SALMON STOCKS AND FISHERIES IN ENGLAND AND WALES, 2002

Preliminary assessment prepared for ICES, April 2003

ISBN: 0 907545 17 3

Acknowledgement:

This report has been compiled jointly by staff from the CEFAS Salmon and Freshwater Fisheries Team at Lowestoft and personnel from the Environment Agency's Salmonid Fisheries Science Group. The monitoring and assessment of salmon stocks conducted by CEFAS is funded by Defra and the National Assembly for Wales. Both CEFAS and the Environment Agency would like to extend their thanks to the various Agency regional fisheries staff who have collected and compiled the data for this report. Thanks are also due to the Centre for Ecology and Hydrology for providing river flow data, and counter data relating to the River Frome, to the General Secretary of ICES for permission to cite the reports of the ICES Working Group on North Atlantic Salmon and to the CEFAS Publications and Graphics Unit for laying out the report in camera-ready form.

CONTENTS

FOREWORD

This is the sixth annual report on the state of salmon stocks in England and Wales prepared by the Centre for Environment, Fisheries and Aquaculture Science (CEFAS) and the Salmonid Fisheries Science Group of the Environment Agency. Each annual report is designed to stand alone so that the reader does not need to refer back to previous reports for background information. This means that much of the descriptive information in this report is similar to that in reports for previous years.

The main purpose of the report is to provide early feedback to managers and fishermen on the status of stocks and fisheries in England and Wales and to supply this information to the International Council for the Exploration of the Seas (ICES). The information submitted to ICES is used, in turn, to provide advice to the North Atlantic Salmon Conservation Organisation (NASCO). The objectives of NASCO are to contribute to *'the conservation, restoration, enhancement and rational management of salmon stocks*'. In particular, NASCO is responsible for negotiating the quotas for the salmon fisheries at West Greenland and Faroes (Annex 1 gives further information on NASCO and ICES).

The full list of information requested by NASCO from ICES for its annual meeting in 2003 is given at Annex 2. However, for this report, the pertinent requests relating to events in 2002 are to:

- *provide an overview of salmon catches and landings, including unreported catches by country and catch and release, and production of farmed and ranched salmon;*
- *describe the key events of the 2002 fisheries and the status of the stocks;*
- *evaluate the effects of management measures introduced in the last 5 years;*
- *provide age-specific stock conservation limits for all stocks; and*
- *provide a compilation of tag releases.*

NASCO has previously indicated that it would like the information on the fisheries to relate to *catches, gear, effort, composition and origin of the catch (including escapees and sea ranched fish), and rates of exploitation*. These headings have therefore been used in the appropriate sections of the report.

An account of the way in which ICES uses the national data presented in this report to make an assessment of the status of salmon stocks is presented in section 3.4.

It must be noted that most of the data relating to 2002 are provisional and will not be finalised until complete catch data are obtained and records can be fully validated. Final data will be presented in the Environment Agency's annual publication of the Salmonid and Freshwater Fisheries Statistics and their annual Salmon Action Plan progress reports (see Annex 3), which will be published later in the year.

MAIN FEATURES OF REPORT FOR 2002

- The declared salmon catch by nets and fixed engines in 2002 was 133 tonnes, a reduction of 20 tonnes on 2001 (153 tonnes), but still just above the average of the last five years. The north east coast fishery accounted for 80% of this total (by weight).

- The declared rod catch (60 tonnes) was only slightly better than that in 2001 despite a substantial increase in fishing effort; low flows in the latter part of the fishing season are thought to have reduced fishing opportunities and thus limited the catch.

- The proportion of rod-caught salmon released increased to 50% (by number, 31.5 tonnes), the highest level ever recorded.

- The introduction of the national measures in 1999 has resulted in the majority of large early-run salmon caught being released early in the season. Since this time, anglers have also been voluntarily releasing a greater proportion of all fish after June, and of large salmon in particular.

- Spawning escapement was estimated to be above the conservation limit in 29% of rivers in England and Wales; the majority of salmon stocks in England and Wales continue to be in a depleted state.

- This year's report includes a new section outlining the national assessment of the status of stocks as reported to ICES (Section 3.4).

SUMMARY

This report presents a preliminary assessment of the state of salmon stocks and fisheries in England and Wales in 2002 to assist ICES in providing scientific advice to NASCO and to provide early feedback to fishery managers and anglers. The chief indicators of the state of salmon stocks are normally the catches taken by rod and net fisheries. When comparing the rod catches for 2002 with those for 2001, it is important to remember that angling was affected by the outbreak of foot and mouth disease (FMD) in 2001, which restricted angling opportunities and access to rod fisheries in many parts of the country for lengthy periods. Angling restrictions were particularly severe in the spring and early summer in the South West and North West Regions, and it seems likely that rod catches were significantly reduced in 2001. Net fisheries were unaffected by FMD. The declared salmon catch for 2002 (including those fish released alive by anglers) is provisionally estimated at 193 tonnes, representing 53,510 fish, and comprising 133 tonnes (~38,000 fish) by nets and fixed engines and 60 tonnes (~15,000 fish) by rods. An estimated 31.5 tonnes of the rod catch was released alive, representing 50% of all the fish caught (by number). These figures do not take account of catches of salmon which go unreported (including those taken illegally), and it is estimated that there may have been a total of 31 tonnes of additional fish caught in 2002; 16% of all fish killed (including the additional fish).

Net catch

The declared net catch, which is dominated by drift net and T and J net fisheries in the North East Region, was 11% lower in 2002 than in 2001, but still a little (3%) above the mean for the previous five years. This is despite a continuing decline in the number of licences issued for nets and fixed engines, which fell by a further 4% in 2002, although the number of days/tides fished by netsmen increased slightly compared with 2001 in the North East Region and Wales. Catch per unit of fishing effort (CPUE) for net fisheries in 2002 was above the previous 5-year mean in all regions except Wales and the North East.

Rod catch

The number of salmon rod licences issued in 2002 (~29,000) was 30% higher than in 2001 (when angling was constrained by FMD). The number of days declared to have been fished by anglers also showed a marked increase (up 35%). However, the rod catch in 2002 (including released fish) only increased slightly on that in 2001 (up 6%) despite the increased effort; the catch was marginally above the average of the previous 5 years. The improvements in the catch reporting system introduced in 2001 (better targeting of reminders and a routine second reminder) resulted in an increase in the declared rod catch from 49.5 tonnes (~12,900 fish) to 56.2 tonnes (~14,400 fish), an increase of 14% (by weight). These improvements continued to apply in 2002, and the (provisional) data presented in this report include many returns received as a result of the second reminder.

Over the past six years, the annual rod catch has fluctuated between about 12,500 and 17,600 fish without any evident trend. This has chiefly been due to variability in the catches of grilse. In 2002, the overall declared catch of both grilse and multi-sea-winter (MSW) salmon was higher than both the catch in 2001 and the mean for the previous five years, although there was some regional variation. Catches of both grilse and MSW salmon were above the five-year average in the North East, North West and Southern Regions, but both were at or below average in the Midlands and the South West Region. In Wales, grilse catches were below average but MSW salmon catches were above. The CPUE for the rod fisheries was lower in 2002 than in 2001 for all Regions except Southern (it should be noted that CPUE was probably elevated in 2001 due to fishing being restricted to a short period in the peak fishing months due to FMD restrictions). CPUE for 2002 remained above the previous 5-year mean for all Regions except the South West and Wales.

Stock status

The changes in rod fishing effort due to river flows and the national measures introduced in 1999 to protect spring salmon make it difficult to draw general conclusions about changes in stock status for 2002.

The actual relationship between catch and stock abundance depends upon exploitation rates (i.e. the proportion of the salmon population actually taken in the catch - both retained fish and those released). This can be estimated where there is a fishery-independent measure of the salmon run, such as that obtained from fish counters. Data from a number of counters and traps in England and Wales show that runs into freshwater in 2002 were all better than those in 2001, with the majority also above the average of the previous five years. In 60% of the rod fisheries in England and Wales where exploitation rates could be determined in 2002, these were well below the average of the previous five years, particularly for fisheries in Wales and the North West Region. Therefore, salmon populations in these rivers were bigger than suggested by the differences in catches alone. In certain other rivers in the South West and Southern Regions, exploitation rates in rod fisheries increased.

From this information, spawning escapement (in terms of the potential of fish surviving after net and rod fisheries to produce eggs) might be expected to have improved in the winter of 2002/03. Estimates of egg deposition for 2002 were above the conservation limit in 20 rivers, between 50% and 100% of the limit in 18 rivers and less than 50% of the limit in 32 rivers. Overall egg deposition was above average (1990-2002), although 46% of rivers in 2002 had less than half the egg deposition required to meet the conservation limit. Thus, the majority of salmon stocks in England and Wales continue to be in a depleted state.

Management measures

Viewed against historical data, current stock estimates and catches provide ongoing cause for concern and the conservation of salmon remains a top priority. The number of netting licences issued for nets and fixed engines has continued to decline as a result of measures taken to reduce levels of exploitation and the declining commercial viability of some fisheries. Overall, the number of net licences issued has decreased by an average of about 3% per year between 1985 and 2002 (total decrease, 59%). Concerns about the decline in the numbers of MSW salmon and particularly those returning early in the year (‘spring salmon’) resulted in national measures being introduced in 1999, banning netsmen from killing and, in most cases, fishing for salmon before 1 June in England and Wales. These measures have reduced the proportion of the net catch taken before June from a five-year average of 6.7% in the mid-1990’s to 0.1%, on average, from 1999; all such fish are released.

A number of measures aimed at better management of this valuable resource were implemented or strengthened in England and Wales in 2002. A number of net fisheries in England and Wales are being (or have been) phased out because they exploit migratory salmonids returning to several rivers (i.e. mixed stock fisheries). A further phase out was introduced for one fishery in South West England in 2002, as a result of a new net limitation order (NLO), which reduced the number of nets permitted to zero. Arrangements have also been made to reduce netting effort in some fisheries by compensating netsmen not to fish for a particular period.

As with the net fisheries, national measures to safeguard spring salmon were introduced for rod fisheries in 1999 and continued through 2002. These banned the killing of salmon caught by anglers prior to 16 June and restricted the methods that they could use at this time to artificial flies or lures. The proportion of the rod catch taken before June fell from 11% over the period 1994-98 to 7.6% in 1999 and to around 5% in the years 2000-02, and these fish are now required to be released. Non-

statutory restrictions on methods and fishing areas imposed by fishery owners and angling associations include weekly and seasonal bag limits, and there is a continued emphasis on encouraging anglers to return rod-caught fish. As a consequence, the proportion of salmon released by anglers increased steadily from 10% in 1993 to 42-44% over the three-year period 1999-2001; the proportion increased again in 2002 to 50% (provisionally). The increase in 2002 may, in part, reflect the fact that catches were relatively good at the very end of the fishing season when a higher proportion of coloured fish are likely to have been caught. Tagging studies on these fish suggest that, if handled appropriately, the majority of released salmon can go on to spawn successfully.

Other, non-regulatory factors may also have contributed to changes in exploitation rates in 2002. River flow is a key factor affecting angler effort; the monthly river flows for 13 monitored rivers in England and Wales showed generally low flows for August, September and much of October (typically peak months for rod catches in many areas) in 2002, which may have provided less than ideal conditions for angling. Relatively high flows in May and June may also have resulted in the loss of some fishing opportunities.

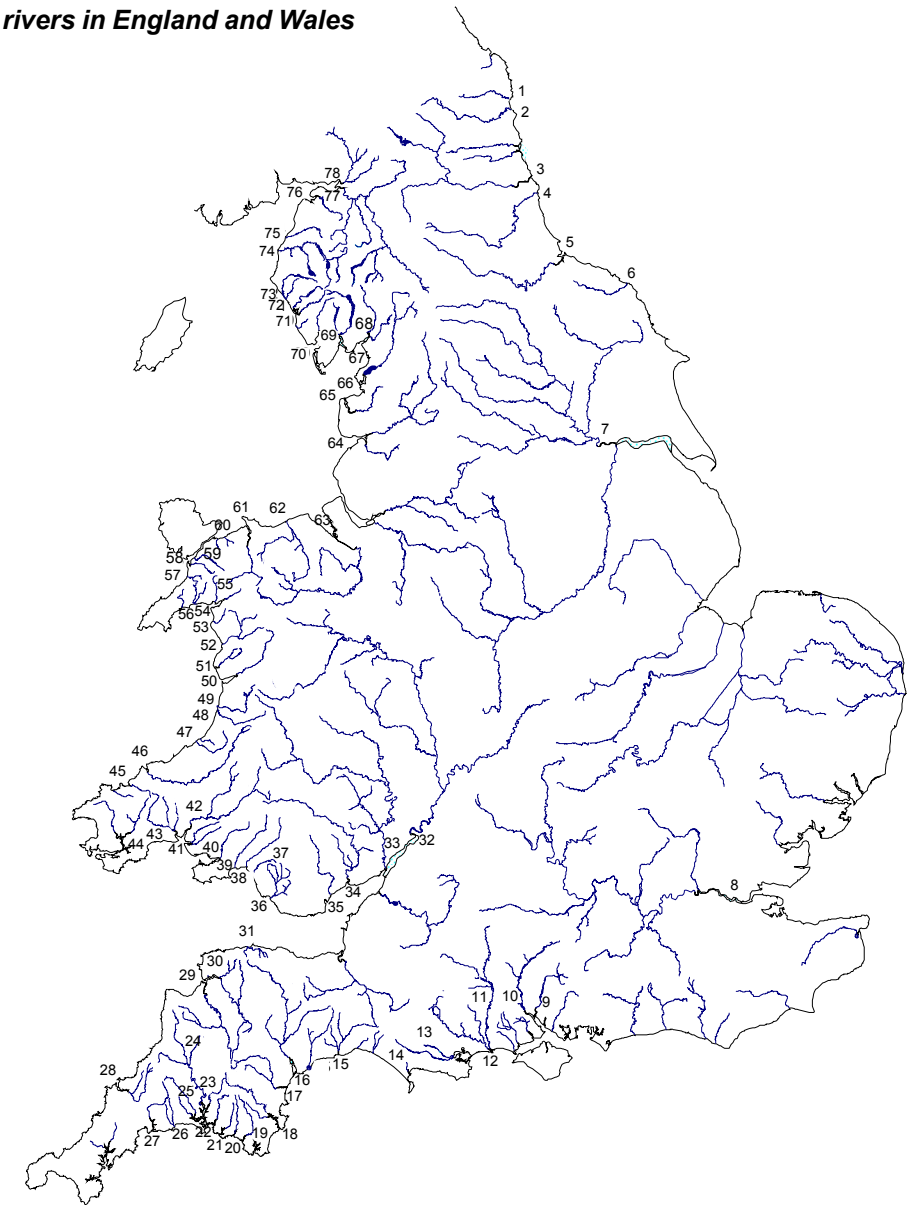
National overview

The ICES North Atlantic Salmon Working Group makes an annual assessment of the status of national stocks in the Northeast Atlantic (NEAC) area as a basis for advising managers. The pre-fishery abundance (PFA) of salmon for each country (defined as the number of 1SW salmon alive in the sea on January 1st in the first sea winter) is estimated. For the first time, a description of the assessment process and the latest national assessment for stocks in England and Wales is included in this report (Section 3.4).

The NEAC PFA model endeavours to provide an interpretation of what the available catch and effort data may tell us about changes in the status of the total national stock of salmon over the past three decades. The model output suggests that, for salmon from England and Wales, the overall PFA has declined by about 50% from the 1970s to the 1990s. The majority of this decline has been in the non-maturing (i.e. potential multi-sea-winter) component of the PFA, which is thought to have declined by about 70%, whilst the maturing (i.e. potential grilse) component has declined by about 20%. It should be noted that these trends mask conflicting changes in individual river stocks. Many rivers have experienced more serious declines but these are obscured by the very substantial improvements in others. The results also suggest that there was a marked decline in PFA around 1990, which is consistent with the general perception of a decrease in the marine survival for many stocks around the North Atlantic at about this time.

The estimated number of salmon returning to England and Wales and the total spawning escapement show similar trends to the PFA, although the declines are less marked due to the reductions in net exploitation both in distant water and homewater fisheries, and in rod fisheries. Thus, numbers of returning fish are estimated to have declined by about 35% between the 1970s and 1990s, and the spawning escapement by about 30%. However, as with the PFA, the decline in MSW components has been at least twice that of 1SW components. The figures suggest a slight upturn in the returns and spawner numbers in the last few years, although it is too early to say whether this represent a reversal of the declining trend or another short-term fluctuation in the stocks.

Salmon rivers in England and Wales



Key

No.	River	No.	River	No.	River	No.	River
1	Aln	21	Yealm	41	Gwendreath Fawr	61	Conwy
2	Coquet	22	Plym	42	Tywi	62	Clwyd
3	Tyne	23	Tavy	43	Taf	63	Dee
4	Wear	24	Tamar	44	E and W Cleddau	64	Ribble
5	Tees	25	Lynher	45	Nevern	65	Wyre
6	Esk (Yorkshire)	26	Looe	46	Teifi	66	Lune
7	Ouse	27	Fowey	47	Aeron	67	Kent
8	Thames	28	Camel	48	Ystwyth	68	Leven
9	Itchen	29	Torridge	49	Rheidol	69	Crake
10	Test	30	Taw	50	Dyfi	70	Duddon
11	Avon (Hants)	31	Lyn	51	Dysynni	71	Esk (Cumbria)
12	Stour (Dorset)	32	Severn	52	Mawddach	72	Irt
13	Piddle	33	Wye	53	Artro	73	Ehen
14	Frome	34	Usk	54	Dwyryd	74	Derwent
15	Axe	35	Taff	55	Glaslyn	75	Ellen
16	Exe	36	Ogmore	56	Dwyfach and Dwyfawr	76	Wampool
17	Teign	37	Afan	57	Llyfni	77	Eden
18	Dart	38	Neath	58	Gwyrfai	78	Esk (Border)
19	Avon (Devon)	39	Tawe	59	Seiont		
20	Erme	40	Loughor	60	Ogwen		

Figure 1. Map of England and Wales showing the main salmon rivers

REPORT ON SALMON FISHERIES IN 2002

1. Gear and fishing effort

1.1 Gear

Salmon are caught in a variety of nets and traps around the coasts of England and Wales. These comprise: gill nets, including drift, trammel, sling and coracle nets; sweep nets, such as seine (draft, draw and wade) nets; fixed engines, which include T-nets, J-nets, stop (compass) nets, putcher ranks, traps, weirs and cribs (coops); and hand-held nets, which include haaf/heave and lave/dip nets. Brief descriptions of all these nets and fixed engines are given in Annex 4. The principal salmon rivers for which data are presented in this report are shown in Figure 1, and the types of gear used in each net fishery operating in 2002 are listed in Table 1.

There were no recorded changes in the types of gear used for the capture of salmon in England and Wales in 2002.

1.2 Effort

The restrictions on fishing introduced in England and Wales in 1999 to protect early-running 'spring' multi-sea-winter (MSW) salmon remained in force in 2002. Details of the restrictions imposed on net and rod fisheries are provided in Sections 1.2.1 and 1.2.2 respectively.

Levels of exploitation of migratory salmonids by both rods and nets in England and Wales are regulated by byelaws controlling the fishing gear that may be used, and where and when fishing may take place. Separate licences are required to use rods and nets. There is no restriction on the number of rod licences that may be issued, but the numbers of licences in most net fisheries are subject to Net Limitation Orders (NLOs) as noted in Table 1.

The regulatory measures provide an overall limit on the 'allowable' fishing effort. However, within these restrictions, there will be annual variations in the amount that both netsmen and anglers actually fish (the 'utilised' effort), due to weather conditions, perceptions about the numbers of fish returning, and other factors. In 2001, angling effort had been particularly constrained throughout England and Wales by foot and mouth disease (FMD) and reduced access to riverbanks; no such restrictions applied in 2002. Netting effort has been affected by the price of salmon, which has decreased in real terms over the past two decades due to the rapid expansion in the production of farmed salmon, while the costs of net licences, fuel and fishing gear have increased. Changes in costs and the willingness on the part of some anglers to practice compulsory catch-and-release may also have affected the take-up of rod licences and angling effort.

For rod fisheries, river flow is a key factor affecting angler effort. Figure 2 shows the monthly river flows for 13 rivers in England and Wales expressed as a percentage of the long-term average for the same month. Overall, flows were above the long-term average for all rivers. However, below average flows in August, September and much of October (typically peak months for rod catches in many areas) are thought to have provided less than ideal conditions for angling and hence reduced catches. These relatively low flows persisted until the end of the fishing season in some areas; in other areas rainfall around the middle of October provided good fishing conditions at the end of the season and higher catches were reported. Relatively high flows in May and June may also have resulted in the loss of some fishing opportunities.

Table 1. Allowable and utilised effort for the principal salmon net fisheries in England and Wales in 2002

Region	River/ Fishery	Method	No. lics	NLO	Days available *	Allowable effort net days **	Utilised effort net days	Utilised effort net tides	% utilised #	Av. utilised effort day/lic.
NE	N Coastal (N)	Drift & T	24	X	114	2,736 }				
	N Coastal (N)	Drift	20	X	65	1,300 }	2,494		60	55
	N Coastal (N) [1]	T	2	25 [$]	114	228 }				
	N Coastal (S)	Drift	18	X	65	1,170	967		83	54
	N Coastal (S) [1]	T	0	1	114	114	0			
	Y Coastal	Drift	7	X	65	455	333		73	48
	Y Coastal [1]	T or J	15	50	114	5,700	620		11	41
	NE Region		**85**			**11,703**	**4,414**		**38**	
SW	Avon & Stour	Seine	4	6	52	312		221	51	39
	Poole Harbour	Seine	1	1	52	52		44	60	31
	Exe	Seine	10	18	64	1,152		290	18	21
	Teign [1]	Seine	6	9	121	1,089		205	13	24
	Dart [1]	Seine	13	15	121	1,815		577	23	32
	Camel [5]	Drift	7	7	52	364		110	22	11
	Tavy [3]	Seine	4	1	66	264		60	16	11
	Tamar [4]	Seine	14	15	58	870		589	48	30
	Lynher [4]	Seine	5	5	58	290		41	10	6
	Fowey [1,6]	Seine	2	2	66	132		43	23	15
	Taw/Torridge	Seine	3	X	43	129		96	53	23
	Lyn [2]	FE	0	n/a	0	0		0	0	0
	SW Region		**69**			**6,469**		**2,276**	**25**	
Midlands	Severn	Putchers	5		76	380	338		89	68
	Severn	Seine	1	4	74	296		42	10	30
	Severn	Lave	18		74	1,332		362	19	14
	Midlands region			**24**		**2,008**	**338**	**404**	**31**	
Wales	Tywi [1]	Seine	6	9	130	1,170		389	24	46
	Tywi [1]	Coracles	7	12	130	1,560		332	15	34
	Taf	Coracles	1	1	130	130		44	24	31
	E/W Cleddau	Compass	8	6	79	632		117	13	10
	Nevern [1]	Seine	0	1	132	132		0	0	0
	Teifi [1]	Seine	1	4	132	528		13	2	9
	Teifi [1]	Coracles	11	11	132	1,452		400	20	26
	Dyfi [1]	Seine	3	3	132	396		121	22	29
	Mawddach	Seine	1	2	79	158		49	22	35
	Glaslyn	Seine	0	1	79	79		0	0	0
	Ogwen	Seine	0	X	0	0				
	Conwy	Seine	2	3	79	237		0	0	0
	Conwy	Basket	1		92	92	79		86	79
	Dee	Trammel	4	2	52	208		185	64	33
	Dee	Seine	8	8	52	416		478	82	43
	Welsh Region		**53**			**7,190**	**79**	**2,128**	**22**	
NW	Ribble	Drift	6	6	79	474		206	31	25
	Lune	Haaf	11	12	79	948		525	40	34
	Lune	Drift	7	7	79	553		374	48	38
	Lune	Seine	1	X	79	79		59	53	42
	Kent	Lave	6	8	79	632		168	19	20
	Leven	Lave	6	6	79	474		266	40	32
	S & W Cumbria [7]	Drift	1	4	79	316		60	14	43
	Eden & Esk	Haaf	99	155	85	13,175		3,564	19	26
	Eden & Esk	Coops	3		100	300		32	8	8
	NW Region		**137**			**16,651**		**5,222**	**22**	

Notes: National spring salmon byelaws apply - all net fisheries closed until June 1.
NLO refers to number of nets allowed under the terms of the net limitation order for that fishery.
In calculating the days available, any day, or part day, on which fishing has been allowed is included.
For fisheries in which utilised effort is recorded in terms of tides fished (Wales, Midlands, SW and NW Regions) the proportion of the available effort used has been estimated by assuming that an average of 1.4 tides have been fished per day.

Key: * *Days available have been adjusted to take account of partial buy-off arrangements.*
** *Allowable effort is calculated by multiplying the days available by the number of nets permitted under the NLO, except where the number of licences excedes the NLO, in which case the higher figure is used.*
\# *Expressed as days utilised (i.e. tide data x 1.4).*
X *Denotes reducing NLO - fishery being phased out as existing licensees leave the fishery.*
$ *Includes joint drift/T net licences.*
1 *Sea trout fisheries - exempted from national spring salmon byelaws (but all salmon caught before 1 June to be released).*
2 *Not fished*
3 *Buy-off 1 July to 31 August.*
4 *Buy-off 8 August to 31 August.*
5 *Buy-off 1 August to 31 August.*
6 *Buy-off 1 June to 15 June.*
7 *Partial buy-off operating in 2002.*

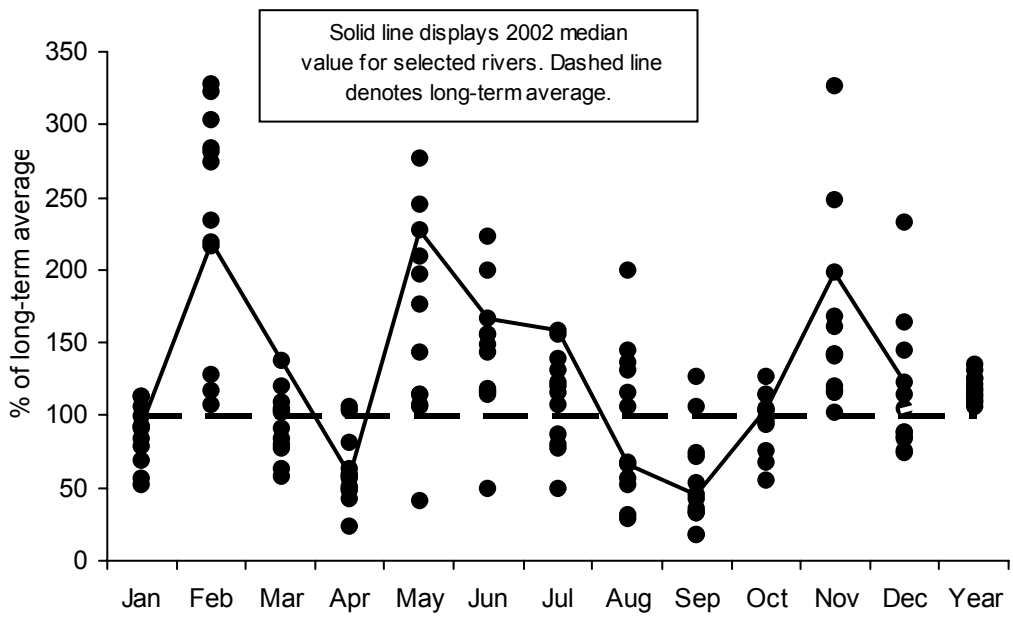


Figure 2. Monthly mean river flows (cubic metres per second) in 2002 for 13 rivers (South Tyne, Tees, Itchen, Avon, Exe, Taw, Severn, Wye, Cynon, Teifi, Dee, Lune and Eden) in England and Wales, expressed as a percentage of the long term average for the same month. (Data supplied by Centre for Ecology and Hydrology). The long term average is calculated for the available time series, which varies from river to river, but is in the range of 25-40 years.

1.2.1 Allowable effort in net fisheries

The various fishing gears used to catch salmon in England and Wales have been grouped into broad categories based on their method of capture (see definitions in footnote to Table 2 and descriptions in Annex 4). Since 1985, there has been a steady decline in the numbers of netting licences issued for gill nets, sweep nets and hand-held nets and, since 1990, for fixed engines, as a result of measures taken to reduce levels of exploitation and the declining commercial viability of some fisheries. The total number of licences issued fell by 4% in 2002 (Table 2 and Figure 3), due mostly to a reduction in the number of licences issued for sweep nets. Overall, the number of net licences issued between 1985 and 2002 has decreased by an average of about 3% per year (total decrease, 59%).

River Cleddau compass net (classified as a Fixed Engine)

Table 2. Numbers of rod licences (1994-2002) and net and fixed engine licences (1983-2002) issued in England and Wales

Year	Rod licences		Gear Type					Total net licences
	Short-term	Annual	Gill	Sweep	Hand-held	Fixed Engines	Combined drift/T net #	
1983			232	209	333	74	75	848
1984			226	223	354	74	75	877
1985			223	230	375	69	75	897
1986			220	221	368	64	75	873
1987			213	206	352	68	75	839
1988			210	212	284	70	75	776
1989			201	199	282	75	75	757
1990			200	204	292	69	75	765
1991			199	187	264	66	75	716
1992			203	158	267	65	75	693
1993			187	151	259	55	36	652
1994	10,637	26,641	177	158	257	53	30	645
1995	9,992	24,949	163	156	249	47	29	615
1996	12,508	22,773	151	132	232	42	29	557
1997	11,640	21,146	139	131	231	35	27	536
1998	11,364	21,161	130	129	196	35	26	490
1999	10,709	18,423	120	109	178	30	26	437
2000	10,916	19,223	110	103	158	32	25	403
2001	9,434	14,916	113	99	143	33	24	388
2002 *	**9,713**	**19,352**	**113**	**85**	**140**	**34**	**24**	**372**

Notes: Rod short-term licences are for 1 or 8 days; annual licences are valid from the date of issue to 31 March following.
Gill nets include: drift, trammel, sling and coracle nets.
Sweep nets include: seine (draft and draw) and wade nets.
Hand-held nets include: haaf/heave and lave/dip nets.
Fixed engines include: T-nets, J-nets, stop (compass) nets, putcher ranks, traps, weirs and cribs (coops).
East Anglian coastal nets are not included, as they are targeted primarily at sea trout and catch few salmon.
East Anglian coastal nets (targeted primarily at sea trout) have been excluded.
Key: # Combined drift/T net licences (issued in Northumbria (northern area)) have been included in the gill net totals.
** Provisional*

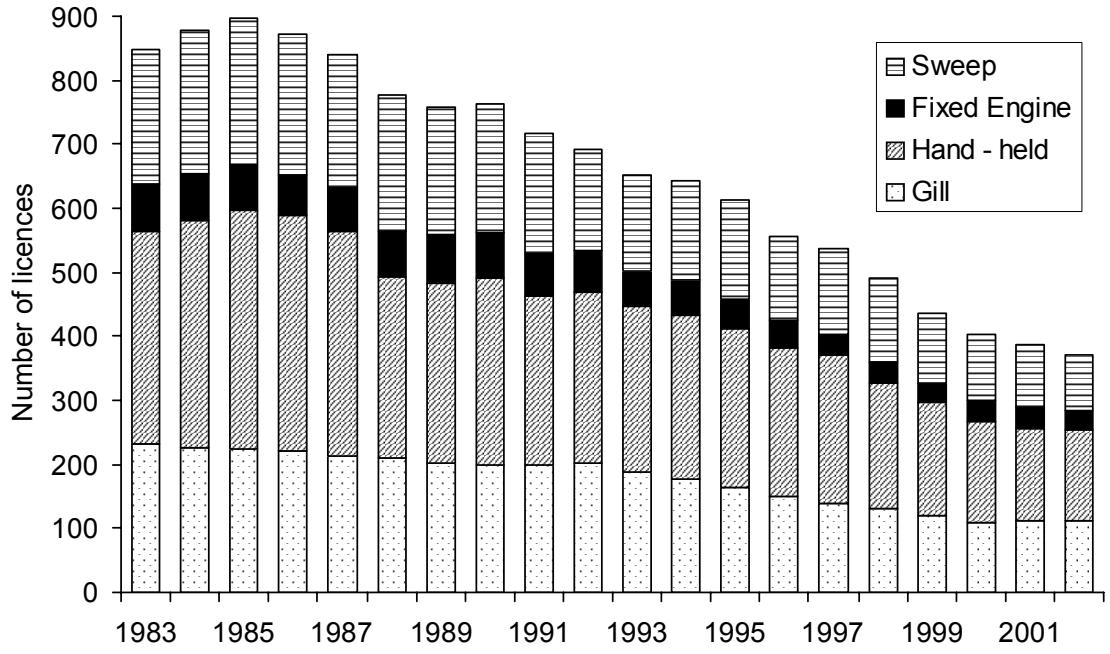


Figure 3. Numbers of salmon net and fixed engine licences issued in England and Wales, 1983-2002

The national measures to safeguard spring salmon, introduced in 1999, continued to apply in 2002. Under these measures, netsmen are banned from killing, and in most cases fishing for, salmon before 1 June. There are derogations that allow fishing in some areas where netting is predominantly for sea trout, on the basis that any salmon caught are returned alive (see Table 1).

A number of net fisheries in England and Wales are being (or have been) phased out because they exploit migratory salmonids returning to several rivers (i.e. mixed stock fisheries). Licence numbers are being reduced as fishermen retire from the fishery. Progress with those phase-outs that were incomplete in 2001 is summarised in the text table below:

Fishery	Netting Method	Start of phase out	Number of nets: before start	in 2002	Reduction %
North East Coast	drift nets	1993	142	69	51%
Anglian Coast	coastal nets	1996	59	46	22%
River Taw/Torridge	seine nets	2002	14	3	79%

In 2002, only one new NLO was introduced and this imposed a reducing NLO of zero (i.e. a phase out) for the Taw/Torridge seine net fishery in SW England. The phase out, which normally occurs as fishermen retire from the fishery, was accelerated by a compensation scheme: the Migratory Salmon Foundation financed the buying out, in perpetuity, of 11 of the 14 nets previously operating. In addition, a new byelaw was introduced in late 2001 for this fishery (effective for the 2002 season), that reduced the length of the fishing season to June and July only.

River Severn putcher rank

In addition, arrangements were made to reduce netting effort in the following fisheries in 2002 (as in earlier years) by compensating netsmen not to fish for the periods shown, or to release fish alive:

River/ Fishery	Method	Period without netting (starting year) (*full season in parentheses*)	Funding agency
Tavy	seine nets	1 July - 31 August (*1 June - 31 August*)	South West Water plc and Environment Agency
Tamar	seine nets	8 August - 31 August (*1 June - 31 August*)	
Lynher	seine nets	8 August - 31 August (*1 June - 31 August*)	
Fowey	seine nets	2 March - 15 June (*2 March - 31 August*) (Varying measures have applied on the above rivers since 1997)	
Camel	drift nets	1 August - 31 August (commenced 2002) (*1 June - 31 August*)	Environment Agency
Cumbrian coast	drift nets (3 of 4 nets only)	complete season (in perpetuity) (commenced 1999) (*1 June - 31 August*)	Derwent Owners Association
Avon and Stour (Christchurch Harbour)	seine nets	All fish caught to be released (scheme operating since 1993) (*1 June - 31 July*)	Wessex Salmon Rivers Trust & Tescos
Severn Estuary (Usk)	drift nets	complete season (in perpetuity*) (commenced 2000) (*1 June – 31 August*)	Local owners/angling interests, NASF & River Wye & Usk Foundation
Severn Estuary (Usk)	1 putcher rank	complete season (for 5 years) (commenced 2000) (*1 June – 31 August*)	
Severn Estuary (Wye)	1 putcher rank	complete season (for 5 years) (commenced 2000) (*1 June – 15 August*)	Environment Agency

Notes: NASF = North Atlantic Salmon Fund.
National byelaw - salmon season start delayed until 1 June from 2000.
Fowey buy-off from 2 March to 31 May for sea trout only.
Severn Estuary - Usk drift nets and putcher fisheries bought-out from 2000.
** Further legislation required to consolidate this.*

There have been substantial reductions in net fisheries in England and Wales over the past 10 years as a result of various controls and restrictions; details are summarised in Table 3.

1.2.2 Allowable effort in rod fisheries

No new statutory effort restrictions were imposed on rod fisheries in 2002. The national measures to safeguard spring salmon, introduced in 1999, continued to apply in 2002. These ban the killing of salmon caught by anglers prior to 16 June and restrict the methods that they can use at this time to artificial flies or lures.

No other statutory effort restrictions were imposed on rod fisheries in 2002, although trial season extensions continued to apply on a small number of rivers in North Wales and were extended to a number of other rivers on Anglesey (N. Wales). Non-statutory restrictions on methods and fishing areas are known to be imposed by some fishery owners and angling associations, but there is no national record of these. For example, anglers on a number of the southern chalkstream rivers are encouraged to return all rod-caught fish (or donate them as broodstock for enhancement purposes).

1.2.3 Utilised effort in net fisheries

Table 1 presents data on utilised effort for salmon net fisheries in England and Wales in 2002. A new national net catch return system was introduced in 2001 in all regions, except the North East. This required netsmen to report catch and effort data monthly according to the number of tides fished, and represents a change in effort reporting procedures for the South West Region (previously, days fished). Reporting rates for net fisheries have been at, or close to, 100% in all regions for many years. Consequently, the effort data for the nets and fixed engines presented in this report are not expected to change significantly due to late returns. In comparison with 2001, there was a decrease in the numbers of tides fished in the Midlands (down 12%), North West (down 10%) and South West (down 22%) Regions, but an increase in the number of days/tides fished in the North East Region (up 6%) and in Wales (up 1%). A broadly similar pattern was observed between 2000 and 2001. The decreases in utilised effort accompanied a decrease in the number of licences issued in all regions except the North East, where there was a small overall increase in the number of licences issued in 2002.

As in previous years, the proportion of the allowable effort that was utilised varied considerably between fisheries and was highest on average for the North East Region (38%). The proportion of the allowable effort utilised was lower in 2002 than in 2001, on average, for all regions except the North East. It is virtually impossible for fisheries to utilise 100% of the allowable effort due to factors such as weather conditions, tide heights and availability of fishing stations. In the north east coast fishery, for example, it has been suggested that no more than about 75% of the allowable effort could be used in the summer months under typical weather conditions (Anon., 1997).

1.2.4 Utilised effort in rod fisheries

The numbers of licences purchased each year for salmon and migratory trout angling (annual and short-term) between 1994 and 2002 are shown in Table 2; the data for 2002 are provisional (annual licences are valid from the date of purchase to the 31 March following). No comparable data are available for earlier years because of changes in licensing arrangements. Rod licence sales were particularly low in 2001 due to the outbreak of FMD, which resulted in anglers having reduced access to many fisheries. The total number of rod licences issued in 2002 increased over 2001 (up

Table 3. Regulatory controls on net fisheries introduced in England and Wales, 1993-2002

Year	Fishery	Phase out Status	NLO			Buy-offs	Other measures
			Fishery	Old	New		
1993	North East coast drift nets	Reducing NLO starts (licences not replaced as fishermen leave the fishery) 124 nets down from 142 at start				Buy-off of Taw & Torridge seine nets	Itchen seine net fished for scientific purposes only - all fish released
1994	North east coast drift nets	Phase out continues - licences reduced to 114				Buy-off of Taw & Torridge seine nets	Itchen seine net fished for scientific purposes only - all fish released
1995	North east coast drift nets	Phase out continues - licences reduced to 99				Buy-off of Taw & Torridge seine nets	Reduced netting season (delayed start) in Wye, Usk & Dee fisheries
1996	North east coast drift nets	Phase out continues - licences reduced to 89					New net licence fees resulted in reduced 'take up' of licences
	Anglian coastal nets	Reducing NLO starts (licences not replaced as fishermen leave the fishery) 59 nets at start					
1997	River Ogwen - seine nets	Reducing NLO starts (licences not replaced as fishermen leave the fishery) 2 nets at start				Full- or part-season buy-offs in place for 5 fisheries: Tavy, Tamar, Lynher, Exe and Fowey (all seine nets)	Reduced netting season (earlier close) in Tywi & Taf fisheries
	North east coast drift nets	Phase out continues - licences reduced to 81					
	Anglian coastal nets	Licences reduced to 56					
	Clwyd - drift nets	Phase out commences - no change in 1997					
	Usk - drift nets	Phase out commences - no change in 1997					
	SW Wales coastal - seine & wade nets	Phase out commences - no change in 1997					
1998	North east coast drift nets	Phase out continues - licences reduced to 75				Full- or part-season buy-offs in place for 6 fisheries: Tavy, Tamar, Lynher, Exe, Fowey (all seine nets), and Cumbrian coast (drift net)	Reduced netting season (delayed start) on Taw & Torridge seine net fishery
	Anglian coastal nets	Phase out continues - licences reduced to 54					Compensation scheme on Avon & Stour (seine nets) - fish released alive
	SW Wales coastal - seine & wade nets	Licences reduced to 0 (phase out complete)					
	Dwyfawar - seine nets	Licences reduced from 2 to 1					
	Ogwen - seine nets	No change (2 licences issued)					
	Seiont - seine nets	Licences reduced to 0 (phase out complete)					
	Clwyd - drift nets	Licences reduced to 0 (phase out complete)				Clwyd - phase out accelerated by buy-off	
	Llyfni - seine nets	Licences reduced to 0 (phase out complete)					
	Usk - drift nets	No change (8 licences issued)					

Table 3. continued:

Year	Fishery	Phase out Status	NLO			Buy-offs Fishery	Other measures Fishery
			Fishery	Old	New		
1999	North east coast drift nets	Phase out continues - licences reduced to 72				Full- or part-season buy-offs in place for 6 fisheries: Tavy, Tamar, Lynher,Exe, Fowey (all seine nets), and Cumbrian coast (drift net)	National measures introduced - all net fisheries banned from taking, and in most cases fishing for, salmon before 1 June
	Anglian coastal nets	Phase out continues - 54 licences (as in 1998)					Reduced netting season (delayed start) on Taw & Torridge seine net fishery
	Usk - drift nets	No change (8 licences issued)					Compensation scheme on Avon & Stour (seine nets) - fish released alive
	Dwyfawar - seine nets	Licences reduced from 1 to 0 (phase out complete)					
	Ogwen - seine nets	No change (2 licences issued)					
2000	North east coast drift nets	Phase out continues - licences reduced to 71	Lune - drift nets	10	7	Full- or part-season buy-offs in place for 8 fisheries: Tavy, Tamar, Lynher and Fowey (all seine nets), Cumbrian coast and Usk (drift nets), Usk and Wye (fixed engines)	New net licence fees resulted in reduced 'take up' of licences
	Anglian coastal nets	Phase out continues - licences reduced to 46	Lune - seine nets	1	0		Some fisheries in SW Wales closed due to Sea Empess oil spill
	River Ogwen - seine nets	Licences reduced from 2 to 1	Lune - haaf nets	26	12		Compensation scheme on Avon & Stour (seine nets) - fish released alive
	River Usk - drift nets	Licences reduced to 0 (phase out complete)	S&W Cumbria - drift nets	4	1	Usk - phase out accelerated by buy-off	
			Dart - seine nets	18	15		
			Teign - seine nets	10	9		
2001	North East coast drift nets	Phase out continues - licences reduced to 70	Tavy - seine nets	5	1	Full- or part-season buy-offs in place for 8 fisheries: Tavy, Tamar, Lynher and Fowey (all seine nets), Cumbrian coast and Usk (drift nets), Usk and Wye (fixed engines)	Compensation scheme on Avon & Stour (seine nets) - fish released alive
	Anglian coastal nets	Phase out continues - licences reduced to 46					
	River Ogwen - seine nets	Licences reduced to 0 (phase out complete)					
2002	Taw/Torridge	14 nets reduced to 3 in 2002				Taw/Torridge - phase out accelerated by buy-off	Compensation scheme on Avon & Stour (seine nets) - fish released alive
	North East coast drift nets	Phase out continues - licences reduced to 69				Full- or part-season buy-offs in place for 9 fisheries: Tavy, Tamar, Lynher and Fowey all seine nets), Camel, Cumbrian coast and Usk (all drift nets), Usk and Wye (fixed engines)	
	Anglian coastal nets	Phase out continues - 46 licences (as in 2001)					

30%), but numbers have still fallen overall (down 22%) during this eight year period; the number of annual licences has fallen by 27% since 1994. The number of short-term (one day and eight day) licences issued has remained relatively stable, and has only fallen by 9% over the period. Expressed as a proportion of the total, short-term licences have increased from about 28% in 1994-5 to between 33 and 39% in the subsequent period. These changes in the numbers of licence types issued are thought to have been influenced by the decline in salmon stocks and the increase in licence prices in 1996, and possibly by the more recent introduction of restrictions on angling, especially those to protect early-run MSW fish.

The Environment Agency maintains a national rod licence database for England and Wales. In order to maximise the quantity and quality of returns received, reminders are issued to as many anglers as possible in November, soon after most rod fisheries have closed. In 2001, various improvements to these procedures were made, reflecting NASCO's resolution to reduce the level of unreported catch. Firstly, a more complete list of anglers was available in November compared to previous years; secondly, a second reminder was issued some 10 weeks after the first, to anglers who had failed to send in a return (in previous years only a single reminder was issued). These improvements continued to apply in 2002; a second reminder was issued on. 24 February 2003.

The proportion (%) of salmon rod licence holders making a catch return, by licence type, 1998-2002 are presented in the text table below:

Year	Licence Type	
	Annual (Full & concessionary)	Short-term (1 & 8 day)
1998	78	51
1999	76	53
2000	71	53
2001	87	67
2002*	**83**	**60**
Mean 1998-2000	75	52

** Provisional data*

Reporting rates for all licence categories improved in 2001 compared with 1998 to 2000 as a result of the reporting improvements and partly as a result of a larger proportion of licence holders receiving a reminder. Provisional data for 2002 indicate that these improvements have been maintained. To date, 83% of annual licence holders and 60% of short-term licence holders made a return in 2002 compared with a three-year mean (1998-2000) of 75% and 52% respectively. A brief description of the Environment Agency's catch reporting and reminder system is provided at Annex 1.

It is known that many anglers purchasing more than one short-term licence during a season combine catch details on a single licence, and this contributes to the lower return rate for this licence category. Also, in general, short-term licence holders fish less and catch fewer fish that those anglers who hold an annual licence. A more detailed analysis of catch return data for 2002 for the Rivers Dee (North Wales) and Tyne indicated that 89% and 86% respectively of short-term licence holders making a return declared a nil catch, and that 98% and 96% respectively of the total declared salmon catch was made by anglers holding an annual licence. The lower return rates for short-term licence holders is, therefore, expected to have a negligible impact on the declared catch.

Table 4 shows the total declared number of rod days fished by anglers in each of the regions in each year from 1994 to 2002. Overall, most of the salmon and sea trout angling in 2002 took place in Wales (40%) and in the North West (24%) and North East (19%) Regions, as in previous years. There was relatively little angling for these species in Thames and Southern Regions. In all regions except Thames, there was a substantial increase in the number of days fished compared with 2001 (35% increase overall); it should be remembered that fishing in 2001 was severly constrained by FMD. However, the number of days fished in 2002 remained below the average of the previous five years in all Regions except Southern and North East (down 9% overall). Rod fishing effort has decreased by 38% since 1994. This reflects both the fall in the number of licences issued over recent years and the introduction of compulsory catch-and-release before 16 June in 1999. The distribution of fishing effort before and after 16 June for 2002 is shown in Table 5, as extracted from a random sample of 4,000 rod catch returns. Based on this sample, 22% of the overall angling effort was prior to June 16, with the proportion varying regionally (excluding the Thames) from 15% (North West) to 35% (Midlands). This represents a marked increase on 2001, when only 11% of the overall angling effort was prior to June 16, ranging from 9-22% between Regions (probably reflecting the impact of FMD). Expressed as a percentage of all the days fished early in the season in England and Wales, the highest fishing effort before June 16 was in Wales. This also applied in 2001, although this proportion rose from 36% in 2001 to 48% in 2002, indicating particularly high early season fishing effort in Wales. This may reflect early season fishing targeted at sea trout rather than salmon.

Table 4. Total number of rod days fished from catch returns for each EA Region, 1994-2002

Total days	NE	Thames	Southern	SW	Mids	Welsh	NW	Total
1994	37,937	343	2,446	41,087	13,596	118,862	78,176	292,447
1995	38,724	414	2,696	35,853	14,893	85,107	65,601	243,288
1996	34,726	154	1,928	32,504	13,056	84,922	64,454	231,744
1997	40,345	181	2,332	38,809	14,886	102,930	70,222	269,705
1998	38,229	145	2,095	31,285	11,493	85,906	64,248	233,401
1999	31,676	311	2,018	25,642	7,024	70,660	50,667	187,998
2000	32,319	143	1,771	22,401	5,373	66,270	49,255	177,532
2001	27,485	111	2,117	18,573	4,084	59,163	23,320	134,853
2002*	**34,278**	**91**	**2,460**	**25,380**	**4,667**	**71,914**	**43,060**	**181,850**
Mean (1997-01)	34,011	178	2,067	27,342	8,572	76,986	51,542	200,698
% change:								
2002 on 2001	+25	-18	+16	+37	+14	+22	+85	+35
2002 on 5-yr mean	+1	-49	+19	-7	-46	-7	-16	-9

* *Provisional.*

Table 5. Number and proportion of rod days fished in 2002 before (<) and from (≥) 16 June (based on a sample of 4,000 rod catch returns)

Region	No. days fished			As % of Regional total		As % of days fished in period	
	< June 16	≥ June 16	Total	< June 16	≥ June 16	< June 16	≥ June 16
North East	1,170	5,416	6,586	18	82	10	14
Thames	0	10	10	0	100	0	0
Southern	119	556	675	18	82	1	1
South West	2,349	6,180	8,529	28	72	21	16
Midlands	365	673	1,038	35	65	3	2
Wales	5,410	16,940	22,350	24	76	48	43
North West	1,747	10,004	11,751	15	85	16	25
Total	**11,160**	**39,779**	**50,939**	**22**	**78**		

1.3 Catch limits

No national catch limit regulations apply to salmon net or rod fisheries in England and Wales, but a number of restrictions have been introduced under local byelaws for rod fisheries. Details of the rod bag limits currently in force are listed below. Non-statutory restrictions have also been introduced in some areas by fishery owners and angling associations, but there is no national record of these.

Region	River	Salmon Bag Limit - rods			Other constraints
		per day	per week	per season	
Thames	Thames	2			
South West	Taw	2	3	10	) No fish > 70 cm to be
	Torridge	2	2	7	) retained after August 1
Wales	Tywi	2	5		
	Taf	2	5		
	E&W Cleddau	2	5		
	Nevern	2	5		
	Teifi	2	5		
	Aeron	2	5		
	Ystwyth	2	5		
	Rheidol	2	5		
North West	Lune			4	

2. Catches and CPUE

2.1 Catches

The provisional catch statistics for 2002 are based upon returns received up until 19 March 2003. The rod catch data are based largely on anglers' returns, except for a few rivers where the data from fishery owners' returns are considered to be more complete (Rivers Wye, Test & Itchen) and include fish reported as a result of the second reminder. A further small increase is expected as a result of late returns. The catch returns for the nets and fixed engines are not expected to change significantly.

2.1.1 Catches in 2002

Table 6 presents the provisional total salmon catch for England and Wales for 2002, compared with confirmed catches for the previous 5 years. A breakdown of the provisional 2002 rod and net catches for each Region is provided in Table 7.

The total declared catch for nets and fixed engines in 2002 was 11% lower than in 2001, but still slightly above the average for the previous 5 years (Table 8, Figure 4). These figures are dominated by the north east coast fishery, which has accounted for between 57% and 85% of the national annual net catch during the period 1992-2002 (81% in 2002). Because of the variability in catches from year to year, care must be taken in comparing figures for a single year. A more reliable picture of catch trends may therefore be obtained by comparing data aggregated over a period of years. Between the periods 1997-99 and 2000-2002, there has been a substantial decline in the average net catches in some regions; the greatest reductions have occurred in Wales (55%), the South West (8%) and the Midlands (5%). However, there has been a substantial increase in the average catches between these two periods in the North East (65%) and in the North West (38%), despite the fact that the north east coast fishery is being phased out. These figures may reflect, in part, the better status of the main river stocks in the north of the country, and particularly in the North East, compared

Table 6. Declared catch of salmon for England and Wales for 1997-2002

Year	Nets & Fixed Engines		Rods (inc. released fish)		Total caught		Total retained	
	No.	Wt (t)	No.	Wt (t)	No.	Wt (t)	No.	Wt (t)
1997	31,459	107.2	13,047	48.4	44,506	155.6	41,374	141.8
1998	25,179	84.7	17,109	59.1	42,288	143.9	36,917	122.9
1999	34,167	124.4	12,492	49.8	46,659	174.2	41,094	150.0
2000	50,998	182.7	17,596	67.5	68,594	250.2	60,953	218.8
2001	43,243	153.3	14,383	56.8	57,626	210.1	51,307	184.2
2002*	**38,279**	**133.2**	**15,231**	**60.0**	**53,510**	**193.2**	**45,644**	**160.8**
Mean (1997-2001)	37,009	130.5	14,925	56.3	51,935	186.8	46,329	163.5

** Provisional*

Table 7. Provisional regional salmon catches (including released fish) for England and Wales - 2002 season

Region	Net catch		Rod catch		Total catch	
	No.	Weight (kg)	No.	Weight (kg)	No.	Weight (kg)
North East	30,980	106,366	3,946	17,600	34,926	123,966
Anglian	112	176	0	0	112	176
Thames	0	0	0	0	0	0
Southern	0	0	533	2,010	533	2,010
South West	1,404	4,400	1,733	6,117	3,137	10,517
Midlands	1,190	4,377	195	892	1,385	5,269
Wales	1,275	5,212	3,304	12,764	4,579	17,976
North West	3,318	12,699	5,512	20,541	8,830	33,240
Unknown	0	0	8	29	8	29
Total	**38,279**	**133,230**	**15,231**	**59,953**	**53,510**	**193,183**

Table 8. Summary of declared regional salmon and grilse net and fixed engine catches (including released fish), 1992-2002

Year	Region						
	NE	Anglian	SW	Mids	Wales	NW	Total
1992	20,144	11	5,521	2,117	2,927	3,123	33,843#
1993	41,800	4	5,017	950	3,324	5,460	56,555#
1994	46,554	3	6,437	2,321	4,995	6,143	66,453#
1995	53,210	5	3,251	2,588	3,039	5,566	67,659
1996	18,581	3	5,093	1,608	2,931	4,464	32,680
1997	21,922	0	2,466	1,282	2,628	3,161	31,459
1998	18,265	3	1,759	1,074	2,300	1,778	25,179
1999*	26,833	6	1,605	989	2,347	2,387	34,167
2000*	43,354	0	2,171	973	1,004	3,496	50,998
2001*	36,115	0	1,794	1,027	997	3,310	43,243
2002 (provisional)*	**30,980**	**112**[+]	**1,404**	**1,190**	**1,275**	**3,318**	**38,279**
Mean (1997 - 2001)	29,298	2	1,959	1,069	1,855	2,826	37,009
% change:							
2002 on 2001	-14		-22	+16	+28	0	-11
2002 on 5-yr mean	+6		-28	+11	-31	+17	+3

Key: *# Totals exclude small numbers of fish caught in the Southern Region. River Itchen seine net fished for scientific purposes only; all salmon caught tagged and released.*

** Includes a small number of fish caught & released (Anglian, Wales & SW Regions only)*

[+] *It is unusual for salmon to be caught in this sea trout fishery in any numbers; these reported fish were of low mean weight and may have been misidentified.*

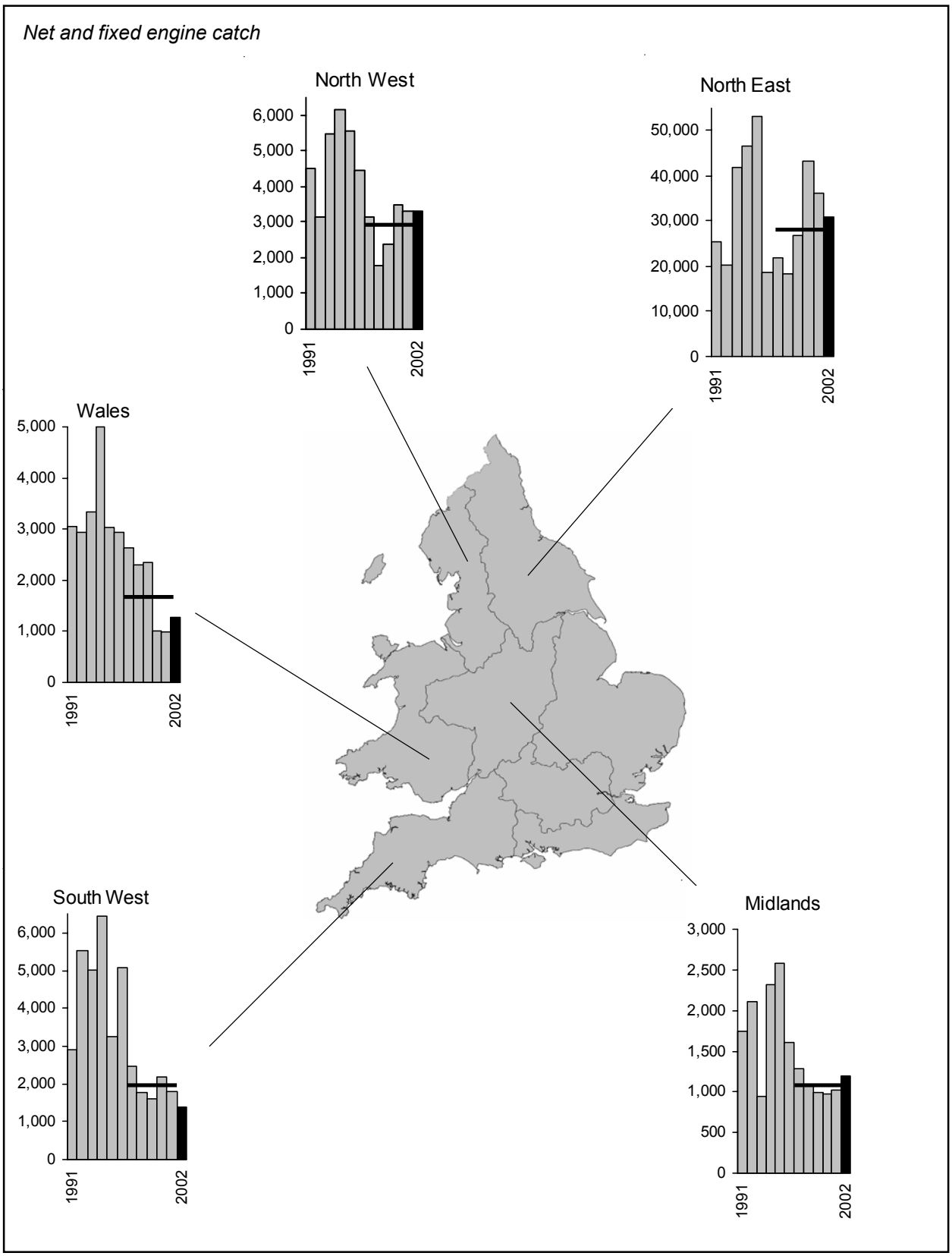


Figure 4. Regional declared salmon net and fixed engine catches. The histograms display data for the twelve years 1991 to 2002, together with the five-year mean for the period 1997-2001 (displayed as a horizontal line). Note that the histograms are not drawn to the same scale. Data for 2002 are provisional.

with other regions of England and Wales. It has also been suggested that the declared catch might have been influenced recently by the prospect of an accelerated phase out ('buy out') of the north east coast fishery (Section 2.1.3).

The rod catches (both retained and released fish) for recent years are shown in Table 9 and Figure 5. The total declared catch has varied between about 12,500 and 17,600 fish over the period 1997 to 2002 without any evident trend; the lowest catches in the time period being in 1999. Catches in 2001 were also relatively low, but this was considered to reflect reduced access to fisheries caused by FMD restrictions rather than necessarily reduced in-river abundance. Despite a significant upturn in angling effort, overall provisional catches for 2002 are only slightly above those in 2001. Catches in 2002 fell on 2001 in Wales (down 24%) and the Midlands (down 29%), but were above the 2001 catches in other Regions. The perception from local Fishery Officers was that runs of salmon late in

Table 9. Summary of declared regional salmon and grilse rod catches, 1997-2002 - including details of fish caught and released and fish caught and killed

Year	Region							
	NE	Thames	Southern	SW	Midlands	Wales	NW	Total*
Declared catch (fish caught and retained)								
1997	1,648	1	43	1,786	282	3,142	3,013	9,915
1998	1,904	0	144	1,842	155	3,346	4,340	11,738
1999	1,322	0	116	983	120	2,166	2,338	7,045
2000	1,712	0	69	1,335	224	2,785	3,998	10,126
2001	1,878	0	8	761	145	3,004	2,430	8,240
2002 (provisional)	**1,703**	**0**	**5**	**815**	**122**	**1,960**	**2,986**	**7,599**
Declared catch (fish released)								
1997	797	1	107	586	30	480	1,131	3,132
1998	1,037	0	222	1,077	31	979	2,019	5,371
1999	1,348	1	137	898	65	1,203	1,795	5,447
2000	1,888	0	247	1,152	103	1,264	2,816	7,470
2001	1,855	0	397	635	128	1,347	1,779	6,143
2002 (provisional)	**2,243**	**0**	**528**	**918**	**73**	**1,344**	**2,526**	**7,632**
% of fish released								
1997	33		71	25	10	13	27	24
1998	35		61	37	17	23	32	31
1999	50		54	48	35	36	43	44
2000	52		78	46	31	31	41	42
2001	50		98	45	47	31	42	43
2002 (provisional)	**57**		**99**	**53**	**37**	**41**	**46**	**50**
Declared catch (including fish caught and released)								
1997	2,445	2	150	2,372	312	3,622	4,144	13,047
1998	2,941	0	366	2,919	186	4,325	6,359	17,109
1999	2,670	1	253	1,881	185	3,369	4,133	12,492
2000	3,600	0	316	2,487	327	4,049	6,814	17,596
2001	3,733	0	405	1,396	273	4,351	4,209	14,383
2002 (provisional)	**3,946**	**0**	**533**	**1,733**	**195**	**3,304**	**5,512**	**15,231**
Mean - including fish caught & released (1997-2001)	3,078	1	298	2,211	257	3,943	5,132	14,925
% change:								
2002 on 2001	+6		+32	+24	-29	-24	+31	+6
2002 on 5-yr mean	+28		+79	-22	-24	-16	+7	+2

** Totals include some fish of unkown Region of capture.*
Most 2002 figures are angler's catch returns received up to 19 March 2003 (including the second reminder); data for the Rivers Wye, Test and Itchen are based upon owners returns.

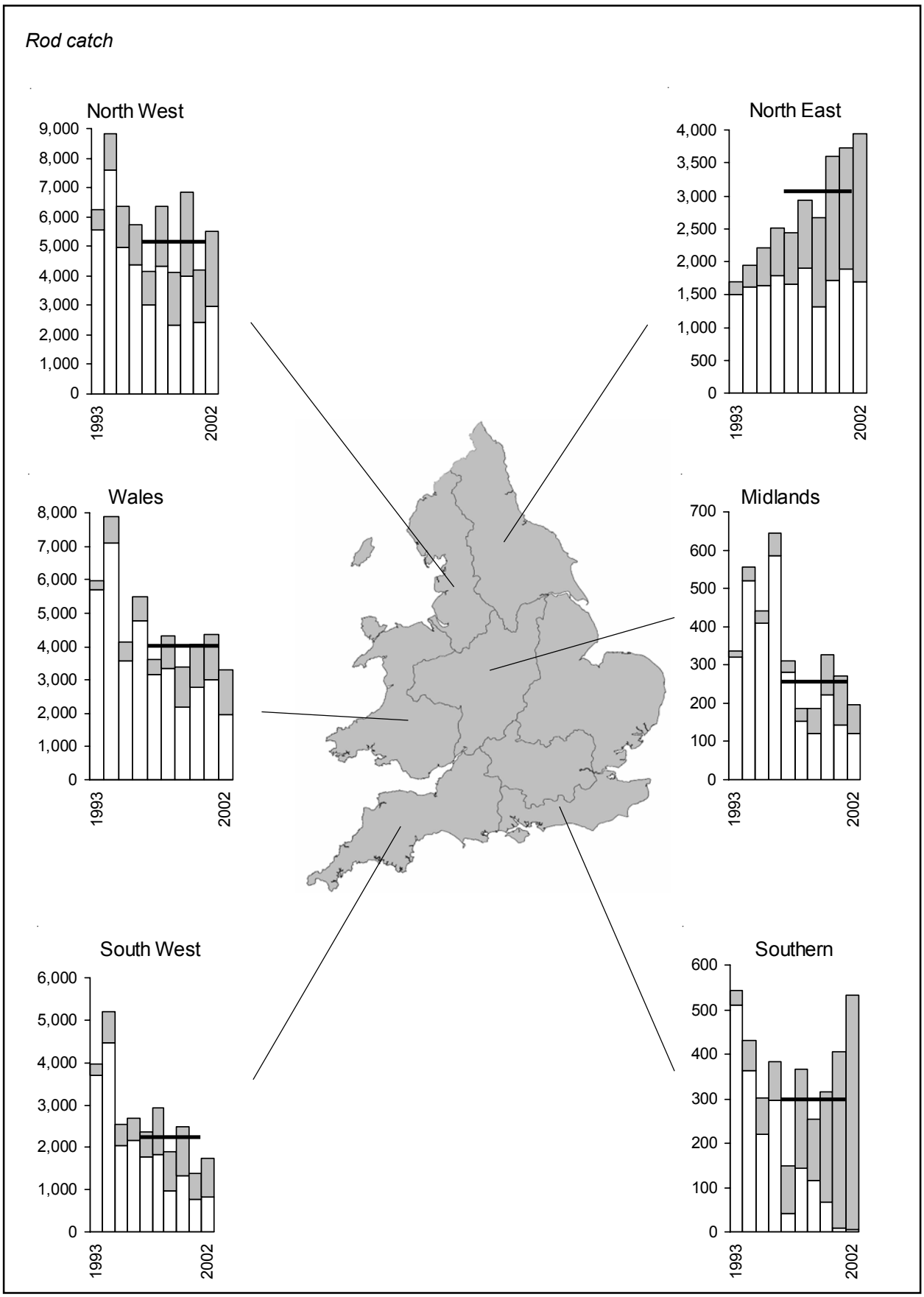


Figure 5. Regional declared rod catch. The histograms display total declared catch, with the shaded area denoting fish caught and released, for the nine years 1993-2002, together with the five-year mean for the period 1997-2001 (displayed as a horizontal line). Note that the histograms are not drawn to the same scale. Data for 2002 are provisional.

the season had been relatively good, particularly in Wales and the North West Region, but that these had arrived too late to feature prominently in catches. The recent rod catch trends for different Regions show marked variability (Figure 5), with several Regions (particularly Wales, the Midlands and South West) showing a declining catch trend, whereas there has been a marked increase over the period in the catches in the North East. Catches in the Southern Region in 2002, although relatively few in number, were close to the highest in the time period (1993-2002). Almost all the fish caught in the Southern Region were released alive.

2.1.2 Catches in coastal, estuarine and riverine fisheries

Catch data grouped for coastal, estuarine and riverine fisheries are requested by ICES and these data (fish caught and retained only) for the years 1993 to 2002 are presented in Table 10. The catch for the coastal fisheries mainly reflects the catch in the north east drift net fishery, but also includes fixed nets in this area, drift nets on the Cumbrian coast (North West Region) and a number of nets and fixed engines fished around the Welsh and East Anglian coasts and in the Bristol Channel. The data set starts in 1993, as this marks the start of the phase out of the north east drift net fishery; other mixed stock fisheries have also been phased out since this date. A full list of the fisheries included in the coastal category appears in the footnote to Table 10. In 2002, only three coastal fisheries remained in operation, and one of these, Anglian, usually takes very few salmon. The riverine fisheries comprise catches in freshwater and represent the rod catch plus the catches in two ancient fixed engines, the River Conwy basket trap and River Eden coops, which also operate in freshwater. The catch from the two latter instruments is very small. The estuarine category includes all the other net and fixed engine fisheries (Table 1).

On average, over the period 1993-2001, coastal catches have comprised 62% of the total (declared fish caught and retained), estuarine catches 17% and riverine catches 21%. In 2002, the coastal catch comprised 67% of the total; over the period 2000 to 2001, the coastal proportion of the catch was at its highest level over the ten-year time series.

Table 10. Declared catch of salmon (fish caught and retained only) in coastal, estuarine and riverine fisheries, 1993-2002

Year	Coastal		Estuarine		Riverine		Total
	Wt (t)	%	Wt (t)	%	Wt (t)	%	Wt (t)
1993	158.8	64	43.4	18	45.9	18	248.1
1994	183.5	57	58.4	18	81.9	25	323.8
1995	200.3	68	45.4	15	48.9	17	294.6
1996	83.3	45	42.3	23	57.5	31	183.2
1997	80.5	57	26.7	19	34.6	24	141.8
1998	65.2	53	19.4	16	38.2	31	122.9
1999	101.0	67	23.1	15	26.0	17	150.0
2000	156.6	72	25.4	12	36.9	17	218.8
2001	128.6	70	24.2	13	31.3	17	184.2
2002*	**107.9**	**67**	**24.4**	**15**	**28.5**	**18**	**160.8**
Mean (1993-01)	128.7	62	34.3	17	44.6	21	207.5

** Provisional*

Notes: Coastal catches include: North East coast nets, Anglian coastal nets, River Parrett putcher rank, River Usk drift nets & putcher rank, SW Wales coastal wade & seine nets, River Ogwen seine nets, River Seiont/Gwyrfai seine nets, River Dwyfawr seine nets, N. Caernarvonshire seine nets, River Clwyd sling (drift) nets and the SW Cumbria drift nets.
Riverine fisheries include: rod catches, River Conwy basket trap and River Eden coops.
Estuarine fisheries include all other nets and fixed engines not mentioned above.

2.1.3 Effects of significant management measures on catches

Catch and release: Within England and Wales there has been increasing voluntary use of catch and release by salmon anglers in recent years and this has been encouraged by the Environment Agency and other organisations. Details of fish caught and released are published for each major salmon river in England and Wales in the annual catch statistics and these data are summarised in Tables 9 and 11 and in Figure 5. In 2002, this amounted to 7,632 fish (31.5 tonnes). The proportion of rod-caught salmon released by anglers increased steadily from 10% in 1993 to 42-44% over the three-year period 1999-2001; the proportion has increased again in 2002 to 50% (provisionally). The increase in 2002 may, in part, reflect the fact that catches were relatively good at the very end of the fishing season when a higher proportion of coloured fish would have been caught.

The national measures introduced in April 1999 also closed all salmon net fisheries before 1 June. However, a small number of fisheries (primarily targeted at sea trout) are allowed to operate prior to 1 June, provided any salmon caught before that date are released. Thus, low levels of catch and release also apply for net fisheries. In 2002, a total of 234 salmon, weighing 0.9 t, are reported to have been caught and released by netsmen. The majority of these fish (202) were actually released as a result of a compensation scheme on the River Avon (see Section 1.2.1), thus only 32 salmon, mainly originating from a number of sea trout fisheries in Wales, arose from the derogation to the national measures. Summary data are included in Table 11.

Table 11. Number, weight and proportion of declared salmon rod catch released by anglers, and number and weight of net catch released, 1993-2002

	Salmon released by rods			Salmon released by nets	
	Number	Weight (t)	As % of declared catch	Number	Weight (t)
1993	1,448	5.26	10.3		
1994	3,227	12.19	13.0		
1995	3,189	12.11	19.9		
1996	3,428	13.99	19.7		
1997	3,132	13.77	24.0		
1998	5,365	20.98	31.4		
1999	5,447	23.87	43.6	118	0.4
2000	7,470	30.70	42.4	171	0.7
2001	6,143	25.50	42.7	176	0.4
2002*	**7,632**	**31.50**	**50.0**	**234**	**0.9**

** Provisional*

Notes: Many of the salmon released by nets have been as a result of a compensation scheme on the River Avon (see Section 1.2.1). Data on catch and release not collected prior to 1993.

National measures to protect spring salmon: There are well-publicised and ongoing concerns about the decline in the numbers of spring salmon. The introduction in 1999 of a national byelaw requiring the compulsory release of all salmon caught by rods before 16 June has resulted in the majority of large, early-run salmon being released before July. An analysis of the numbers of salmon released by weight category (<8 lbs, 8-14 lbs, and >14 lbs) and season, for the years 1998 to 2002, is shown at Table 12. This indicates that, since the introduction of the national measures to protect spring salmon, anglers have been voluntarily releasing an increased proportion of all fish caught after June, and large salmon (>14 lbs) in particular. For example, in the months of September and October, 45% of large salmon (>14 lbs) were voluntarily released by anglers in 1998 and this rose to 63% in 2002 (provisional). Various research studies have demonstrated that if fish are appropriately handled, mortality following capture is low and a large proportion of fish survive to spawn (Webb, 1998a and b: Whoriskey *et al.*, 2000).

Release of angler-caught salmon

Table 12. Number and proportion (%) of salmon released, by weight category (lbs) and season, 1998-2002

Season	April to June			July to August			September to October			April to October		
Wt. category (lbs)	<8	8-14	>14	<8	8-14	>14	<8	8-14	>14	<8	8-14	>14
Number												
1998	148	124	20	687	206	40	2,298	965	253	3,133	1,295	313
1999	240	658	194	328	178	61	1,663	1,105	466	2,231	1,941	721
2000	295	581	148	555	241	72	2,722	1,515	502	3,572	2,337	722
2001	179	774	138	494	318	52	2,320	1,255	420	2,993	2,347	610
2002*	**332**	**733**	**213**	**561**	**222**	**57**	**2,629**	**1,564**	**485**	**3,522**	**2,519**	**755**
Proportion												
1998	24	16	18	18	23	18	36	44	45	29	34	35
1999	60	67	74	23	26	30	40	46	53	38	48	53
2000	63	70	72	21	28	30	41	47	56	37	48	55
2001	61	61	68	25	28	26	41	46	58	37	46	55
2002*	**68**	**65**	**71**	**26**	**27**	**33**	**49**	**54**	**63**	**44**	**52**	**61**

** Provisional.*
1998 Pre national byelaw.
1999 National byelaw requiring compulsory catch and release before 16 June introduced on 14 April.
2000 First full year of national catch and release byelaw.

The introduction of the national measures in 1999 also resulted in a large reduction in the number of fish caught by net fisheries before June, from a five-year average (1994-98) of 2,997 fish (6.7% of the total catch) to a mean of 54 (0.1% of the catch) since 1999 (Table 13). For rods, the number of fish caught before June fell from a five-year average (1994-98) of 1,898 (10.9% of the total catch) prior to the introduction of the national measures to a mean of 801 (5.4% of the catch) since 1999. This will reflect in large measure the reduction in fishing effort due to the national measures as well as the impact of FMD in 2001. As already indicated, the measures require these fish to be released. The contribution of MSW salmon to catches in recent years is covered in Section 2.5.

Table 13. Number and proportion of declared salmon net and rod catch taken before (<) 1 June, and the numbers taken from (≥) 1 June, 1989-2002

Year	Net catch				Rod catch (including released fish)			
	Numbers			%	Numbers			%
	< 1 June	≥ 1 June	Total	< 1 June	< 1 June	≥ 1 June	Total	< 1June
1989	4,742	64,198	68,940	6.9	3,199	11,529	14,728	21.7
1990	7,339	64,488	71,827	10.2	2,397	12,290	14,687	16.3
1991	3,637	34,038	37,675	9.7	2,240	11,496	13,736	16.3
1992	2,497	31,352	33,849	7.4	1,012	9,725	10,737	9.4
1993	1,630	54,936	56,566	2.9	865	13,194	14,059	6.2
1994	4,824	61,633	66,457	7.3	2,609	22,282	24,891	10.5
1995	4,888	62,771	67,659	7.2	2,141	13,865	16,006	13.4
1996	2,913	29,767	32,680	8.9	2,691	14,753	17,444	15.4
1997	1,528	29,931	31,459	4.9	1,335	11,278	12,613	10.6
1998	832	24,335	25,167	3.3	712	15,275	15,987	4.5
1999	116	34,043	34,159	0.3	920	11,211	12,131	7.6
2000	19	50,979	50,998	0.04	760	16,496	17,256	4.4
2001	47	43,196	43,243	0.11	708	13,675	14,383	4.9
2002*	**32**	**38,247**	**38,279**	**0.08**	**817**	**14,253**	**15,070**	**5.4**
Mean (1994-98)	2,997	41,687	44,684	6.71	1,898	15,491	17,388	10.9
Mean (1999-2002)	54	41,616	41,670	0.13	801	13,909	14,710	5.4

** Provisional.*

Notes: National measures to protect 'spring' salmon introduced on April 15 1999 - required compulsory catch and release of all rod caught salmon prior to June 16, and closed most net fisheries prior to June 1.
Rod catch data only include fish for which date of capture recorded; data differ from total catch (Table 8).

Mixed stock fisheries: Since 1993, there has been a policy to phase out coastal mixed stock salmon fisheries in England and Wales as existing licensees retire. The largest of these fisheries is on the north east coast, where the number of drift net licences issued has now been reduced by 51%.

Nine other small coastal mixed stock fisheries have also been identified in recent years, seven of which are no longer operating, while the remaining two are in the process of been phased out (Table 3). In some cases, fishermen have been paid to give up their licences early and, in December 2000, the Government offered up to £750,000, subject to matching funds from interested parties, to launch compensation arrangements designed to accelerate the phase out of mixed stock fisheries on a voluntary basis with particular emphasis on the north east coast fishery. Negotiations have continued through 2002, and additional Government funds were identified to facilitate this process. At the current time, it appears that agreement has been reached, in principle, with the majority of the netsmen (~70-80%) to surrender their licences in return for agreed compensation payments. Subject to ratification, it is hoped that this will be effective immediately, thus representing a very substantial reduction in effort in this fishery prior to the start of the 2003 season.

Although there have been large annual fluctuations in the declared catches, the overall effect of these measures has been to reduce the catches in these coastal fisheries from an average of about 41,000 fish for the period 1988-92 to a little under 32,000 for the period 1998-2002. For example, prior to the buy-off of the nets and fixed engines on the River Usk in 2000, this fishery took, on average, about 1,000 fish each year (~40% of the total net catch in Wales). The more recent buy-off of the Taw/Torridge fishery has resulted in a drop in the catch from a five-year mean (1997-2001) of 665 fish to just 103 in 2002.

2.1.4 Long-term catch trends

Figure 6 shows the declared net catch for England and Wales since 1956 and distinguishes the catch in the north east coast fishery from that in all other areas. The catch in the north east coast fishery increased rapidly in the late 1960s with the introduction of synthetic nets and has comprised well over 50% of the total net catch in England and Wales in most of the subsequent years (81% in

2002). Despite a 51% reduction in the number of licences issued since 1993, the reported north east coast catch has not declined proportionately.

The catches in the other net fisheries have been declining since the mid 1970s and, since 1998, have remained near the lowest level in the past 40 years. The decline in catches in the 1990s reflects the steady reductions in both fishing effort (see Table 2) and stock size.

The declared rod catch of salmon has declined by around 50% from its peak in the mid-1960s to the present day (Figure 7). This trend underestimates the true rate of decline in catches because reporting rates have improved and catch data for the past seven years are the most complete in the time series. In addition, the pattern on individual rivers has varied from much more severe declines to substantial recoveries. Although angling effort appears to have declined substantially since 1995 (Table 4), we do not know how this relates to the level of fishing activity in earlier years. The total annual catch since 1989 has fluctuated around a level of about 14,000 fish.

2.2 Catch per unit effort (CPUE)

Catch levels are influenced by stock abundance, the catchability of the fish, and by the variation in the time anglers and netsmen spend fishing. Catch per unit of fishing effort (CPUE) is, therefore, used as well as the declared catch in order to help evaluate the relative status of stocks. CPUE can also provide a measure of angler satisfaction (most people would rather catch one salmon for every 10 days they fished than one every 20 days), and indicates changes in the profitability of net fishing, catch being the income set against the costs of time spent netting. For net fisheries in England and Wales, regional CPUE data have been collated using the number of tides fished (or in the North East Region the number of days fished) as a measure of the amount of fishing undertaken by each licence holder. Rod CPUE data (catch per licence day) are now reported for all major salmon rivers in England and Wales in the annual catch statistics reports.

2.2.1 CPUE in net fisheries

Regionally aggregated CPUE data for 2002, compared with previous years, are shown in Table 14. It should be noted that these data do not take account of the differing fishing methods employed in the various regions, nor of any changes in the relative proportions of different gears used. Further, recent restrictions on netting early in the season to safeguard spring salmon will have concentrated fishing effort in the more favourable fishing months. It is also possible that measures to reduce fishing effort through licence reduction have tended to result in the least efficient netsmen leaving the fishery, and thus in an improvement in the overall catchability (the relationship between CPUE and stock). CPUE is also likely to vary within a season. Thus, cautious interpretation is required.

To partially address the above concerns, and to provide a more consistent time series of CPUE data, Table 14 also includes CPUE for the drift nets in the north east coast fishery. These data are for the summer months only (June to August inclusive) since 1993. The CPUE for this specific fishery varies from 4.9 to 12.2 salmon per day over the period 1993-2002; the CPUE in 2002 was 8.2 salmon per day, a little below the average for the previous five year period.

In 2002, the CPUE value for nets and fixed engines was below the mean of the previous five years in Wales, the Midlands and the North East Region. In the South West and North West Regions, CPUE values were at or slightly above the previous five-year average. Generally, CPUE levels appear to have been relatively high in the periods 1993-95 and again in 1999-2001. In addition to other factors mentioned above, the recent relatively high levels may be due to the effect of national measures which have concentrated effort on the more productive time of year. This would tend to mask the effects of any reduced availability (stock abundance) on the CPUE in recent years, and it would be inadvisable to draw conclusions about stock status based on catch data alone.

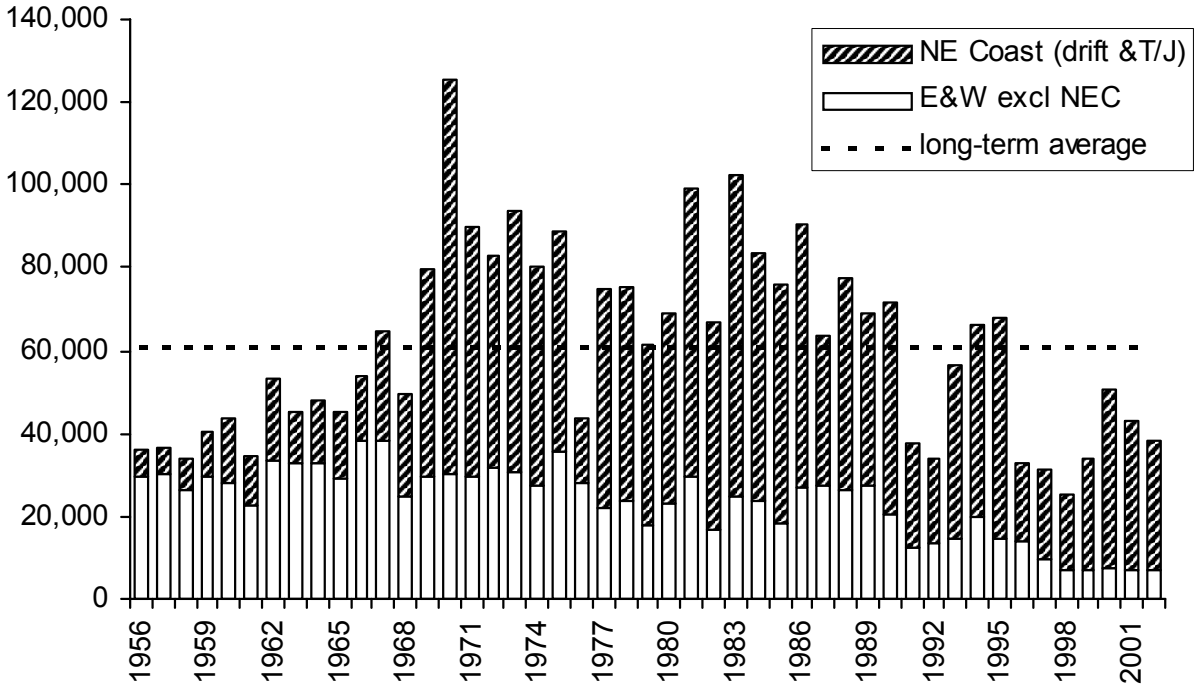


Figure 6. Total declared salmon net and fixed engine catch for England and Wales 1956-2002; the shaded area indicates the catch in the north east coast fishery

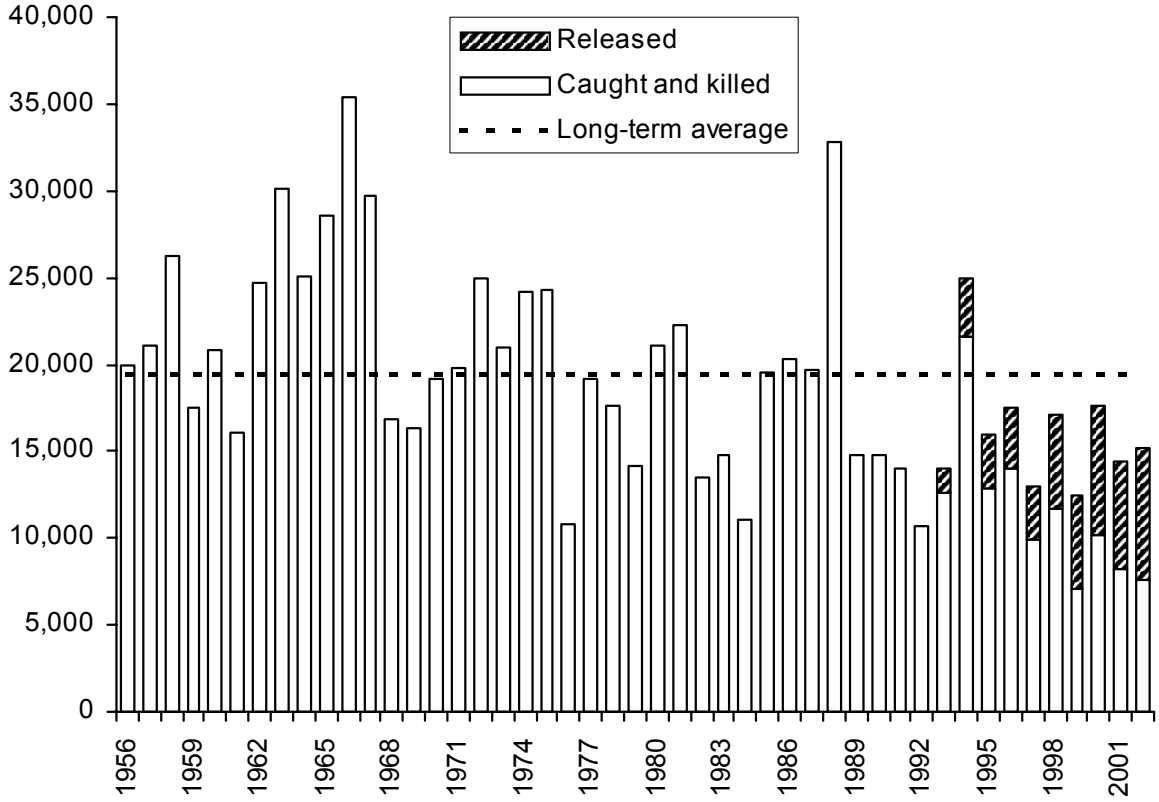


Figure 7. Total declared salmon rod catch for England and Wales 1956-2002; the shaded area indicates fish caught and released. (N.B. Data for 2002 are provisional; fish caught and subsequently released were not reported prior to 1993)

Table 14. Regional CPUE data for net and fixed engine salmon fisheries, 1988-2002

Data are expressed as catch per licence-tide in all Regions except the North East, for which the data are recorded as catch per licence-day.

Year	NE	Region (aggregated data, various methods)					
	Drift nets (June-August)	NE	Southern	SW	Midlands (a)	Wales	NW
1988		5.49	10.15				
1989		4.39	16.8			0.90	0.82
1990		5.53	8.56			0.78	0.63
1991		3.20	6.40			0.62	0.51
1992		3.83	5.00			0.69	0.40
1993	8.23	6.43	No fishing			0.68	0.63
1994	9.02	7.53	"			1.02	0.71
1995	11.18	7.84	"			1.00	0.79
1996	4.93	3.74	"			0.73	0.59
1997	6.84	5.30	"	0.42		0.77	0.35
1998	6.49	5.12	"	0.56	0.25	0.69	0.32
1999	8.77	7.28	"	0.48	0.36	0.83	0.37
2000	12.21	10.50	"	0.64	0.43	0.40	0.64
2001	10.06	8.70	"	0.62	0.42	0.47	0.56
2002 (Provisional)	**8.23**	**7.00**	"	**0.62**	**0.34**	**0.53**	**0.63**
Mean (1997 - 2001)	8.87	7.38		0.54	0.37	0.63	0.45

Note: Revised reporting procedures introduced in 2001 required fishermen in all Regions, except NE, to report catches per tide fished.

Key: (a) Seine nets and lave nets only.

2.2.2 CPUE in rod fisheries

Regional summaries of rod CPUE data for anglers making returns (expressed as number of salmon caught per 100 days fished) are presented in Table 15 for the period 1997 to 2002. These figures include returns from a wide variety of anglers; for example, from locals who fish regularly, those who only fish for salmon whilst on holiday, and those who fish primarily for sea trout. River characteristics (e.g. underlying geology, flow patterns, etc.) can also vary markedly between regions. This will result in the CPUE for salmon varying between regions, but still provides scope for comparisons through time within a region. However, it should also be noted that reductions in effort due to the national measures to protect spring salmon may have affected CPUE from 1999 onwards.

Table 15. Rod CPUE - number of salmon (including released fish) caught per 100 days fished for regional rod fisheries, 1997-2002. (Catches shown in Table 9).

Year	Region							England & Wales
	NE	Thames	Southern	SW	Midlands	Wales	NW	
1997	5.0	0.6	3.1	5.2	1.7	2.6	5.3	4.0
1998	6.5	0.0	5.9	7.5	1.3	3.9	8.6	6.0
1999	7.4	0.3	3.1	6.3	2.1	3.5	7.4	5.5
2000	9.2	0.0	5.2	8.8	4.9	4.4	11.7	7.9
2001	11.3	0.0	11.0	6.6	5.4	5.5	15.4	8.7
2002 *	**9.4**	**0.0**	**17.2**	**5.8**	**3.5**	**3.6**	**10.6**	**6.8**
Mean (1997 - 2001)	7.9	0.2	5.7	6.9	3.1	4.0	9.7	6.4
% change:								
2002 on 2001	-17		+56	-12	-35	-35	-31	-22
2002 on 5-yr mean	+19		+204	-16	+14	-10	+10	+6

Note: Based only on catch returns for which effort data have been reported.

** Provisional.*

The rod CPUE in 2002 was the highest recorded in the period in the Southern Region, but elsewhere CPUE was reduced compared with the relatively high values noted in 2001 (down 22% overall). In the North East, North West, Southern and Midlands Regions rod CPUE remained above the recent five-year average; in Wales and the South West Region CPUE fell below the five-year average. Relatively high CPUE values in the last three years suggest reasonably high in-season availability of fish and an overall improvement in angling success, possibly due to increased abundance of fish or reduced fishing effort by less efficient anglers. However, the particularly high CPUE values in 2001 may, in part, reflect restrictions on river access due to FMD and the consequent focussing of rod effort at times when salmon were most available to anglers. Thus, as with nets, it should be noted that the inter-relationship between CPUE for rod fisheries and salmon abundance can be influenced by confounding factors.

2.3 Unreported and illegal catches

If the full effects of fisheries upon stocks are to be assessed, managers must take account of unreported catches by net and rod licence holders and also the scale of illegal catches. In earlier years, estimates of the levels of under-reporting and illegal fishing (expressed as percentages of the declared regional catches) have been provided by regional fisheries staff. However, in an effort to improve these estimates, the methodology was re-examined in 1997 and an approach agreed. This has been used for estimating the extent of unreported and illegal catches since 1998.

2.3.1 Under-reporting by licence holders

The rate of under-reporting for net fisheries is generally considered to be low in most regions of England and Wales, and this has been supported by the findings of two studies. In the North East, under-reporting in the coastal fishery has previously been estimated at about 7% (Anon., 1991). In the North West, comparison of the catches seen by the bailiff with those declared for that day, suggested that catches in the estuary net fishery on the River Lune were under-reported by around 8%. Opinions on the level of under-reporting in net fisheries in other regions of England and Wales were collected from Environment Agency regional fisheries personnel in February 1998; these fell in the range 0% to 15%. It has been suggested that over-reporting of catches may occur in some fisheries, in response to rumours about potential future buy-outs (and the perception that compensation will be based on declared catches). This may have applied to the north east coast fishery since 2000. For this report, a figure of 8% has been used for the level of under-reporting of the national net catch, except for the north east coast where it has been assumed that there was no under-reporting in the period 2000 to 2002.

For the purpose of setting conservation limits under their Salmon Action Plan guidelines (see Annex 3), the Environment Agency have estimated that declared salmon rod catches from 1994 onwards should be increased by 10% to allow for under-reporting of the legal rod catch across England and Wales. This has been based on a study of annual catch returns made following reminders (Environment Agency, 1998). Exceptions to this apply for the River Wye in Wales and the Rivers Test and Itchen in the Southern Region for which the fishery owners' returns are regarded as being accurate, and for which no scaling factor has been applied for under-reporting. The 10% correction for under-reporting has continued to apply for the 2001 and 2002 seasons, although it is expected that this will be reviewed in light of the recent issue of second reminders for catch returns.

2.3.2 Illegal catches by unlicensed fishermen

By their nature, illegal catches are very difficult to quantify. However, assessments can be made on the basis of enforcement activities. Consultation with Environment Agency regional fisheries personnel was used as the basis for an updated assessment in February 1998, which provided estimates of illegal catches in coastal waters and within rivers and estuaries. These ranged from 5% to 18 % of the declared catch for different regions. For this report (as in all years since 1998), a figure of 12% has been used to estimate the total illegal catch for England and Wales. It is recognised that the estimate is crude and that it is not possible to detect year-on-year changes in this value. It is planned to review these estimates again in 2003.

2.3.3 Under-reporting and illegal catch estimate for 2002

On the basis of the above estimates, the non-reported and illegal catch for England and Wales in 2002 is estimated at about 31 tonnes, which represents 16% of the total weight (including the under-reported and illegal catch) of salmon caught and killed.

2.4 Other sources of non-catch fishing mortality

Non-catch fishing mortality includes all sources of mortality generated directly or indirectly by fishing which are not included in the recorded catch. It includes the illegal and unreported catches discussed above, in addition to losses of fish that are removed from fishing gear by predators, dead fish that fall out of a net and fish that escape or are released and subsequently die.

The extent of the likely losses will vary between fisheries because of the type of gear used and its method of operation. In addition, the impact of predators, particularly seals, varies between areas. However, in most net fisheries in England and Wales the netsmen remain with their gear and remove any fish caught quite quickly; thus relatively few fish will drop out and losses to predators can usually be limited. Sweep and hand-held nets cause very little damage to the fish and so losses of fish that may escape are likely to be minimal. However, small losses may occur from enmeshing nets, and predation losses may be significant in the north east coast fishery, which is close to a large grey seal colony.

No data are available on the mortality of salmon incurred during normal angling activities (e.g. due to lost or foul-hooked fish that subsequently die) that are not recorded in the retained catch. Whilst the use of catch-and-release is likely to result in some fish dying through exhaustion or damage, studies suggest that such losses can be negligible if fish are handled carefully (Webb, 1998a and b; Whoriskey *et al.*, 2000).

2.5 Composition of catches

2.5.1 Age composition of net catches

In the past it has not been possible to estimate the proportions of grilse (one-sea-winter) and MSW salmon in the catch of all regional net fisheries, because netsmen have generally not been required to report the sizes of individual fish caught and few scale samples have been collected. However, data collection procedures for all fisheries, except the North East, were standardised in 2001 and this will permit age composition of catches to be reported in the future.

Catches in some net fisheries are reported as small (<8 lb) or large (>8 lb) salmon, based upon weight splits, and this can be used as a rough indication of sea-age, although this will result in some grilse being classed as MSW salmon and some MSW fish as grilse. Such data are available for 2002 for a number of regions as shown in the text table below:

	Small salmon		Large Salmon		Total
	(<8 lbs)	%	(>8 lbs)	%	
NE	21,408	69	9,572	31	30,980
NW	2,089	63	1,229	37	3,318
Midland	791	66	399	34	1,190
Wales	682	53	593	47	1,275
SW	1,009	83	200	17	1,209
Total	**25,979**	**68**	**11,993**	**32**	**37,972**

Where the reporting systems have been consistent, these data can provide an indication of changes in the age-composition of the catches. In the North East Region, for example, large ('MSW') salmon are estimated to have made up between 31 and 35 % of the catch over the period 1997 to 2002, which is below the long-term average of 42% (1965-2002). The estimated proportion of 'MSW' salmon in 2002 (31%) is the lowest recorded over the period, and the proportion shows a steady decline over this period (Figure 8). In Wales, 40% of the salmon caught in both 2000 and 2001 were estimated to be 'MSW', this rose to 47% in 2002. In all other Regions, the proportion of 'MSW' salmon in 2002 was lower than in 2001.

The proportions of MSW salmon recorded in the years 2000 to 2002 are expected to have been reduced by the introduction of the national measures restricting netting effort in the early part of the season when MSW salmon comprise the majority of the catch.

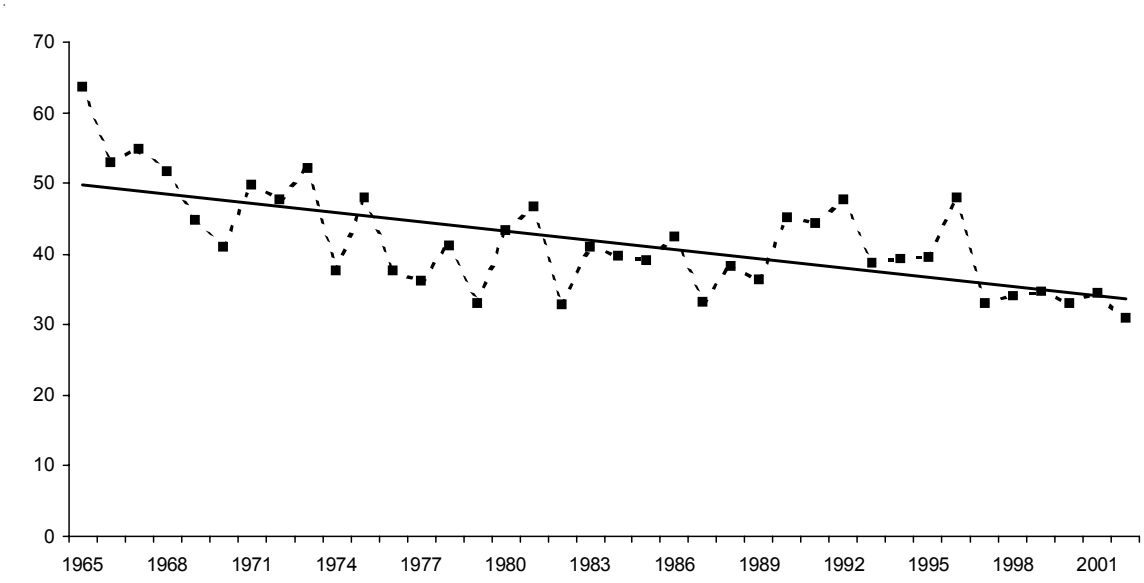


Figure 8. Estimated proportion of MSW salmon (salmon >8lb, as declared by netsmen) in the north east coast fishery, 1965-2002.

2.5.2 Age composition of rod catches

Monthly age-weight keys are available for salmon caught in the River Dee trap over the period 1992-2002, and these have been used to estimate the age composition of catches for the principal salmon rivers (Table 16). These estimates were derived from the declared catches where a weight and date of capture have been provided.

Table 16. Proportions of grilse and MSW salmon in provisional declared 2002 rod catches, including fish released

Region	River	No. grilse	%	No. MSW	%
NE	Coquet	452	71	187	29
	Tyne	1,424	62	863	38
	Wear	398	85	70	15
Southern	Itchen	137	92	12	8
	Test	73	83	15	17
SW	Hants Avon	36	36	63	64
	Frome	70	71	28	29
	Exe	154	83	32	17
	Teign	32	71	13	29
	Dart	14	52	13	48
	Tavy	14	93	1	7
	Tamar	98	75	33	25
	Lynher	25	89	3	11
	Fowey	178	93	14	7
	Camel	190	88	25	12
	Taw	64	47	72	53
	Torridge	5	21	19	79
	Lyn	152	80	37	20
Midlands	Severn	80	43	105	57
Wales	Wye	113	40	169	60
	Usk	200	36	348	64
	Ogmore	39	87	6	13
	Tywi	273	81	64	19
	Tawe	102	87	15	13
	Taf	19	59	13	41
	E & W Cleddau	30	97	1	3
	Teifi	320	77	98	23
	Dyfi	46	96	2	4
	Mawddach	88	93	7	7
	Ogwen	51	91	5	9
	Conwy	93	91	9	9
	Dee	367	82	79	18
NW	Ribble	547	85	96	15
	Lune	895	86	146	14
	Kent	290	85	51	15
	Leven	6	100	0	0
	Irt	69	91	7	9
	Ehen	328	95	16	5
	Derwent	751	89	94	11
	Eden	718	78	201	22
	Border Esk	606	84	113	16
Total		**9,547**	**75**	**3,148**	**25**

Note: Data only included for fish for which weight data provided on catch return; these data do not represent the total catch for the season.

In 2002, six of the principal salmon rivers listed in Table 16 (Hants Avon, Taw, Torridge, Severn, Wye and Usk) had 50% or more MSW salmon in the rod catch (including fish subsequently released), an increase of two on 2001. Thirteen of the listed rivers had at least 25% MSW salmon in the rod catch, an increase on the period 1999 to 2001 (ten rivers each year). The estimated numbers of grilse and MSW salmon, and the proportion of MSW fish, in regional rod catches (including fish caught and released) over the period 1995 to 2002 are shown in Table 17 and Figure 9.

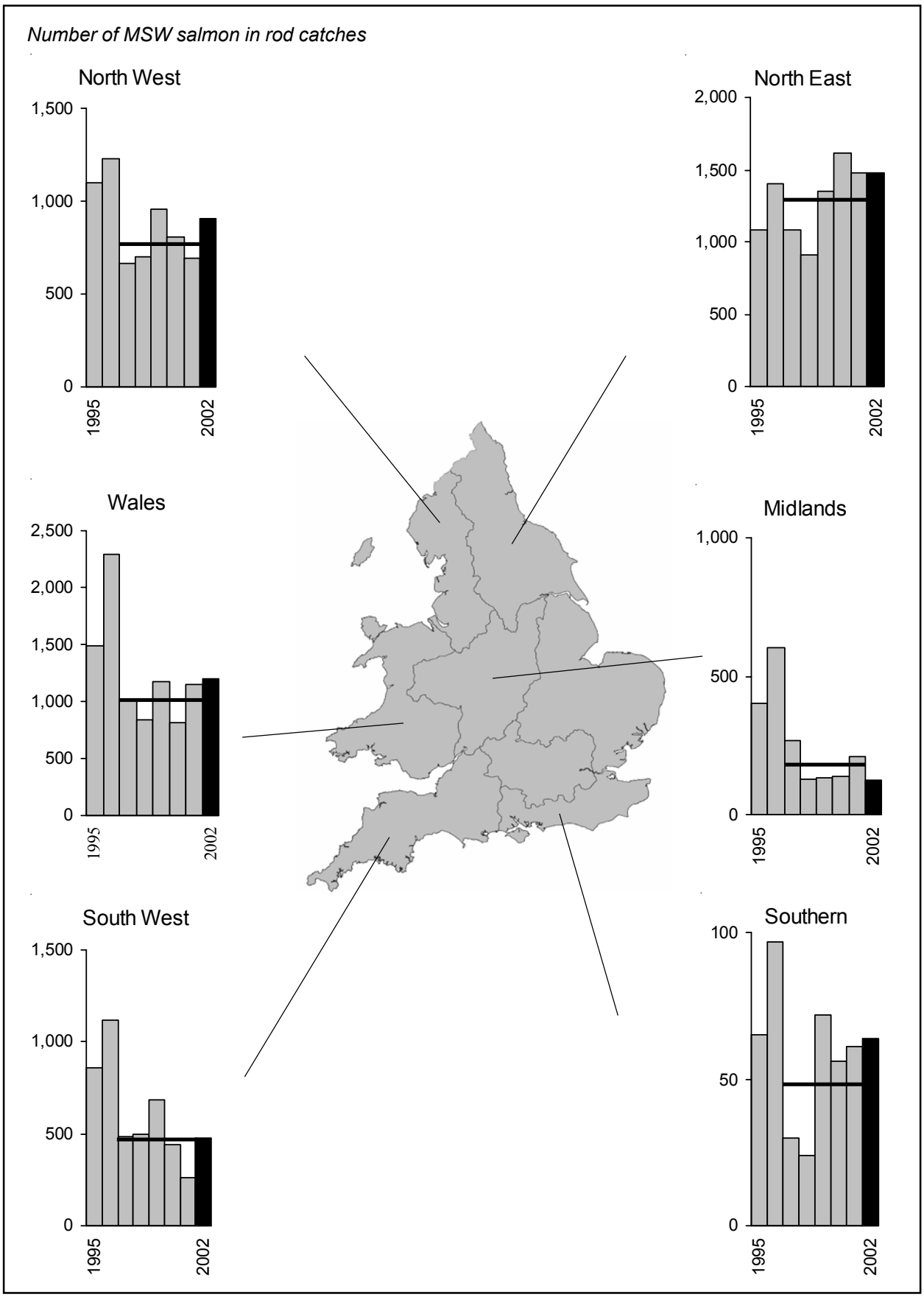


Figure 9. Estimated number of MSW salmon in regional rod catches. The histograms display data for the eight years 1995 to 2002, together with the five-year mean for the period 1997-2001 (displayed as a horizontal line). Note that the histograms are not drawn to the same scale. Data for 2002 are provisional.

Table 17. The estimated number of grilse and MSW salmon (corrected for under-reporting) and the percentage composition of MSW salmon in regional rod catches in England and Wales, 1997-2002 (including fish caught and released)

Year	Region												All Regions	
	NE		Southern		SW		Midlands		Wales		NW			
	Grilse	MSW	Grilse	MSW	Grilse	MSW	Grilse	MSW	Grilse	MSW	Grilse	MSW	Grilse	MSW
1997	1,305	1,084	119	30	1,894	483	53	266	2,385	1,021	3,703	667	9,459	3,551
1998	2,226	909	378	24	2,543	501	66	131	3,548	843	5,975	699	14,736	3,107
1999	1,586	1,351	206	72	1,386	683	70	132	2,278	1,175	3,589	955	9,115	4,368
2000	2,188	1,618	292	56	2,270	441	200	139	3,196	816	6,507	807	12,383	3,821
2001	2,628	1,478	344	61	1,275	261	90	210	3,638	1,149	3,936	694	11,911	3,853
2002*	**2,865**	**1,476**	**469**	**64**	**1,430**	**476**	**92**	**123**	**2,435**	**1,199**	**5,154**	**909**	**12,445**	**4,247**
Mean (1997-2001)	1,987	1,288	268	49	1,874	474	96	176	3,009	1,001	4,742	764	11,521	3,740
% change:														
2002 on 2001	+9	0	+36	+5	+12	+82	+2	-41	-33	+4	+31	+31	+4	+10
2002 on 5-year mean	+44	+15	+75	+32	-24	0	-4	-30	-19	+20	+9	+19	+8	+14

Percentage MSW

Year	Region						All
	NE	Southern	SW	Midland	Wales	NW	Regions
1997	45	20	20	83	30	15	27
1998	29	6	16	66	19	10	17
1999	46	26	33	65	34	21	32
2000	43	16	16	41	20	11	24
2001	36	15	17	70	24	15	24
2002 *	**34**	**12**	**25**	**57**	**33**	**15**	**25**
Mean (1997-2001)	39	15	20	65	25	14	25

* *Provisional.*

Whilst there were fewer MSW salmon taken by rods in 2002 than in 2001 in the Midlands Region, numbers were at or above 2001 levels elsewhere. The proportion of MSW salmon in the 2002 catch was higher than that in 2001 in the South West Region and Wales, the same in North West Region, but lower elsewhere. Overall, the MSW catch in 2002 was better than that in 2001 (up 10%) and the recent five-year mean (up 14%). In 2002, MSW salmon were estimated to comprise 25% of the catch nationally, compared with 24% in both 2000 and 2001, and 32% in 1999. There has been an overall downward trend in the MSW catches over the past 6 years in the South West and Midlands Regions, although no such trend is evident elsewhere.

Overall rod catches of grilse in 2002 were a little higher than those in 2001, although there was some variability between Regions. Grilse catches increased on 2001 in all Regions except Wales, but remained below the five-year mean in the South West and Midlands Regions and in Wales. There has been no overall trend in the grilse catches over the past 6 years, though grilse catches in many regions tend to alternate between good and bad years.

2.6 Origin of catches

2.6.1 Reared fish

There is currently no salmon ranching in England and Wales and only one small salmon cage-rearing facility, which is believed to be primarily run for research purposes (e.g. feed trials). Fish farm escapees are not usually recorded in catches in England and Wales, although an estimated 180 farmed-origin fish were recorded in fisheries in North West England and North Wales in autumn 2001. The source of these fish was believed to have been a salmon cage-rearing facility in Glenarm

Bay, County Armagh, Northern Ireland, from which a major escape was reported. There were no reports of any farmed-origin salmon in net or rod catches in England and Wales in 2002.

In a number of catchments, juvenile salmon are stocked from hatcheries for mitigation or enhancement purposes. Full details of the numbers of fish stocked in these programmes, and the stage (eggs, fry, parr and smolts) of release, are included on a catchment by catchment basis in the Salmonid and Freshwater Fisheries Statistics published annually by the Environment Agency. In most instances, if they return as adults, these fish cannot be distinguished from fish derived from natural spawning, although marking and tagging programmes are undertaken in some areas to assess the efficacy of these programmes (Annex 5). The relatively small scale of stocking and low survival of stocked fish in most instances (Harris, 1994) suggest that these initiatives have a small overall impact on natural salmon populations in England and Wales.

2.6.2 Salmon from other countries

Based upon studies conducted in the 1970s and 1980s, approximately 75% of the salmon caught in the English north east coast fishery in recent years are estimated to be returning to rivers in Scotland. This represents ~ 25,000 fish in 2002. The fishery operating in the Solway Firth is also thought to exploit some salmon returning to rivers in Scotland, but the proportion of such fish in the Solway net catch has not been estimated. There are very few records of tagged salmon released in, or originating from, rivers in other countries being taken in English and Welsh fisheries.

2.7 Exploitation rates

2.7.1 Homewater exploitation

The relationships between catch and run are mediated by fishing effort and catchability (the proportion of the stock taken per unit of fishing effort), which in turn are shown to vary between and within rivers. A prime cause of this variation is likely to be river flow, which probably acts by influencing the behaviour and availability of the fish, and also angler activity.

Relatively few rivers have independent measures of run size to compare against catch. However, such data obtained from counters and traps are available for some rivers in England and Wales (Table 21 and Figure 10). The total catch (retained and released combined) has been used in Table 17 to estimate exploitation rates. These show varying trends, but the true exploitation rates (i.e. fish retained) show a decline in most rivers in recent years, an effect largely attributable to catch and release, which has increased from 10% to 50% between 1993 and 2002.

Levels of exploitation in 2002 were below the average of the previous five years in most of the rod fisheries for which data are available. Exceptions were noted for the Rivers Frome and Fowey in the South West Region and the Rivers Test and Itchen in the Southern Region, for which increases occurred. In the latter instances, a high proportion of the salmon catch is released. Exploitation rates are also available for three net fisheries, the Dee, Kent and the Lune; two of these (the Dee and Kent) were below the average of the previous five years, whereas the Lune showed a small increase.

In a separate study (Milner *et al*. 2001), an analysis of data from seven of these rivers (Test, Itchen, Frome, Tamar, Fowey, Dee and Lune) has shown that while exploitation rates are comparatively stable within rivers, there is more variation between years within individual rivers. From a tagging and recapture programme on the River Dee, North Wales, it has been shown that early season

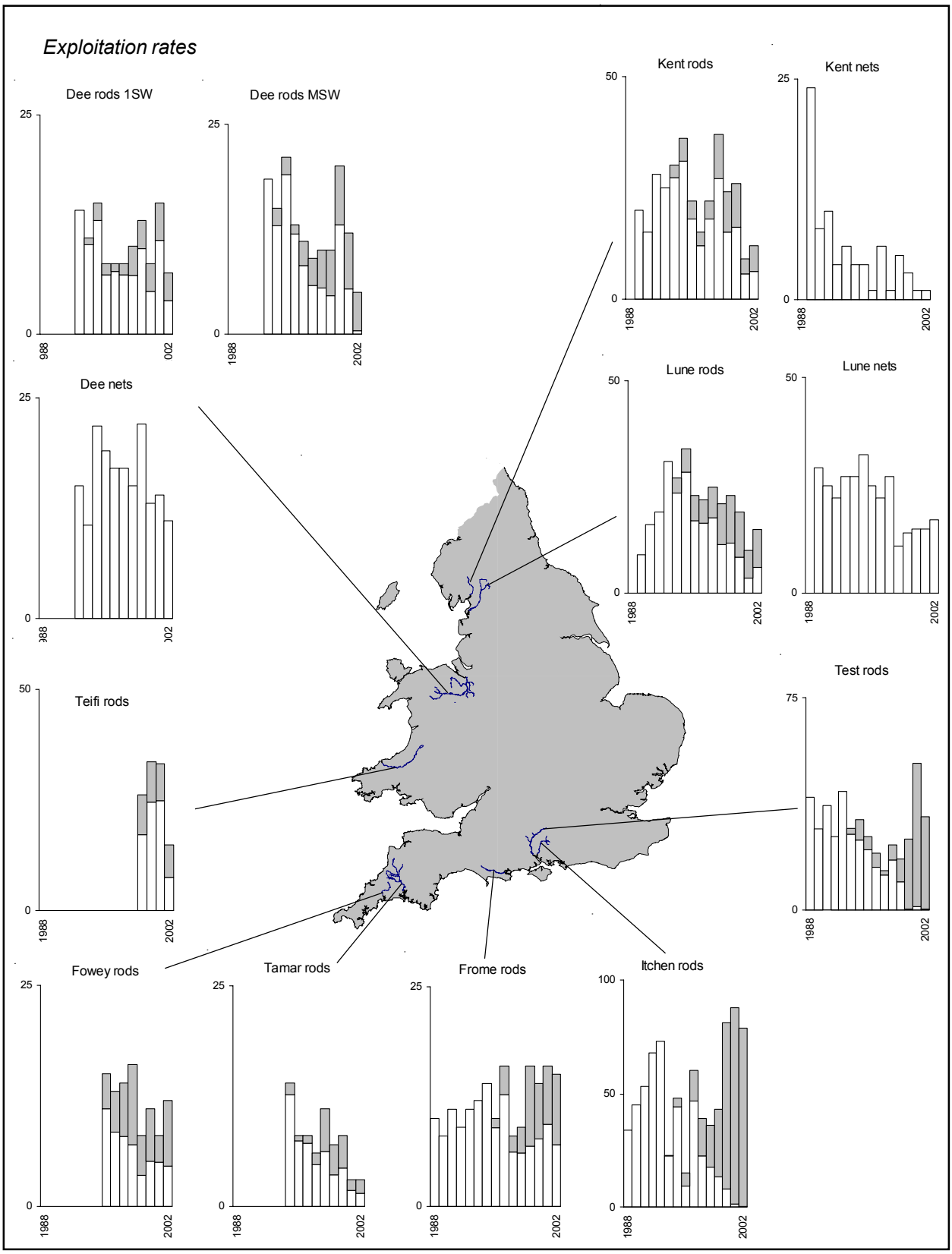


Figure 10. Estimated exploitation rates (%), including fish released (shown as shaded part of bar), for selected rod and net salmon fisheries in England and Wales. The histograms display all available data for the years 1988 to 2002. Data for 2002 are provisional. Note that estimates for the Dee rods have been split by age class (1SW and MSW); all other estimates are combined for all ages.

Table 18. Estimated exploitation rates (%) for selected rod and net fisheries in England and Wales, 1988-2002; data for rod fisheries distinguish exploitation rates for all fish (including fish released) and for retained fish only (Ret.) (Rates are corrected for under-reporting)

Region	Rod Fisheries Southern				SW						Wales						NW				Net Fisheries Wales	NW	
River	Test		Itchen		Frome		Tamar		Fowey		Dee		Dee		Teifi		Kent		Lune		Dee	Kent	Lune
Hatchery/Wild	W/H		W		W		W		W		W (1SW)		W (MSW)		W		W		W		W	W	W
Year	All (c)	Ret.	All (c)	Ret.	All (a)	Ret.	All	Ret.	All	Ret.	All (b)	Ret.	All (b)	Ret.	All	Ret.	All	Ret.	All	Ret.	Ret.	Ret.	Ret.
1988	40	40	34	34	10	10																	
1989	29	29	45	45	8	8											20	20	9	9		24	29
1990	37	37	53	53	11	11											15	15	16	16		8	25
1991	26	26	68	68	9	9											28	28	19	19		10	22
1992	42	42	73	73	11	11					14	14	18	18			25	25	31	31	15	4	27
1993	29	27	23	22	12	12					11	10	15	13			30	27	27	24	11	6	27
1994	32	25	48	44	14	14	14	13			15	13	21	19			36	31	34	29	22	4	32
1995	26	21	15	9	10	9	8	7	15	11	8	7	13	12			22	18	23	17	19	4	25
1996	20	15	60	47	16	13	8	7	13	8	8	7	11	8			15	12	22	17	17	1	22
1997	14	13	39	22	8	6	6	5	14	8	8	7	9	6			22	18	25	18	17	6	27
1998	23	18	36	18	9	6	11	6	16	7	10	7	10	5			37	27	21	11	15	1	11
1999	18	10	43	13	16	7	7	4	8	4	13	10	10	5	26	17	24	15	23	12	22	5	14
2000	25	0.3	81	8	14	8	8	4	11	5	8	5	20	13	34	25	26	16	19	8	13	3	15
2001	52	1	88	1	16	9	3	2	8	5	15	11	12	5	33	25	9	6	10	4	14	1	15
2002*	**33**	**0.2**	**79**	**0.4**	**15**	**7**	**3**	**1.5**	**12**	**5**	**7**	**4**	**5**	**0.4**	**15**	**8**	**12**	**6**	**15**	**6**	**11**	**1**	**17**
Mean (1997 - 2001)	26	8	57	13	13	7	7	4	11	6	11	8	12	7	31	22	24	16	20	11	16	3	16
% change																							
2002 on 2001	-37	-83	-10	-71	-6	-25	0	-17	+50	-8	-53	-64	-58	-93	-55	-70	+33	+9	+50	+67	-21	0	+13
2002 on 5-yr mean	+25	-98	+38	-97	+19	-3	-57	-64	+5	-19	-35	-50	-59	-94	-52	-66	-49	-63	-23	-43	-32	-69	+4

Key: (a) Data based on CEH counter at Wareham, and supplied courtesy of CEH.
(b) Data derived from mark recapture experiment.
(c) Includes rod caught fish retained for broodstock.
(d) Local restrictions on fishing imposed in 1999.
** Provisional.*

Notes: Estimates for Dee, Kent, Leven and Lune net fisheries are based on declared catches and are minimum estimates.
The entire catch from net fisheries is assumed killed.

entrants to the river were subject to much higher exploitation than those entering later, though exploitation rates of Dee spring salmon declined from 26% in 1992-94 to 8% in 1999.

Since regulation changes occur frequently in salmon fisheries, with the explicit aim of changing exploitation rates, this needs to be taken into account when interpreting historical catches, in terms of indicating stock abundance.

2.7.2 Exploitation in fisheries outside England and Wales

Salmon stocks in England and Wales are exploited in a number of fisheries other than those operating under the jurisdiction of the Environment Agency within national waters. These include the distant water fisheries at Faroes and West Greenland, and other fisheries such as those operating off Ireland and in homewaters in other parts of the UK. Tagging studies have provided information on the levels of exploitation for English and Welsh stocks in many of these fisheries and this is summarised briefly below:

West Greenland

This fishery exploits only salmon that would have returned to Europe and North America as MSW fish. Prior to recent negotiated reductions in the quota for this fishery, the exploitation rates on the MSW component of English and Welsh stocks was estimated to be in the region of 10 to 20% (Russell and Potter, 1996). However, following significant quota reductions since the late 1980s and the buy-out in 1993-94, exploitation of MSW fish is believed to have fallen to very low levels. In 2001 and 2002 increased quotas were agreed based on three distinct periods, with the continuation of the fishery in later periods dependent on sufficiently high CPUE in previous ones. This resulted in a quota of 114 t in 2001, although the total catch recorded was only 34.5 t. An additional 8 t of 'private sales' were also reported. In 2002, a privately-funded buy-out was negotiated and a subsistence only fishery operated. It is expected that this catch will be relatively small (<10 t).

A summary of the recent regulatory measures for the West Greenland fishery is given in Annex 1.

Faroes

The Faroes fishery exploits both grilse and MSW salmon of largely northern European origin. Prior to the recent buy-out arrangements, few tags of English and Welsh origin were recovered in this fishery and estimated exploitation rates on English and Welsh stocks were very low (~1%) (Russell and Potter, 1996). Between 1991 and 1998, the Faroes salmon quota was bought out with NASF funds, and only a small research fishery was operated, taking up to 23 t per year. No buy-out was arranged for 1999 or 2000. Although no fishing took place in 1999, a single vessel carried out commercial fishing in 2000 and a catch of 8 t was reported. There were no reported landings in 2001 and this is also expected to apply for 2002.

A summary of the recent regulatory measures for the Faroes fishery is given at Annex 1.

Ireland

Provisional estimates of the levels of exploitation in Irish coastal fisheries vary substantially between stocks in different English and Welsh regions and from year to year. Prior to the introduction of new fisheries regulations in 1997, exploitation rates were low (~1%) for stocks from the north east of England, higher (at around 5 to 10%) for rivers on the west coast and in Wales, but highest (perhaps 10 to 20%) for stocks from south coast rivers. More recent unpublished data suggest that levels of exploitation have been significantly reduced (believed to be by at least 50%) following the introduction of management measures in Ireland in 1997. However, relatively large numbers of tagged salmon originating from the River Thames have been recovered in Irish fisheries between 1999 and 2002 (268 fish of 312 recaptured over the four years).

Other homewater fisheries

Few tags of English and Welsh origin have been returned from homewater fisheries in Northern Ireland and Scotland. The exploitation rates of English and Welsh salmon in these fisheries have not been estimated, but are thought to be low.

Marine by-catch

The potential catch of salmon post-smolts in marine pelagic fisheries (including those for sandeels and mackerel) continues to be a matter of concern and continuing efforts are being made through ICES to investigate this issue. A dedicated research vessel survey was carried out in the Norwegian Sea in 2001, at approximately the same time as the commercial mackerel fishery started in this area (Anon., 2002b). During this survey large catches of mackerel were made and these contained varying numbers of salmon post-smolts. Although preliminary, this enabled estimates to be made, for the first time, of the possible by-catch of post-smolts in the mackerel fishery in the Norwegian Sea based on observed data. A total of 198 post-smolts were captured simultaneously with 7,959kg of mackerel, and these were scaled up to the commercial mackerel trawl captures in the area in 2000 (data for 2001 were not available at the time of the estimate). The estimate suggested a by-catch of around 600,000 to 950,000 post-smolts; by comparison, the current PFA estimate for the Northeast Atlantic in 2001 was approximately 3.6 million (immature and maturing) salmon. It was noted that caution was necessary in interpreting these provisional findings, but recognised that the by-catch of post-smolts in the mackerel fishery was potentially significant.

An area off the Firth of Forth and the Grampian coast is closed to sandeel fishing from April to August. This is principally to protect sandeels as prey for certain bird species, but it might also benefit stocks of salmon and sea trout.

REPORT ON STATUS OF STOCKS IN 2002

3. Status of stocks

3.1 Conservation Limits and Management Targets

3.1.1 Progress with setting conservation limits

The use of conservation limits in England and Wales has developed in line with the requirements of ICES and NASCO to set criteria against which to give advice on stock status and the need to manage and conserve individual river stocks. Provisional conservation limits have been set for all principal salmon rivers (Table 19) and these are being refined as Salmon Action Plans are prepared by the Environment Agency (Annex 3).

Conservation Limits (CLs) indicate minimum desirable spawning stock levels below which stocks should not be allowed to fall. When a stock falls below the CL the number of juvenile fish produced in the next generation is likely to be significantly reduced. ICES and NASCO currently define the CL as the spawning stock level that produces maximum sustainable yield; that is, the stock level at which, with the appropriate level of exploitation, the catch would be maximised over a number of years. However, the choice of this reference point does not imply that managers are attempting to maximise catches. On the contrary, the aim is to ensure that spawning stocks are maintained at higher levels, which would be closer to those that would maximise production of juveniles in freshwater.

Compliance of the spawning escapement with the CL in a particular river system is not normally assessed for individual years but in three-year blocks (i.e. average over 3 years). Compliance is based upon rules relating to 'episodes' (periods of years) when the escapement falls below the CL (Environment Agency, 1998). These rules state that episodes may last no longer than two years**,** and that there should be a clear gap between episodes of at least two years. Failure cannot distinguish between a real deterioration in the egg deposition and a chance (1-in-20 year**)** false alarm, and so the circumstances have to be investigated to determine which was the more likely explanation and corrective action taken if necessary. A river classed as failing would remain classified as such until a reassessment, for a subsequent three-year period, showed a pass. The recent history of English and Welsh SAP rivers is shown in Table 19, in which the timing of each three-year block is determined by the particular Salmon Action Plan; current compliance according to the above criteria is shown in the right hand column for those rivers for which CLs have been finalised.

A new column has been added to the data in Table 19, providing a Management Target (MT) for each river. The MT is a spawning stock level for managers to aim at, to ensure that the objective of exceeding the CL is met in four years out of five over the long run (i.e. 80% of the time). It provides an additional mechanism to assist managers in safeguarding stocks. The value for the MT has been estimated using the standard deviation (SEd) of egg deposition estimates for the last 10-years, where: MT = CL + 0.842*SEd. The constant 0.842 is taken from probability tables for the standard normal distribution, such that the CL forms the 20 percentile of a distribution whose average (or 50 percentile) equates to the MT.

CLs and MTs form only one part of the assessment of the status of a stock, and management decisions are never based simply on a compliance result alone. Because stocks are naturally variable, the fact that a stock is exceeding its CL does not mean that there will be no need for any management action. Similarly, the fact that a stock may fall below its CL for a small proportion of the time may not mean there is a problem. Thus, a range of other factors are taken into account, particularly the structure of

Table 19. Conservation Limits (CL) and the proportion of CL attained for the period 1994-2002 for the principal salmon rivers of England and Wales. Compliance estimates are shown for those rivers where CLs have been refined and published externally. Compliance failure is indicated by shaded blocks based on 3 year assessment periods - see Section 3.1.1 (all results are provisional)

Region	River	Accessible wetted area hectares	Conservation Limit eggs/100m²	Conservation Limit eggs (millions)	Management Target eggs (millions)	2002 egg deposition (millions) ***			Proportion of Conservation Limit attained (%)									Current compliance #
									1994	1995	1996	***1997	***1998	***1999	***2000	***2001	***2002	
						1SW	MSW	All	All	All	All	All	All	All	All	All	All	
NE	** Coquet	144	316	4.54	6.29			9.53	107	93	109	159	131	117	181	197	210	Pass
	** Tyne	542	289	15.65	24.76			49.08	115	129	177	157	173	221	255	302	314	Pass
	** Wear	232	336	7.81	9.34			8.38	41	52	60	38	62	52	90	80	107	Fail
	** Tees	620	330	20.46	21.49	0.53	1.76	2.29	8	15	5	4	20	18	17	12	11	Fail
	** Esk-Yorks	86	322	2.76	3.22	0.82	0.24	1.06	77	21	9	31	17	9	21	27	38	Fail
	Total			**51.22**	**65.10**			**70.34**										
Southern	** Test	138	246	3.40	3.92			2.58	40	32	35	23	57	65	39	29	76	Fail
	** Itchen	69	234	1.63	1.97			0.50	34	101	42	31	63	27	29	32	31	Fail
	Total			**5.03**	**5.89**			**3.08**										
SW	** Avon-Hants	360	237	8.53	9.85			6.12	25	32	61	13	22	30	48	44	72	Fail
	* Stour	199	142	2.82	2.88			0.40	9	6	5	8	5	6	11	9	14	Fail
	Piddle	25	194	0.49	0.60	0.32	0.04	0.37				22	12	36	3	6	75	n/a
	** Frome	90	223	2.00	2.50			2.10	127	128	154	147	150	98	73	79	105	Fail
	Axe	57	247	1.40	1.75	0.88	0.19	1.07				6	9	11	9	48	76	n/a
	Exe	210	343	7.20	9.54	1.95	0.59	2.74				129	137	85	118	70	38	n/a
	* Teign	98	352	3.47	4.49			1.58	139	105	136	67	63	54	96	62	46	Fail
	* Dart	132	294	3.87	4.52			1.32	88	40	39	46	42	18	46	-	34	Fail
	Avon-Devon	18	294	0.52	0.72	0.58	0.05	0.63				44	50	31	67	145	119	n/a
	Erme	10	300	0.31	0.38	0.29	0.01	0.30				32	19	43	22	30	96	n/a
	Yealm	8	297	0.25	0.35	0.17	0.04	0.22				57	144	13	89	-	86	n/a
	Plym	17	436	0.75	0.83	0.24	0.06	0.30				52	43	19	33	51	40	n/a
	** Tavy	79	257	2.02	2.80			0.18	139	48	39	64	124	44	37	28	9	Fail
	** Tamar	197	293	5.77	7.26	1.52	0.81	2.47			100	51	117	78	73	33	43	Fail
	** Lynher	29	294	0.86	1.28	0.39	0.01	0.39	152	27	31	60	124	50	103	48	46	Fail
	* Fowey	42	295	1.25	1.65			2.68			133	87	105	152	153	155	215	Pass
	* Camel	56	243	1.35	1.99			2.10	216	208	192	131	138	94	139	100	155	Pass
	* Taw	273	299	8.16	9.63			2.30	65	40	71	45	77	71	93	34	28	Fail
	* Torridge	200	284	5.69	6.99			0.64	79	36	29	15	25	16	28	4	11	Fail
	Lyn	27	556	1.50	2.93	1.87	0.52	2.39				114	103	69	136	384	159	n/a
	Total			**58.23**	**72.96**			**30.28**										
Midlands	** Severn	898	190	17.06	27.86	1.20	7.72	8.92	184	194	257	104	55	54	70	86	52	Fail
	Total			**17.06**	**27.86**			**8.92**										

Wales	**	Wye	1402	245	34.50	39.51			6.76	63	33	56	23	18	34	28	42	20	Fail
	*	Usk	407	350	14.25	16.87			17.61	129	92	110	87	105	108	148	153	124	Pass
	*	Taff & Ely	146	314	4.58	4.91			0.57	18	36	17	13	13	25	11	5	13	Fail
	**	Ogmore	61	231	1.41	1.55			0.51	43	28	38	55	59	48	60	49	36	Fail
		Afan	17	450	0.76	0.81	0.06	0.00	0.06				16	25	8	6	10	8	n/a
		Neath	37	419	1.55	1.82	1.00	0.21	1.21				15	35	45	47	51	78	n/a
	**	Tawe	76	312	2.36	2.74			1.45	68	54	25	30	34	25	16	50	61	Fail
		Loughor	35	289	1.02	1.05	0.10	0.03	0.13				7	7	9	16	13	13	n/a
	**	Tywi	500	314	15.70	19.41			7.55	126	71	73	40	56	51	64	32	48	Fail
	**	Taf	90	256	2.31	2.93			0.81	127	23	39	61	40	63	78	98	35	Fail
	**	E&W Cleddau	87	236	2.04	2.34			0.40	51	22	17	31	34	23	38	29	20	Fail
	**	Teifi	296	401	11.89	15.35			11.05	135	56	160	101	96	105	104	120	93	Pass
		Aeron	35	417	1.44	1.48	0.12	0.03	0.15				2	1	4	4	5	10	n/a
		Ystwyth	46	397	1.83	1.98	0.07	0.00	0.07				24	29	10	18	10	4	n/a
	**	Rheidol	31	276	0.85	0.98			0.20	66	61	90	61	48	45	41	39	24	Fail
	**	Dyfi	179	311	5.57	7.44	1.06	0.06	1.12	115	66	100	45	62	44	55	64	20	Fail
	**	Dysinni	-	-	0.88	0.98	0.10	0.07	0.17	43	6	19	22	31	6	18	5	20	Fail
	**	Mawddach	57	312	1.77	2.30	0.91	0.13	1.05	170	73	81	76	83	91	52	59	59	Fail
		Artro	9	423	0.37	0.39	0.03	0.02	0.05				9	18	8	5	16	14	n/a
	**	Dwyryd	9	246	0.23	0.46	0.91	0.01	0.92	334	242	229	229	230	114	65	167	406	Pass
	**	Glaslyn	25	242	0.61	0.82	0.22	0.03	0.25	126	137	86	107	57	31	19	33	41	Fail
	**	Dwyfawr	33	322	1.07	1.29	0.23	0.03	0.26	105	42	47	48	28	28	41	29	24	Fail
	**	Seiont	21	288	0.61	0.88	0.32	0.00	0.33	148	115	115	124	155	87	168	181	54	Pass
	**	Ogwen	24	449	1.07	1.83	1.44	0.25	1.68	273	187	145	209	271	133	225	308	157	Pass
	**	Conwy	50	171	0.85	1.57	1.18	0.16	1.34	316	288	298	168	198	128	256	303	158	Pass
	**	Clwyd	84	312	2.62	3.62	1.04	0.16	1.20	127	51	36	21	97	58	47	62	46	Fail
	**	Dee	617	248	15.30	18.71	10.09	7.50	17.59	79	97	86	91	107	81	61	85	115	Fail
		Total			**127.44**	**154.01**			**74.50**										
NW	**	Ribble	351	242	8.49	10.59			6.03	81	29	52	26	63	63	81	38	71	Fail
		Wyre	46	264	1.22	1.38	0.20	0.04	0.24				5	34	5	5	35	20	n/a
	**	Lune	423	280	11.84	14.67			17.19	85	74	78	51	105	86	135	99	145	Fail
	**	Kent	68	223	1.52	2.97			7.19	308	250	218	140	367	117	271	414	473	Pass
	**	Leven	46	249	0.83	0.98			0.57	62	56	45	45	56	31	92	-	68	Fail
	**	Crake	16	243	0.32	0.40			0.18	80	91	50	14	108	32	63	-	57	Fail
		Duddon	11	402	0.45	0.69	0.26	0.03	0.28				30	104	39	38	203	63	n/a
		Esk	14	401	0.55	1.05	1.13	0.11	1.24				50	154	181	266	368	224	n/a
		Irt	20	317	0.63	0.81	0.56	0.06	0.62				88	151	46	114	115	98	n/a
	**	Ehen	41	283	1.16	1.95			2.87	172	145	109	71	206	42	279	-	249	???
	**	Calder	13	326	0.41	0.59			0.60	71	89	84	119	176	21	141	-	146	???
	*	Derwent	213	271	5.77	7.60			8.23	154	119	92	95	100	98	204	160	143	Pass
		Ellen	17	322	0.54	0.64	0.19	0.02	0.21				6	61	16	44	54	39	n/a
	**	Eden	688	300	20.63	27.29			14.67	166	131	111	73	63	61	68	72	71	Fail
		Esk-Border	144	440	6.31	11.49	11.82	3.46	15.28				166	159	116	190	390	242	n/a
		Total			**60.68**	**83.09**			**75.39**										
Total		**Total**			**319.66**	**408.91**	**-**	**-**	**262.51**	**87**	**68**	**82**	**63**	**73**	**66**	**83**	**86**	**82**	

*Key: ** Refined conservation limit identified in Final Salmon Action Plan (SAP).*
** Refined conservation limit identified in draft or published SAP Consultation Document or Local Environment Agency Plan (LEAP).*
Remaining conservation limits and compliance estimates are provisional only and require refinement through river specific inputs.
**** All estimates include eggs contributed by rod released fish (assuming 80% 'post release' survival to spawning).*
 # Basis for current compliance explained in Section 3.1.1
??? No compliance assessment possible due to missing data in 2001 (impact of FMD).

Note: Some entries in this table have been updated from that presented in previous reports as a result of river-specific refinements and corrections.

the stock and any evidence concerning the status of particular stock components, such as tributary populations or age groups, based for example on patterns of run timing and the production of juveniles in the river sub-catchments. These data are provided by a programme of river catchment monitoring.

The Environment Agency is continuing to review and revise its scheme with the aim of incorporating more extensive statistical descriptions of the risks and uncertainties in reference points and assessments.

3.1.2 Spawning escapement in 2002

Egg deposition estimates for 2002 are given for 70 rivers in England and Wales in Table 19. In some cases, data for 2001 have also been updated where estimates were delayed last year due to the outbreak of FMD. For rivers without traps or counters, the usual procedure for estimating egg deposition derives run size from rod catch using estimates of exploitation which ignore annual changes in fishing effort. In 2001, FMD significantly reduced angling effort in a number of areas due to restricted bank access, and to account for this on some of the worst affected rivers (in North West and South West Regions) exploitation rates were assumed to have fallen to 40% and 50% of the average, respectively, based on the decline in exploitation observed on rivers with counters in these Regions. However, for some rivers in the North West and South West Regions worst affected by FMD, it has still not been possible to provide estimates of egg deposition for 2001.

An improved procedure for estimating angling exploitation is being developed by the Environment Agency. This will take account of annual changes in fishing effort, as well as partitioning effort between salmon and sea trout (no distinction is currently made between these species when reporting effort). The new procedure has not been used in the calculation of compliance data in Table 19, but is expected to be available shortly and will be applied retrospectively to the 2002 data set and earlier years. In addition, the Agency is also considering the influence that recent changes in the marine survival of salmon might have in calculating CLs for all monitored rivers.

Across England and Wales, 29% of rivers exceeded their CL in 2002 (the second highest percentage since 1997), a small improvement on 2001 (Table 20). The percentage of rivers in the middle class (50-100% of the CL) was also a small improvement on 2001 (up from 25% to 26%).

Table 20. Summary of the number and percentage of rivers above their Conservation Limits (CL), between 50% and 100% of the CL, and less than 50% of the CL, 1997-2002

Year	>CL		50-100% CL		<50% CL	
	No.	%	No.	%	No.	%
1997	15	21	19	27	36	51
1998	25	36	17	24	28	40
1999	11	16	19	27	40	57
2000	19	27	19	27	32	46
2001*	17	27	16	25	31	48
2002	**20**	**29**	**18**	**26**	**32**	**46**

** No CL possible for 6 rivers due to impact of FMD.*

River-to-river variation in the proportion of the CL attained is illustrated in Figure 11 for rivers with refined CL values. It is apparent that rivers in northern England and north Wales have generally performed better than those elsewhere. Spawning escapement remained below the CL in most of the south coast chalkstream catchments and in many of the rivers in SW England and in south and mid Wales. A number of rivers, such as the River Tees in the North East and some catchments in South Wales, are being restored from previous polluted conditions and may require interim rebuilding targets to be set.

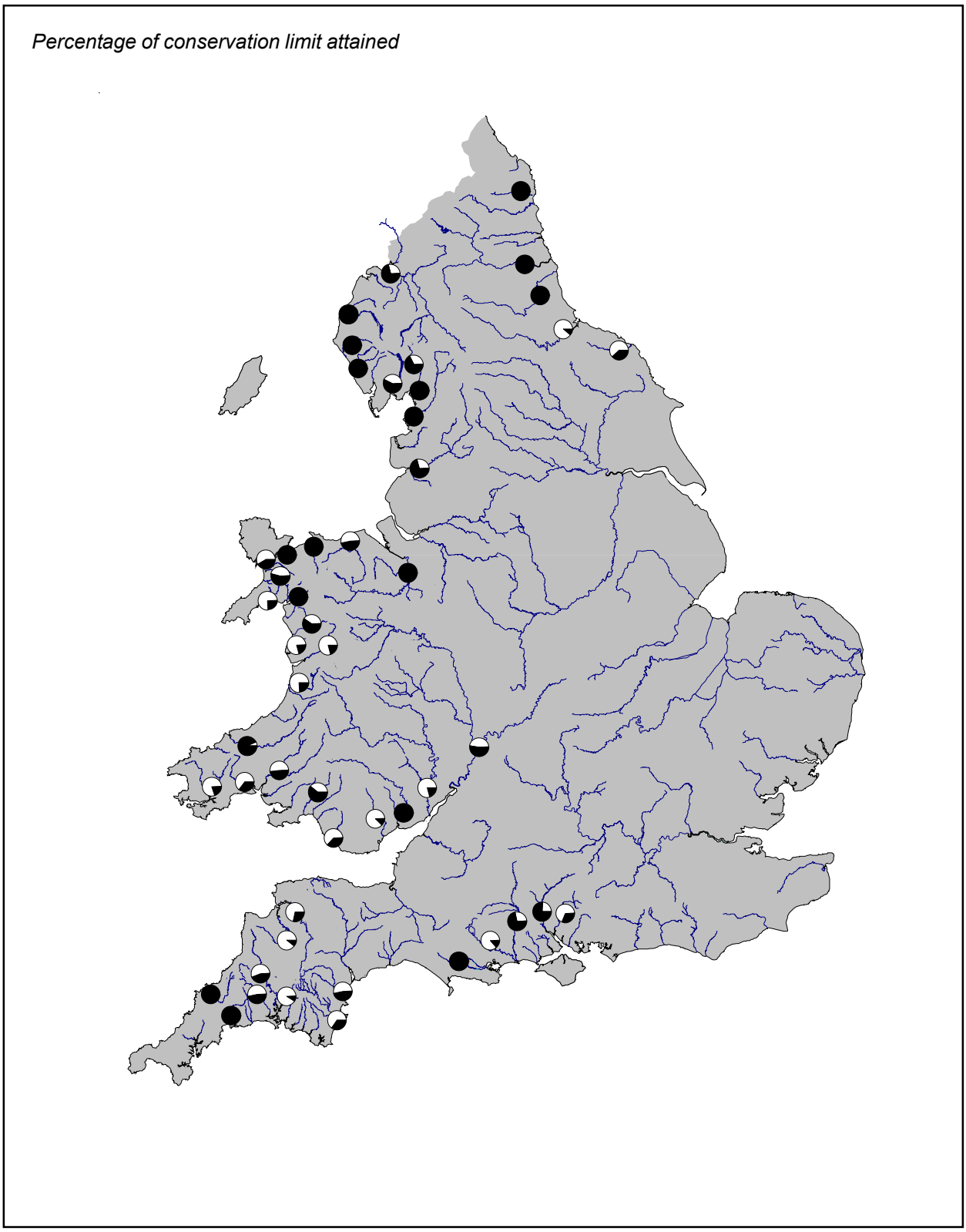


Figure 11. Pie charts for individual rivers for which refined limits have been set (Table 19) showing the % of the conservation limit attained in 2002. A black circle indicates that the target was met or exceeded

Table 21. Validated counts and run estimates of salmon smolts and adults in rivers in England and Wales

	Stage:	Smolts	Adults												
	Region:	Southern	Thames	Southern		SW			Wales				NW		
	River:	Test #	Thames[#]	Test	Itchen	Frome	Tamar	Fowey	Dee	Teifi	Tawe	Wye	Lune	Kent	Caldew
	Method:	Run estimate	T	RSE[1]	RSE[1]	RSE[1]	RSE[1]	C[+]	RSE[2]	RSE[1$]	T **	C *	RSE[1]	RSE[1]	T
1986			81												
1987			41												
1988			288	1,507	1,336	4,334									
1989			91	1,730	791	3,324							8,785	1,137	
1990			63	790	367	2,002							8,261	2,216	
1991			36	538	152	847					93		7,591	1,736	
1992		11,967	247	614	357	954			4,643		77		4,066	1,816	
1993		7,131	259	1,155	852	1,280			9,757		85		7,883	1,526	
1994		3,381	143	775	378	1,156	6,359		8,285		383		6,254	2,072	1,590
1995		6,853	162	647	880	1,074	5,637	890	5,703		43		4,589	2,812	1,417
1996		4,712	122	623	433	1,501	3,988	1,187	4,931		82		4,739	3,341	1,289
1997		7,229	25	361	246	1,207	2,989	1,075	5,495		58	4,451	3,205	1,530	889
1998		14,672	6	898	453	1,266	4,176	882	6,661		79	4,712	7,531	2,306	1,106
1999		4,138	35	867	213	815	3,588	1,262	3,664	2,319	37	1,797	5,026	1,059	1,022
2000		3,516	53	583	208	641	3,539	1,692	3,751	1,906	47	4,913	8,364	2,403	1,566
2001		2,625	9	410	217	652	4,184	1,611	4,767	2,032	88	1,846	6,198	2,927	n/a
2002		**2,190**	**22**	**1,047**	**239**	**841**	**6,053**	**1,804**	**7,319**	**3,758**	**252**	**2,460**	**7,615**	**3,204**	**1,302**
Mean (1997-01)		6,436	26	624	267	916	3,695	1,304	4,868	2,086	62	3,544	6,065	2,045	1,146

Key to methods: *T = adult trap.*
C = adult salmon count.
C(>4lb) = Adult count (fish greater than 4 lb in weight).
RSE[1] = returning stock estimate (validated count + catch below counter).
RSE[2] = returning stock estimate (mark/recapture estimate).

Key: *# Denotes stock supported by large-scale stocking from hatchery programme.*
** Index of run only, data adjusted for down-time but not corrected for counter efficiency.*
$ Species split of counter data based on Bayesian hierarchical model (Ellis & Davies, 2001).
*** Index of run - based on adult trap (2 days per week, April to November).*
[+] Includes large sea trout.

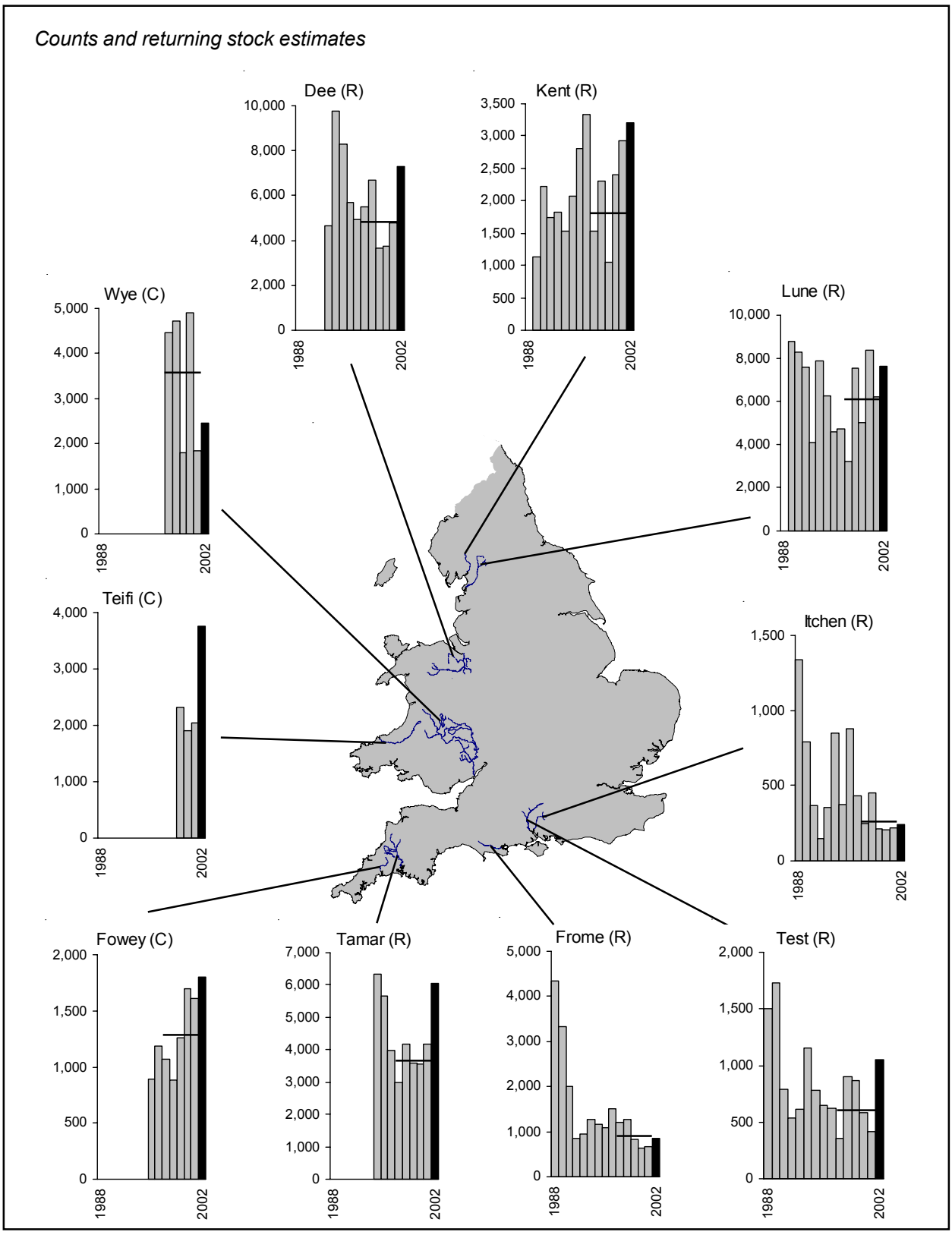


Figure 12. Counts (C) and returning stock estimates (R) for selected salmon stocks in England and Wales. The histograms display all available data for the years 1988 to 2002, together with the five-year mean for the period 1997-2001 (displayed as a horizontal line). Note that the histograms are not drawn to the same scale. Data for 2002 are provisional. Data for River Wye are partial hydroacoustic counts.

The provisional nature of the CLs should be noted. Many rivers, and particularly some of the smaller catchments on the west coast of Wales, support relatively small salmon stocks and are principally regarded as sea trout rivers. Current procedures for setting CLs (as well as for estimating egg deposition) may fail to take adequate account of this and CLs for such rivers may need to be refined in the future.

There are now 50 rivers in England and Wales with refined CLs and for which egg deposition has been estimated for a series of years (Table 19). Compliance assessments (see Section 3.1.1) are available for 47 of these rivers in 2002, of which 35 (74%) have shown compliance failure over the most recent three year assessment period. The compliance failures are fairly evenly distributed in different regions.

3.2 Measures of abundance/escapement

Electronic fish counters are operated on a number of catchments in England and Wales to provide estimates of the upstream run of adult salmonids. Where possible, the counts have been adjusted to provide estimates of the returning salmon stock. Time-series of counts, or other estimates of in-river stocks, are presented in Table 21 and Figure 12.

The available measures of adult stock abundance in 2002 were all above the levels recorded in 2001, with very marked improvements evident on some rivers. The majority (70%) of the adult stock abundance values for 2002 were also higher than the averages for the previous five years (1997-2001). The counts in Table 21 still show an overall downward trend on some rivers in the South and South West in the last five years (Thames, Itchen and Frome), whilst others show an increasing trend over this period (Tamar and Fowey). Counts on the rivers in the North West (Lune, Caldew and Kent) and in north Wales (Dee) also show an upward trend over the past 5 years. There are no direct measures of adult stock abundance for rivers in the North East, but this is being addressed by a new stock assessment programme on the River Tyne, which will commence in 2003.

Although salmon have been returning strongly to some historically polluted rivers (e.g. Tyne, Wear, Ogmore), there is concern about chronic environmental degradation in others, mainly in rural areas, driven by changing land use practices, especially agriculture and forestry. Issues of particular concern are siltation resulting from soil erosion, pesticides from sheep dip chemicals, acidification and changes

Adult fish trap on the River Dee

in river flows. The relative importance of these effects vary around the country, but clusters of high pesticide levels have been found in Welsh upland streams, and acidification is still extensive in the uplands of Wales and the North West. Salmon runs in the chalk rivers of Southern Region have declined in recent years, but the reasons for this are not yet clear. The extent and nature of soil erosion impacts are being investigated and national water abstraction licence legislation is under review.

Changes in the British climate are predicted to become more pronounced (Hulme *et al*., 2002). Though predictions vary, the most likely changes are for higher temperatures, wetter winters, drier summers and more extreme events of flooding and drought. Regional variations are likely. Changes in climate are global and the increased natural mortality of salmon at sea in recent years is also believed to be linked to climate change.

3.3 Survival indices

No data are available to evaluate long-term trends in marine survival for salmon stocks in England and Wales at the current time. Marine survival estimates for the River Corrib (Ireland), River Bush (Northern Ireland) and River North Esk (Scotland) are shown in Table 22. These data confirm patterns seen elsewhere in the North Atlantic, which indicate that marine survival can be quite variable between stocks and between years. The Corrib and Bush, like most stocks, have experienced a decrease in marine survival for smolts since 1987. However, this has not been apparent for the River North Esk.

Table 22. Estimated survival of wild smolts (%) to return to homewaters (prior to coastal fisheries) for index rivers in the UK and Ireland (from Anon., 2002a)

Smolt migration year	Ireland River Corrib		UK (N. Ireland) River Bush	UK (Scotland) River North Esk	
	1SW	2SW	1SW	1SW	2SW
1987	13.2	1.0	35.1	13.9	3.4
1988	7.5	0.6	36.2	-	-
1989	5.3	2.1	25.0	7.8	4.9
1990	4.1	1.4	34.7	7.3	3.1
1991	5.6	1.1	27.8	11.2	4.5
1992	5.9	-	29.0	-	-
1993	9.0	1.6	-	-	-
1994	8.4	1.1	27.1	17.2	2.3
1995	7.4	0.1	n/a	11.5	5.1
1996	4.9	0.9	31.0	10.7	3.5
1997	9.7	0.3	19.8	10.3	6.3
1998	2.9	0.8	13.4	n/a	n/a
1999	4.3		16.5		
Mean (1995-99)	5.8	0.5	20.2	10.8	5.0

3.4 The ICES assessment of the status of salmon stocks in England and Wales

3.4.1 Description of the assessment methodology

Each year the ICES North Atlantic Salmon Working Group makes an assessment of the status of the salmon stocks in the Northeast Atlantic (NEAC area) as a basis for advising managers. A key part of this assessment is the estimation of the pre-fishery abundance (PFA) of all NEAC stocks. The PFA of salmon from countries in the NASCO-NEAC area is defined as the number of fish alive in the sea on January 1st in the first sea winter. ICES uses estimates of PFA for the period 1970 to the present to investigate the effect of fisheries and other natural and anthropogenic factors on stocks. ICES has also used these estimates to develop a forecast of PFA for coming seasons in order to advise management actions.

The model that ICES uses to estimate PFA for NEAC countries first estimates the returns of salmon to freshwater, and then back-calculates the numbers of fish that must have been alive in the sea to generate these returns. The numbers of returning fish are estimated using the catch data for each country, which are raised to take account of non-reported catches and exploitation rates for 1SW and MSW fish. These values are then further raised to take account of catches in the distant water fisheries and natural mortality between January 1st in the first sea winter and their return to homewaters. Ranges of values are used for some of the input data in order to obtain a measure of the uncertainty in the PFA estimates. In order to run the NEAC PFA model, each country requires time-series (beginning in 1971) of catch in numbers, non-reporting rates and exploitation rates for 1SW and MSW salmon.

For England & Wales, nominal catches have been derived from the catch returns submitted by netsmen and anglers and split into 1SW and MSW categories using two different methods (Section 2.5). Over the period 1992-2001, monthly age-weight keys derived from salmon caught in the River Dee trap have been used to estimate the age composition of all rod-caught fish where a weight and date of capture have been provided. This has then been scaled up to the total catch (rods and nets combined) on a pro-rata basis. In earlier years (1971-91) the age composition of the total catch has been estimated using the mean weight of the fish caught and the mean weight of 1SW and MSW salmon recovered in tagging programmes. Estimates of unreported and illegal catches have been made on the basis of consultation with regional fisheries personnel and according to the approach described in Section 2.3.

As the contribution of farmed and ranched salmon to national catches in the NEAC area is generally low (<2% in most countries, see Section 2.6), the occurrence of such fish is ignored in assessments of the status of national stocks. However, a large proportion of the fish taken in England and Wales are caught in the north east coast fishery and are destined for Scottish rivers, and these are deducted from the England and Wales returning stock estimate and added to that for eastern Scotland. This proportion is estimated to have declined from 95% of the north east net catch in the early part of the time-series to 75% more recently, reflecting mainly the steady improvement in the status of the stocks in northeast England.

Exploitation rates in England and Wales in 1998-99 are available from a number of sample fisheries given in Section 2.7.1. National exploitation rates have then been estimated by deriving a time-series of 'standard fishing units' employed in the salmon fisheries for the period 1970 to the present. These are calculated from the numbers of licences issued (section 1.2.1) weighted by their relative catching power which is estimated from historic CPUE data. The annual exploitation rates are then estimated by adjusting the estimate for 1998-99 according to the changes in the number of standard fishing units employed. Finally, ICES has agreed to apply a natural mortality rate of 3% per month in back-calculating the PFA of salmon in the sea, on the basis of studies undertaken on a range of stocks (Anon., 2002a).

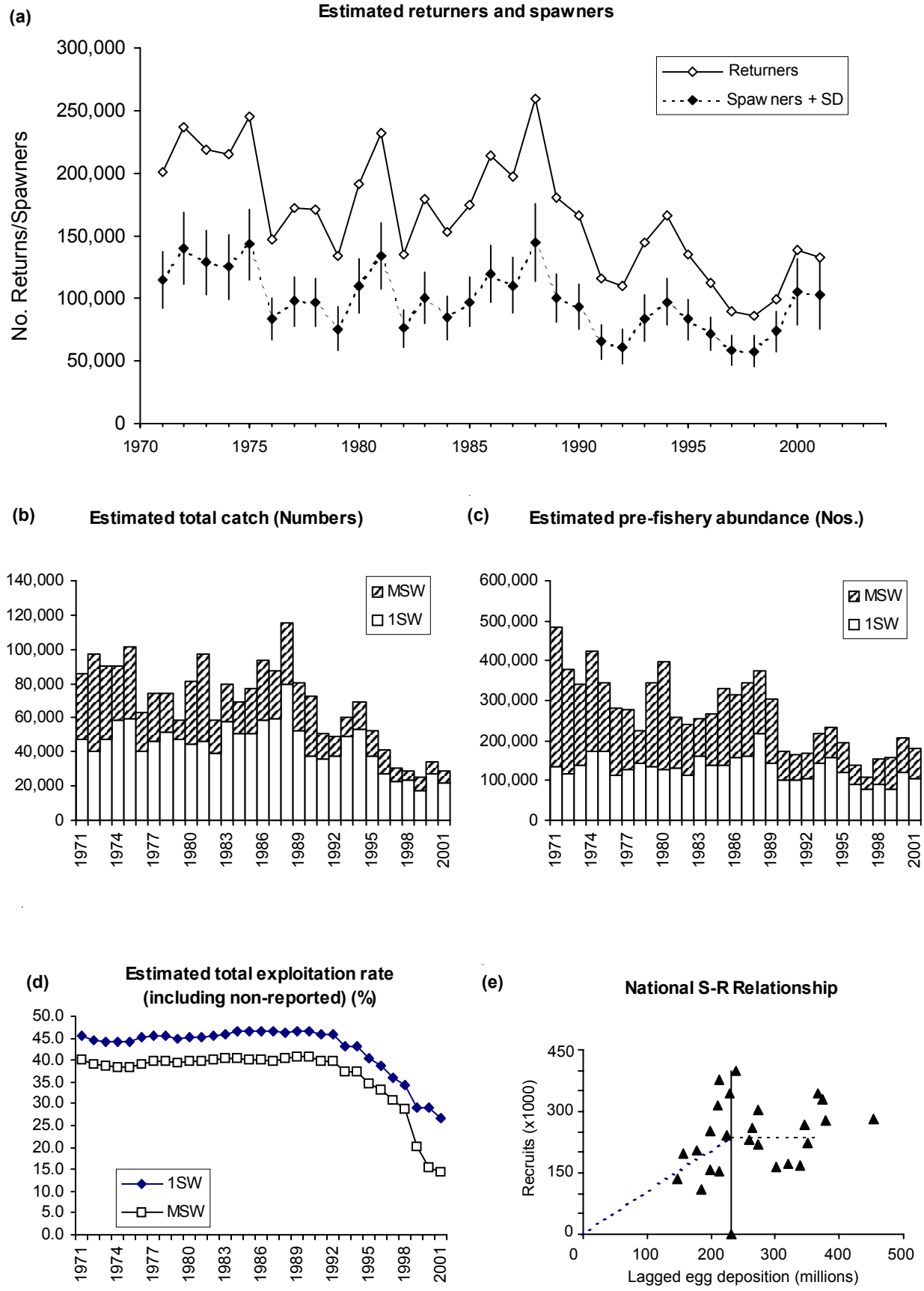
Whilst this model is acknowledged as containing a number of uncertainties, it currently provides our best interpretation of available information on our salmon stocks at a national level. Efforts are being made to improve the input data and we hope that progress in that direction is apparent in this and previous annual reports.

3.4.2 Results of the pre-fishery abundance assessment

The output from the model is summarised in Figure 13(a) to (e).

The ICES-NEAC model endeavours to provide an interpretation of what the available catch and effort data may tell us about changes in the status of the total national stock of salmon over the past

Figure 13 (a - e). Summary output from the ICES-NEAC PFA model - Summary of Fisheries and Stock description for UK (England & Wales).



three decades. It is important to note that the overall trends may not reflect the patterns of change in any individual river. Indeed it is well known that while many river stocks in England and Wales have declined substantially in the past 30 years, there are others that have shown great improvements; the model aims to sum all of these trends. Furthermore, the model is likely to provide a more reliable picture of the medium-term trends than of the year-to-year variations, and it is almost certainly unable to take account of many such short-term fluctuations.

The pre-fishery abundance (PFA) is the estimated number of salmon alive in the middle of the first winter that they spend at sea (1st January). The model output suggests that the overall PFA of salmon from England and Wales has declined by about 50% from the 1970s to the 1990s (Figure 13c). The majority of this decline has been in the non-maturing (i.e. potential multi-sea-winter) component of the PFA, which is thought to have declined by about 70%, whilst the maturing (i.e. potential grilse) component has declined by about 20%. Of course, these trends mask conflicting changes in individual river stocks. Many rivers have experienced more serious declines but these are obscured by the improvements in others, like the Tyne and Wear which have experienced very substantial recoveries in this period. The results also suggest that there was a marked decline in PFA around 1990, which is consistent with the general perception of a decrease in the marine survival for many stocks around the North Atlantic at about this time.

The estimated number of salmon returning to England and Wales (prior to exploitation in homewater fisheries) and the total spawning escapement show similar trends to the PFA (Figure 13a), although the declines are less marked due to the reductions in net exploitation both in distant water and homewater fisheries, and in rod fisheries. Thus returning fish are estimated to have declined by about 35% between the 1970s and 1990s, and the spawning escapement by about 30%. However, as with the PFA, the decline in MSW components has been at least twice that of 1SW components. The figures (Figure 13a) suggest that there has been a slight upturn in the returners and spawner numbers in the last few years, although it is too early to say whether this represent a reversal of the declining trend or another short-term fluctuation in the stocks.

The results also provide an estimate of the total catches in England and Wales, including the non-reported and illegal catches (Figure 13b), and the consequent overall trends in exploitation (Figure 13d). Exploitation probably remained at around 40% for most of the 1970s and 1980s but has been roughly halved in the last decade with the measures taken to control both legal and illegal fisheries.

The final figure (Figure 13e) shows the relationship between the numbers of spawners for the national stock and the subsequent production in the next generation. As expected, production (recruits) appears to have been reduced in years of poor spawner abundance (low egg deposition).

4. Microtag, fin clip and external tag releases

Details of all marking and tagging of salmon undertaken in England and Wales in 2002 are included at Annex 5.

In 2002, 57,000 hatchery-reared salmon parr and smolts and over 6,000 wild salmon smolts were microtagged and adipose fin-clipped and released in England and Wales to assess levels of exploitation and marine survival and to investigate the efficacy of enhancement programmes. A further 191,000 hatchery parr and smolts and 1,500 wild parr were marked with adipose fin clips, around 7,000 of which also had other tags or marks (elastomer & PIT tags). A little over 1,400 adult salmon were tagged for the assessment of returning stocks or in conjunction with the use of radio tags in behaviour studies.

5. References

ANON., 1991. Salmon Net Fisheries: Report of a review of salmon net fishing in the areas of the Yorkshire and Northumbia regions of the National Rivers Authority and the salmon fishery districts from the River Tweed to the River Ugie. MAFF and Scottish Office, 224pp.

ANON., 1997. Report of the Technical Working Group on the English North East Coast Salmon Fishery. Report prepared by MAFF, SOAEFD and EA scientists following a meeting held at Nobel House, London on 17 December 1996.

ANON., 2002(a). Report of the Working Group on North Atlantic Salmon. ICES C.M. 2002/ACFM:14.

ANON., 2002(b). Extract of the report of the Advisory Committee on Fishery Management - North Atlantic Salmon Stocks. ICES CNL(02)10.

ELLIS, J. AND DAVIES, R. ,2001. Statistical Interpretation and Species Apportionment of Acoustic Fish Counter Data. Environment Agency, R&D Technical Report W237.

ENVIRONMENT AGENCY, 1998. Salmon Action Plan Guidelines Version 2, Environment Agency.

ENVIRONMENT AGENCY, 2002. Fisheries Statistics 2001 - Salmonid and freshwater fisheries statistics for England and Wales, 2001.

HARRIS, G., 1994. The identification of cost-effective stocking strategies for migratory Salmonids. Environment Agency, R&D Report No. 353, 150pp.

HULME, M., JENKINS, G. J. AND TURNPENNY, J.R., 2002. Climate Change Scenarios for the United Kingdom: The UKCIP02 Briefing Report. Defra.

MILNER, N., DAVIDSON, I., EVANS, R., LOCKE, V. AND WYATT, R., 2001. The use of rod catches to estimate salmon runs in England and Wales. Paper for Atlantic Salmon Trust Workshop, Lowestoft, November 2001.

RUSSELL, I.C., IVES, M.J., POTTER, E.C.E., BUCKLEY, A.A. AND DUCKETT, L., 1995. Salmon and migratory trout statistics for England and Wales, 1951-1990. MAFF Direct. Fish. Res., Data Report No. 38, 252pp.

RUSSELL, I.C. AND POTTER, E.C.E., 1996. Interception salmon fisheries - assessing their impact on national stocks. Proc. IFM Study Course, Cardiff, Sept. 1993.

WEBB, J., 1998(a). Catch and Release: behaviour and summary of research findings. In: Atlantic Salmon Trust, Progress Report. December 1998.

WEBB, J., 1998(b). Catch and release: the survival and behaviour of Atlantic salmon angled and returned to the Aberdeenshire Dee, in spring and early summer. Scottish Fisheries Research Report Number 62/1998.

WHORISKEY, F.G., PRUSOV, S. AND CRABBE, S., 2000. Evaluation of the effects of catch and release angling on the Atlantic salmon of the Ponoi River, Kola Peninsula, Russian Federation. Ecology of Freshwater Fish, 2000: 9.

ANNEX 1. Additional information

North Atlantic Salmon Conservation Organisation

The North Atlantic Salmon Conservation Organisation (NASCO) was established in 1984 following calls for international co-operation on the management of salmon stocks. It is an international body with the objective of contributing through consultation and co-operation to the conservation and rational management of salmon stocks taking account of the best available scientific evidence. NASCO therefore seeks scientific advice on the status of salmon stocks and fisheries and their management from the International Council for the Exploration of the Sea (ICES) (Annex 2). The Contracting Parties to the NASCO Convention are: Canada; Denmark (in respect of the Faroe Islands and Greenland); European Union; Iceland; Norway; the Russian Federation; and the USA. Much of the business of the organisation is conducted by three regional Commissions: the North American Commission; the North East Atlantic Commission; and the West Greenland Commission. One of the main functions of these Commissions is to propose regulatory measures for fisheries of one Party to the NASCO Convention which exploit salmon originating in the rivers of other Parties. The main fisheries of relevance for the management of European stocks are those operated on the west coast of Greenland and within Faroese waters. In 1998, NASCO adopted the Agreement on the Adoption of a Precautionary Approach; this requires that more caution be exercised when information is uncertain, unreliable or inadequate, and that the absence of adequate scientific information is not to be used as a reason for postponing or failing to take conservation and management measures.

International Council for the Exploration of the Sea

The International Council for the Exploration of the Sea (ICES) provides biological information and advice on a wide range of fish stocks in order to help fisheries managers maintain viable fisheries within sustainable ecosystems. Information is compiled and assessments are conducted by Working Groups, which are comprised of national experts on the specific fish stocks. The Working Group reports are passed to the Advisory Committee on Fisheries Management (ACFM) for peer review and to prepare the advice to managers. The advice may take many forms, but in general it involves: assessments of stock dynamics; evaluation of the status of the stocks; projections of various stock parameters into the future; and management options. For Atlantic salmon, ICES provides advice relating to the list of questions posed by NASCO (Annex 2). The assessment of salmon stocks and their fisheries presents particular problems to the ICES scientists both because of the highly migratory nature of the fish and because they comprise a large number of distinct river stocks which must, to some extent at least, be managed separately.

The Environment Agency's catch return system

The Environment Agency and its predecessor the National Rivers Authority have operated a national catch return system since 1995. The first national catch reminder was issued to anglers (regardless of whether a return had already been made) in January 1995, in respect of the 1994 season. For 1995, the reminder was brought forward to November, closer to the end of the fishing season in most regions. The reporting and reminder system has been subject to a number of difficulties, not least the problem of collating licence counterfoils from over 17,000 outlets and inputting details onto a database in time for the November reminder. In 2001, improvements to the database enabled more effective targeting of reminders. These improvements also made possible the issue of a second reminder (sent to all anglers who had not sent in a return by 11 January); this was undertaken nationwide for the first time early in 2002, in respect of catches for the 2001 season. This was continued in 2003 for the 2002 season, and it is hoped to routinely issue second reminders in future years, in line with NASCO recommendations, in order to reduce the level of unreported catch.

Summary of Regulatory Measures agreed by NASCO for the West Greenland Salmon Fishery

Year	Allowable catch (tonnes)	Comments/other measures
1984	870	
1985	-	Greenlandic authorities unilaterally established quota of 852t.
1986	850	Catch limit adjusted for season commencing after 1 August.
1987	850	Catch limit adjusted for season commencing after 1 August.
1988-1990	2520	Annual catch in any year not to exceed annual average (840t) by more than 10%. Catch limit adjusted for season commencing after 1 August.
1991	-	Greenlandic authorities unilaterally established quota of 840t.
1992	-	No TAC imposed by Greenlandic authorities but if the catch in first 14 days of the season had been higher compared to the previous year a TAC would have been imposed.
1993	213	
1994	159	
1995	77	
1996	-	Greenlandic authorities unilaterally established a quota of 174t.
1997	57	
1998	Internal consumption fishery only	Amount for internal consumption in Greenland has been estimated in the past to be 20t.
1999	Internal consumption fishery only	Amount for internal consumption in Greenland has been estimated in the past to be 20t.
2000	Internal consumption fishery only	Amount for internal consumption in Greenland has been estimated in the past to be 20t.
2001	28 – 200	Under an *ad hoc* management programme the allowable catch will be determined on the basis of CPUE data obtained during the fishery.
2002	20 - 55	Under an *ad hoc* management programme the allowable catch will be determined on the basis of CPUE data obtained during the fishery.

Note: Information supplied courtesy of the North Atlantic Salmon Conservation Organisation.

Summary of Regulatory Measures agreed by NASCO for the Faroese Salmon Fishery

Year	Allowable catch (tonnes)	Comments/other measures
1984-1985	625	
1986	-	
1987-1989	1790	Catch in any year not to exceed annual average (597t) by more than 5%.
1990-1991	1100	Catch in any year not to exceed annual average (550t) by more than 15%.
1992	550	
1993	550	
1994	550	
1995	550	
1996	470	No more than 390 tonnes of the quota to be allocated if fishing licences issued.
1997	425	No more than 360 tonnes of the quota to be allocated if fishing licences issued.
1998	380	No more than 330 tonnes of the quota to be allocated if fishing licences issued.
1999	330	No more than 290 tonnes of the quota to be allocated if fishing licences issued.
2000	300	No more than 260 tonnes of the quota to be allocated if fishing licences issued.
2001	No quota set	It is the intention of the Faroese authorities to manage the fishery in a precautionary manner with a view to sustainability, and to make management decisions with due consideration to the advice from ICES concerning status of stocks contributing to the fishery.
2002	No quota set	It is the intention of the Faroese authorities to manage the fishery in a precautionary manner with a view to sustainability, and to make management decisions with due consideration to the advice from ICES concerning status of stocks contributing to the fishery.
2003	No quota set	It is the intention of the Faroese authorities to manage the fishery in a precautionary manner with a view to sustainability, and to make management decisions with due consideration to the advice from ICES concerning status of stocks contributing to the fishery.

Notes: The quotas for the Faroe Islands detailed above for the period 1984-2000 were agreed as part of effort limitation programmes (limiting the number of licences, season length and maximum number of boat fishing days) together with measures to minimise the capture of fish less than 60 cm in length. The measure for 1984/85 did not set limits on the number of licences or the number of boat fishing days

Information supplied courtesy of the North Atlantic Salmon Conservation Organisation.

ANNEX 2. NASCO's request for scientific advice from ICES in 2003

1 with respect to Atlantic salmon in the North Atlantic area:

1.1 provide an overview of salmon catches and landings, including unreported catches by country and catch and release, and worldwide production of farmed and ranched salmon in 2002;

1.2 report on significant developments which might assist NASCO with the management of salmon stocks;

1.3 provide long-term projections for stock re-building, focusing on trajectories for restoring stocks to target levels above conservation limits;

1.4 provide a compilation of tag releases by country in 2002.

2 with respect to Atlantic salmon in the North-East Atlantic Commission area:

2.1 describe the key events of the 2002 fisheries and the status of the stocks;

2.2 evaluate the extent to which the objectives of any significant management measures introduced in the last five years have been achieved;

2.3 further develop the age-specific stock conservation limits where possible based upon individual river stocks;

2.4 provide catch options or alternative management advice, if possible based on a forecast of PFA, with an assessment of risks relative to the objective of exceeding stock conservation limits;

2.5 further refine the estimate of by-catch of salmon post-smolts in pelagic trawl fisheries for mackerel and provide estimates for other pelagic fisheries that may catch salmon;

2.6 advise on an appropriate methodology to improve knowledge on the distribution and movements of escaped farmed salmon;

2.7 identify relevant data deficiencies, monitoring needs and research requirements.

3 with respect to Atlantic salmon in the North American Commission area

3.1 describe the key events of the 2002 fisheries and the status of the stocks;

3.2 evaluate the extent to which the objectives of any significant management measures introduced in the last five years have been achieved;

3.3 update age-specific stock conservation limits based on new information as available;

3.4 provide catch options or alternative management advice with an assessment of risks relative to the objective of exceeding stock conservation limits;

3.5 provide an analysis of existing biological and/or tag return data, and recommendations for required data collections, to identify the origin of Atlantic salmon caught at St Pierre and Miquelon;

3.6 identify relevant data deficiencies, monitoring needs and research requirements.

4. with respect to Atlantic salmon in the West Greenland Commission area

4.1 describe the events of the 2002 fisheries and the status of the stocks;

4.2 evaluate the extent to which the objectives of any significant management measures introduced in the last five years have been achieved;

4.3 provide information on the origin of Atlantic salmon caught at West Greenland at a finer resolution than continent of origin (river stocks, country or stock complexes);

4.4 provide catch options or alternative management advice with an assessment of risks relative to the objective of exceeding stock conservation limits;

4.5 provide a detailed explanation and critical examination of any changes to the model used to provide catch advice and of the impacts of any changes to the model on the calculated quota;

4.6 identify relevant data deficiencies, monitoring needs and research requirements.

Notes:

1. In the responses to questions 2.1, 3.1 and 4.1 ICES is asked to provide details of catch, gear, effort, composition and origin of the catch and rates of exploitation. For homewater fisheries, the information provided should indicate the location of the catch in the following categories: in-river; estuarine; and coastal. Any new information on non-catch fishing mortality of the salmon gear used and on the by-catch of other species in salmon gear and of salmon in any new fisheries for other species is also requested.

2. With regard to question 2.5, descriptions (gear type; and fishing depth, location and season) should be provided for all pelagic fisheries that may catch salmon post-smolts.

3. In response to question 4.1, ICES is requested to provide a brief summary of the status of North American and North-East Atlantic salmon stocks. The detailed information on the status of these stocks should be provided in response to questions 2.1 and 3.1.

4. With regard to question 4.5, “changes to the model” would include the development of any new model.

ANNEX 3. Status of Salmon Action Plans (SAPs)

SAPs are the means by which the Environment Agency aims to meet the objectives of its National Salmon Management Strategy (launched in 1996) at a local level. Each SAP comprises two documents:

- The Consultation Document reviews stock and fishery status (including the use of conservation limits), identifies factors limiting performance and lists a series of costed options to address these. This is circulated to outside interests to seek their opinion and support for the plan.

- The Final Plan follows consultation and contains an agreed list of actions which the Agency, in partnership with others, is committed to address in the five year lifetime of the plan. Progress against these actions is reviewed annually at both regional and national levels.

The schedule below identifies the timetable for production of final plans for individual rivers where these have still to be completed.

Schedule for completion of Salmon Action Plans (SAPs) - March 2003

Region	2002/3			2003/4			Final
	End of Q2	Q3	Q4	Q1	Q2	Q3	No. SAPs
North East	Coquet**, Wear**, Esk**, Tyne**, Tees**						5
Thames				Thames			1
Southern	Test**, Itchen**						2
South West	Tamar**, Frome**, Avon (Hants)**, Lynher**, Tavy**	Taw*, Torridge*, Camel*, Stour*	Fowey*, Teign*, Dart*	Exe, Piddle	Erme, Lyn, Plym	Yealm, Avon (D), Axe	20
Midlands		Severn**, Severn Estuary**					2
Wales	Dee**, Ogwen**, Clwyd**, Mawddach**, Seiont**, Conwy**, Teifi**, Dwyfawr**, Taf**, Wye**, Tywi**, Dyfi**, Cleddau**, Glaslyn/Dwyryd**, Dysynni**	Usk*, Nevern** Ogmore**, Tawe**	Taff, Rheidol**	Loughor, Neath, Afan	Ystwyth	Aeron	26
North West	Eden**, Ehen (& Calder)**, Kent**, Leven (& Crake)**, Ribble**, Lune**	Derwent*	Duddon		Wyre, Cumbrian Esk	Border Esk, Irt	12
Cumulative total completed	**33**	**44**	**50**	**56**	**62**	**68**	**68**

* *Rivers with completed SAP Consultation Documents*

** *Rivers with completed Final SAPs*

ANNEX 4. Description of fishing methods (nets and fixed engines) used for taking salmon and migratory trout in England and Wales

A wide variety of nets and fixed engines are used to take salmon and sea trout. The term fixed engine is an ancient one used as a general descriptor of stationary fishing gears. The following are generalised descriptions of the gear used in England and Wales (for further details see Russell *et al.*, 1995); in practice there is considerable regional variation in the precise mode of operation of specific gears and in the dimensions and mesh sizes of the nets. These characteristics have generally evolved to suit local conditions and are regulated by local byelaws.

Basket trap This is a type of fixed engine which has only been used on the river Conwy in North Wales. It consists of a metal basket set between two boulders, which is designed to catch salmon and sea trout which fall back when attempting to ascend a small waterfall.

Coastal net A loose term used to describe the nets used in the fishery off the East Anglian coast. In practice, various methods of fishing have been employed, including seine nets, drift nets and nets pulled along the coast close to the shore (known locally as long-shoring).

Compass net These nets are operated from a boat held stationary against the current. A net is hung between two long poles lashed together in a V-shape and held over the side of the boat so that the net streams out underneath the boat. When a fish strikes the net, the poles are pivoted upwards with the aid of counter-balancing weights. Similar nets were known as stop nets on the Wye and Severn and stow nets in the Thames Estuary (no longer in operation).

Coracle net These nets are only used in parts of Wales. Short lengths of trammel net are suspended between two coracles (small boats), which then drift downstream with the net strung across the current.

Crib (or Coop) These ancient fixed engines consist of stone buttresses set across a river, the gaps between the buttresses being filled by box-like traps made of either wood or metal with in-scale entrances. The river Eden cribs were built in 1133 A.D. by monks, although the Derwent cribs are of more recent construction.

Drift net The drift net consists of a sheet of netting which hangs from a floated head rope to a weighted foot rope and is designed to drift with the current or tide. Regional names include: hang, whammel, sling and tuck nets.

Haaf or heave net These one-man-operated nets are operated exclusively in the North West Region. The gear consists of a rectangular net hung from a horizontal wooden beam up to 5.5m wide. A central pole permits the netsmen to stand in the tideway holding the net facing the current with the netting streaming behind him. The net is lifted when a fish strikes the net. It is usual for several netsmen to work together line-abreast.

Lave (or dip) net Lave nets, one regional variety of similar hand-held, one-man-operated nets, consist of a large Y-shaped wooden frame supporting a net, similar in design to an angler's landing net, but measuring up to 2 m across. The netsman actively stalks fish in estuary pools or shallows at low tide.

Putchers Putchers are wickerwork conical baskets which, when erected on stages, form putcher ranks (containing up to 800 putchers). This type of fixed engine is peculiar to the Bristol Channel

and is dependent upon the high turbidity and large tidal range which occurs in this area. Each putcher has a mouth from 3 to 5 feet wide, tapering to a narrow point which will prevent fish of moderate size from passing through. A netting leader is often used to guide fish into the putchers.

Seine net The seine net (also known as the draft or draw net) consists of a wall of netting with a weighted foot rope and floated head rope. One end is held on the shore while the rest is paid out from a boat to enclose an area of water between two points on the shore. The net is then retrieved and any fish enclosed drawn up onto the shore. Seine nets normally operate within estuaries, although some are also fished off coastal beaches.

Sling net The sling net is a type of drift net used exclusively on the river Clwyd in North Wales. The sling net differs from other drift nets only in so far as the nets are permitted to carry weights (not exceeding 9 lbs) at either end, designed to retard the drift.

T-net T-nets are fixed engines operated close to the shore. They comprise a 'leader', usually about 200 m in length, stretching out from the beach to a 'headpiece', which contains two traps with funnel entrances. Some fish may become enmeshed or entangled in the leader of the net, but the majority are taken, free-swimming, in the traps. T-nets are normally fished in specific berths.

'T or J'-net 'T or J'-nets consist of plain sheets of netting on a floated head rope which hang vertically in the water by means of a weighted foot rope and are set from the shore usually in the shape of a 'T', 'J' or 'P'. These nets are usually operated as fixed engines, held stationary by means of weights, anchors or stakes, but can also be drifted with weights used to retard the rate of movement. Fish can only be caught in a 'T or 'J' net by becoming enmeshed or entangled in the walls of the net.

Trammel net Trammel nets are similar to drift nets but are modified by the addition of sheets of larger mesh netting on one or both sides of the net. Such nets are referred to as being 'armoured'. A fish striking a trammel net pushes the small mesh net through one of the large meshes in the adjoining net and is caught in the resultant pocket. Sometimes known locally as tuck nets.

Wade net A wade net consists of a short (~30 m) single sheet of netting which is attached to a pole at each end, and is pulled along the foreshore parallel to the beach by two men, one wading and the other on the beach. Nets are 'beached' at regular intervals, or when a fish strikes, in much the same way as a seine net.

ANNEX 5. ICES Compilation of microtag, fin clip and external tag releases

Marking season: 2002

Country: England and Wales

Totals:

Origin	Primary Tag or Mark			
	Microtag	External Mark	Adipose Clip	Total
Hatchery juvenile	57,056	4,304	119,081	180,441
Wild juvenile	6,082		1,515	7,597
Adult		1,418		1,418
Total fish marked	**63,138**	**5,722**	**120,596**	**189,456**

Marking Agency	Age	Life Stage	H/W	Stock Origin	Primary Tag or Mark	Number marked	Code or Serial	Secondary Tag or Mark	Release date	Release Location
EA North East Various	Adult	W	Tyne	Needle tag	42		None	Mar-Jun	Tyne	
EA North East Various	Adult	W	Coquet	Needle tag	29		None	Feb-Jun	Coquet	
EA Thames	Various	Adult	W	Thames	Radio tag	21	SAL3	Floy tag	Various	Thames
EA Thames	Various	Adult	W	Thames	Floy tag	3	00284, 306, 307	None	Various	Thames
EA Thames	S2	Smolt	H	Delphi	None	6,085		Adipose	03/25/02	Thames (Kennet)
EA Thames	S1	Smolt	H	Shannon	Microtag	10,079	01/42/60	Adipose	03/04/02	Thames (Kennet)
EA Thames	S1	Smolt	H	Shannon	Microtag	10,100	01/42/61	Adipose	03/04/02	Thames (Kennet)
EA Thames	S1	Smolt	H	Shannon	Microtag	10,039	01/42/62	Adipose	03/06/02	Thames (Kennet)
EA Thames	S1	Smolt	H	Shannon	Microtag	8,326	01/4263	Adipose	03/06/02	Thames (Kennet)
EA Thames	S1	Smolt	H	Shannon	None	4,754		Adipose	02/18/02	Thames (Kennet)
EA Thames	S1	Smolt	H	Shannon	None	3,980		Adipose	03/25/02	Thames (Kennet)
EA Thames	S1	Smolt	H	Shannon	None	8,482		Adipose	04/03/02	Thames (Kennet)
EA Thames	S1	Smolt	H	Shannon	None	3,683		Adipose	04/26/02	Thames (Kennet)
EA Thames	S1	Smolt	H	Shannon	Elastomer	4,304		Adipose	03/22/02	Thames
EA South West	S1	Smolt	H	Exe	None	3,500		Adipose	04/30/02	Axe
EA South West	0+	Parr	H	Exe	None	5,000		Adipose	08/28/02	Exe (Culm)
EA Wales	S1	Smolt	H	Conwy	Microtag	4,250	20/42/38	Adipose	03/05/02	Conwy (Lledr)
EA Wales	S1	Smolt	H	Conwy	Microtag	4,323	21/42/48	Adipose	03/13/02	Conwy (Pentre)
EA Wales	S1	Smolt	H	Dee	None	14,000		Adipose	01/15/02	Dee (Tryweryn)
EA Wales	S1	Smolt	H	Dee	None	3,000		Adipose	01/18/02	Dee (Alwen)
EA Wales	S1	Smolt	H	Severn	None	4,000		Adipose	03/14/02	Severn (Teme)
EA Wales	S2	Smolt	H	Taff	Microtag	9,900	01/42/59	Adipose	Mar-Apr	Taff
EA Wales	S1	Smolt	H	Taff	None	25,000		Adipose	Mar-Apr	Taff
EA Wales	1+	Parr	H	Taff	None	27,000		Adipose	July	Taff
EA Wales	Various	Adult	W	Taff	CART tag	32	Various orange	Floy tag	Jun-Dec	Severn Estuary
EA Wales	Various	Adult	W	Taff	Floy tag	72	Various green	None	May-Dec	Taff
EA Wales	Various	Adult	W	Dee	Floy tag	1,124	Various blue	None	Feb-Oct	Dee
EA North West	Various	Adult	W	Eden	Radio tag	90		None	Various	Eden
EA North West	1+	Parr	H	Lune	None	10,000		Adipose	March	Lune
CEFAS/EA South West	Various	Smolt	W	Tamar	Microtag	4,007	01/42/35	Adipose	April	Tamar
CEFAS/EA Wales	Various	Smolt	H	Dee	Microtag	39	01/42/22	Adipose	May	Dee
CEFAS/EA Wales	Various	Smolt	W	Dee	Microtag	2,075	01/42/22	Adipose	May	Dee
CEFAS	S2	Adult	W	Kent	Floy Tag	5	E772004, E772007/8, E772010/11	None	June-July	Kent
CEFAS	Various	Parr	W	Itchen	PIT	51	DC0021….	Adipose	21/08/02	Itchen
CEFAS	0+	Parr	H	Itchen	PIT	597	DC001A….	Adipose	24/09/02	Itchen
CEFAS	Various	Parr	W	Ceiriog	PIT	1,364	DC0021….	Adipose	02-06/09/02	Ceiriog

Note: Excludes some adipose fin-clipped fish from private initiatives.