulieu has a *similar* stock description.

8 Conclusions

The results of this study suggest that the stock description for R. Ouse sea trout resembles, in a number of respects, those for the Northeast rivers: R. Wear and R. Coquet. The similarities include:

1 high mean length and weights
2 rapid growth rates
3 the existence of winter runs, after the season has closed
4 the presence of significant numbers of maiden multi-sea-winter fish.

There are, however, a number of differences as follows:

1 the higher proportion of mature fish in R. Ouse samples, even after allowing for misinterpretation of spawning marks at whitling stage
2 the higher proportion of large multiple-spawned fish in R. Ouse samples (up to 4 spawning marks)
3 the higher proportion of maiden multi-sea-winter fish in R. Ouse samples.

However, a review of mean weight statistics suggests that R. Ouse stock description may be limited to the Sussex rivers and perhaps R. Beaulieu and other New Forest Rivers. Much smaller mean weights of sea trout captures suggest that the Hampshire chalk rivers and Dorset rivers extending to R. Axe in Devon have different stock descriptions.

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 Nall, G.H. (1930) *The Life of the Sea Trout*, London, Seeley Service and Co.

3 Buckley, B., Southern Water Authority (1984) private communication.

4 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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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 Le Cren, E.D. (ed.) 1985 *The Biology of the Sea Trout* (and references cited therein), Summary of a Symposium held at Plas Menai 24–26 October 1984, Atlantic Salmon Trust.