

Annual
Assessment
of Salmon
Stocks and
Fisheries
in England
and Wales



2001

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SALMON STOCKS AND FISHERIES IN ENGLAND AND WALES, 2001

Preliminary assessment prepared for ICES, April 2002



**ENVIRONMENT
AGENCY**

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FOREWORD

This is the fifth 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 National Salmon and Trout Fisheries Centre (NSTFC) 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 2002 is given at Annex 2. However, for this report, the pertinent requests relating to events in 2001 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 2001 fisheries and the status of the stocks;

evaluate the effects of management measures introduced since 1991;

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.

It must be noted that most of the data relating to 2001 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 2001

- The declared salmon catch by nets and fixed engines in 2001 was down slightly on 2000 at 153 tonnes, but remained above the 5-year average. The north east coast fishery accounted for 83% of this total (by weight).
- Angling effort was severely impacted by the access restrictions imposed to prevent the spread of foot and mouth disease.
- Despite these restrictions, the declared rod catch (56.2 tonnes) only fell by 17% on the catch in 2000.
- New reporting arrangements introduced by the Environment Agency in 2001 (including a second reminder) resulted in a marked increase in the proportion of anglers making a catch return. For comparison with rod catches in recent years, it should be noted that the declared catch for 2001 after the first reminder (49.5 t) was 27% down on 2000.
- The introduction of the national measures in 1999 has resulted in the majority of large early-run salmon 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.

SUMMARY

This report presents a preliminary assessment of the state of salmon stocks and fisheries in England and Wales in 2001 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. However, in 2001 angling was affected by the outbreak of foot and mouth disease (FMD), which restricted angling opportunities and access to rod fisheries in many parts of the country for lengthy periods. It is impossible to quantify the impact that FMD had on rod catches, although these were undoubtedly significantly reduced; net fisheries were unaffected by FMD. The declared salmon catch for 2001 (including those fish released alive by anglers) is provisionally estimated at 209 tonnes, representing some 57,000 fish, and comprising 153 tonnes (~43,000 fish) by nets and fixed engines and 56 tonnes (~14,000 fish) by rods. For direct comparison with previous years, it should be noted that the declared catch prior to the issue of a second reminder was about 49 tonnes (see below). An estimated 26 tonnes (43%) of the rod catch was released alive. 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 33 tonnes of additional fish caught in 2001; approximately 15% of all fish killed.

Net catch

The declared net catch, which is dominated by drift net and T and J net fisheries in the North East Region, was 15% lower in 2001 than in 2000, but was 24% 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 2001, although the number of days/tides fished by netmen increased compared with 2000 in the North East and South West Regions. Catch per unit of fishing effort (CPUE) for net fisheries in 2001 was above the previous 5-year mean in all regions except Wales and the South West. CPUE for the North East Region was the second highest recorded value (highest in 2000) since the time series began in 1988. This may reflect several factors, including a reduction in netting effort and a delay in the start of fishing to 1st June since 1999, as well as changes in salmon abundance.

Rod catch

The number of salmon rod licences issued in 2001 (23,000) was 23% lower than in 2000, and the number of days declared to have been fished by anglers showed a 33% decline. The widespread FMD epidemic is considered to have had a major influence on fishing effort in many parts of the country, especially in the spring and early summer. Angling restrictions were particularly severe in the South West and North West Regions. The rod catch (including released fish) was lower than that in 2000 and 7% below the previous 5-year mean. This undoubtedly reflects reduced fishing pressure. However, this will have been offset to some extent by improvements in the catch reporting system in 2001 to reduce the level of unreported catch. These improvements (better targeting of reminders and a routine second reminder) resulted in a substantially improved reporting rate. It has not been possible to fully analyse the data from the additional catch returns (e.g. in relation to age composition or date of capture), but the 'additional' catch has been included in this report. Provisionally, the improvements 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).

Over the past six years, the annual rod catch has fluctuated between levels of approximately 13,000 and 17,500 fish in alternate years. This has chiefly been due to variability in the catches of grilse, which in 2001 were lower than in 2000 in all but the North East Region, being 18% below the mean for the previous five years (excluding data from the second reminder). Rod catches of multi-sea-

winter (MSW) salmon in 2001 were similar to those in 2000 overall, but were below the 5-year mean in all but the North East Region. The CPUE for the rod fisheries was higher in 2001 than in 2000 and well above the previous 5-year mean for all Regions except the South West, where there was a small decrease. This is more probably a reflection of the marked reduction in angling effort in 2001 than higher catch.

Stock status

The changes in rod fishing effort due to FMD and the national measures introduced in 1999 to protect spring salmon make it difficult to draw general conclusions about changes in stock status for 2001. In the North East Region, the information on catch and effort suggests that the in-season availability of salmon, both to coastal net fisheries and river anglers, was relatively high in 2001 compared with the previous five years, though slightly lower than in 2000. For other regions the position was less clear.

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 2001 were variable: some rivers' counts were above the average of the previous five years; while others were below the average. In most of the rod fisheries in England and Wales where exploitation rates could be determined in 2001, these were well below the average of the previous five years, particularly for the South West and North West Regions. Therefore, salmon populations in these rivers were bigger than suggested by the differences in catches alone. In certain other rivers in Wales and Southern Region, 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 2001/02. Estimates of egg deposition for 2001 were above the conservation limit in 17 rivers, between 50% and 100% of the limit in 14 rivers and less than 50% of the limit in 27 rivers. Overall performance was better than in most years, although 47% of rivers in 2001 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. Because of FMD and uncertainty about its effects on angling effort and, as a consequence, rod exploitation, egg deposition estimates for 2001 are more tentative than usual and will be re-assessed later in the year.

Management measures

Viewed against historical data, current stock estimates and catches provide an 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 2001 (total decrease, 57%). 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 netmen 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 0.3% in 1999 and 0.11% in 2001.

A number of measures aimed at better management of this valuable resource were implemented or strengthened in England and Wales in 2001. 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 new net limitation order (NLO) was introduced in one fishery in South West England in 2001, which reduced the number of nets permitted. 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 2001. 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 5.1% in 2001, 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 1993 (10%) to 1999 (44%); although it appears to have remained at about this level subsequently; 42% in 2000 and 43%, provisionally, in 2001. Tagging studies on these fish suggest that, if handled appropriately, the majority of released salmon can go on to spawn successfully.

Apart from the impact of FMD, other, non-regulatory factors may have contributed to changes in exploitation rates in 2001. 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 from May onwards in 2001, which may have provided less than ideal conditions for angling. Particularly high flows in October may also have resulted in the loss of some fishing opportunities.

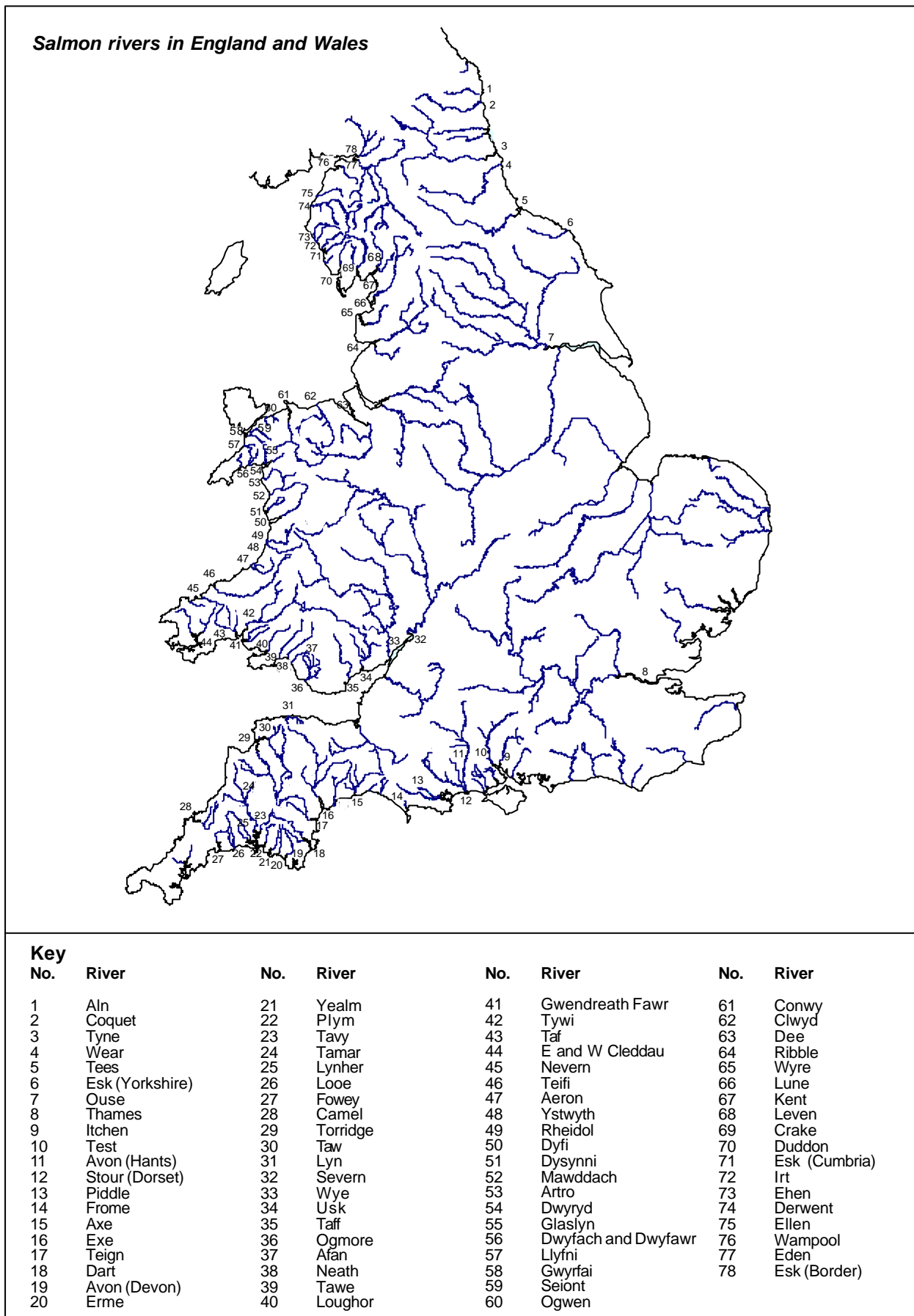


Figure 1. Map of England and Wales showing the main salmon rivers

REPORT ON SALMON FISHERIES IN 2001

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 2001 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 2001.

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 2001. 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 was particularly constrained by foot and mouth disease (FMD) and reduced access to riverbanks; throughout England and Wales there were fisheries that were closed for much of the salmon fishing season with a consequent effect on both the level and timing of effort in the rod fishery. 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. Particularly high flows in April and October may have resulted in the loss of some fishing opportunities, while the relatively low flows in many rivers from May onwards may have provided less than ideal conditions for angling.

Table 1. Allowable and utilised effort for the principal salmon net fisheries in England and Wales in 2001

Region	River/ Fishery	Method	No. Lic	NLO	Days available	Allowable effort net. days*	Utilised effort		% utilised #	Av. utilised effort day/lic
							net. days	net. tides		
NE	N Coastal (N)	Drift & T	24	X	114	2,736	}	2,409	57	52
	N Coastal (N)	Drift	21	X	66	1,386				
	N Coastal (N) ¹	T	1	25 [§]	114	114				
	N Coastal (S)	Drift	18	X	66	1,188	882	74	49	
	N Coastal (S) ¹	T	1	1	114	114	38	33	38	
	Y Coastal	Drift	7	X	66	462	315	68	45	
	Y Coastal ¹	T or J	12	50	114	5,700	524	9	44	
NE Region			84			11,700	4,168	36		
SW	Avon & Stour	Seine	5	6	53	318		195	44	28
	Poole Harbour	Seine	1	1	53	53		48	65	34
	Exe	Seine	11	18	65	1,170		316	19	21
	Teign ¹	Seine	5	9	126	1,134		177	11	25
	Dart ¹	Seine	11	15	126	1,890		487	18	32
	Camel	Drift	7	7	66	462		212	33	22
	Tavy ³	Seine	4	1	88	352		64	13	11
	Tamar ⁴	Seine	15	15	78	1,170		610	37	29
	Lynher ⁴	Seine	5	5	78	390		58	11	8
	Fowey ^{1,5}	Seine	2	2	133	266		122	33	44
	Taw/Torridge	Seine	14	14	66	924		615	48	31
	Lyn ²	Trap	0	n/a	0	0		0	0	0
	SW Region			80			8,129	2,904	26	
Midlands	Severn	Putchers	7		76	532	532		100	76
	Severn	Seine	3	4	78	312		36	8	9
	Severn	Lave	19		78	1,482		423	20	16
Midlands Region				29			2,326	532	459	37
Wales	Tywi ¹	Seine	7	9	113	1,017		483	34	49
	Tywi ¹	Coracles	7	12	113	1,356		322	17	33
	Taf	Coracles	1	1	113	113		7	4	5
	E/W Cleddau	Compass	8	6	78	624		160	18	14
	Nevern ¹	Seine	0	1	113	113		0	0	0
	Teifi ¹	Seine	2	4	113	452		9	1	3
	Teifi ¹	Coracles	10	11	113	1,243		325	19	23
	Dyfi ¹	Seine	2	3	113	339		88	19	31
	Mawddach	Seine	1	2	78	156		81	37	58
	Glaslyn	Seine	0	1	78	78		0	0	0
	Ogwen	Seine	0	X	78	0		0	0	0
	Conwy	Seine	2	3	78	234		47	14	17
	Conwy	Basket	1		92	92	87		95	87
	Dee	Trammel	4	2	54	216		208	69	37
	Dee	Seine	8	8	54	432		380	63	34
Welsh Region			53			6,465	87	2,110	25	
NW	Ribble	Drift	6	6	78	468		205	31	24
	Lune	Haaf	12	12	78	936		671	51	40
	Lune	Drift	7	7	78	546		360	47	37
	Lune	Seine	1	X	78	78		35	32	25
	Kent	Lave	8	8	78	624		256	29	23
	Leven	Lave	6	6	78	468		272	42	32
	S&W Cumbria ⁶	Drift	1	1	78	78		52	48	37
	Eden & Esk	Haaf	98	155	87	13,485		3,866	20	28
	Eden & Esk	Coops	3		92	276		105	27	25
	NW Region			139			16,959	5,822	25	

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: * Allowable effort is calculated by multiplying the days available by the number of nets permitted under the NLO, except where the number of licences exceeds the NLO, in which case the higher figure is used.

Expressed as days utilised (i.e. tide data x1.4)

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 (all salmon caught before 1 June to be released)

² Not fished

³ Buy-off 1 July to 7 August

⁴ Buy-off 8 August to 31 August

⁵ Buy-off 1 June to 15 June

⁶ Partial buy-off operating in 2001

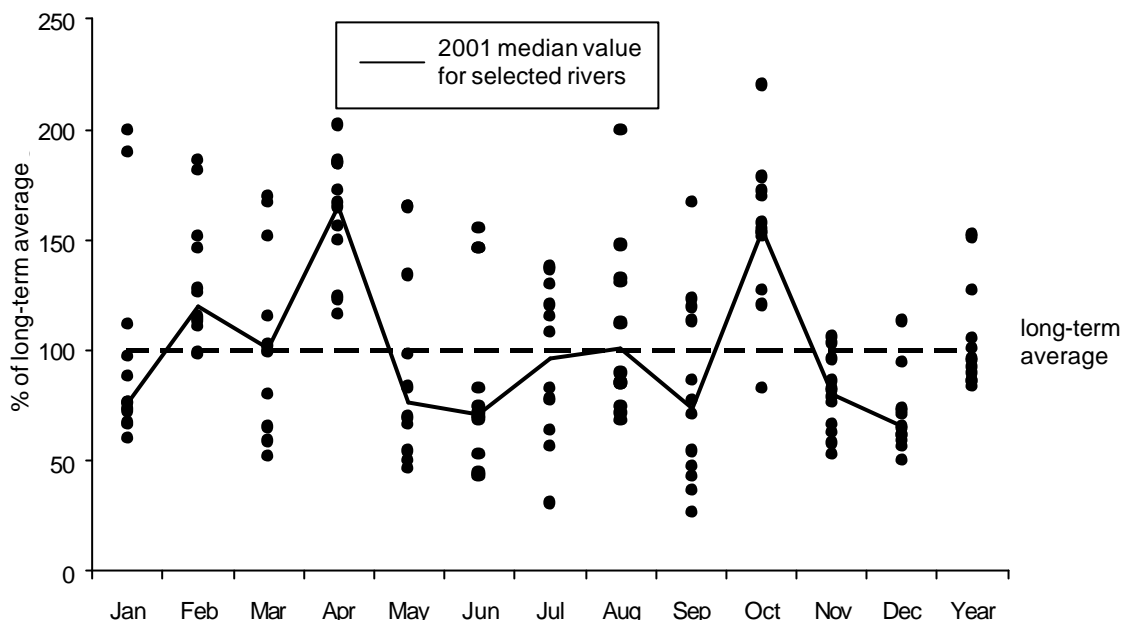


Figure 2. Monthly mean river flows (cubic metres per second) in 2001 for 13 rivers (South Tyne, Tees, Itchen, Avon, Exe, Taw, Severn, Wye, Cynon, Teifi, Dee, Lune and Eden) in England and Wales, expressed as a percentage of the long term average for the same month. (Data supplied by Centre for Ecology 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 a further 4% in 2001 (Table 2 and Figure 3), due mostly to a reduction in the number of licences issued for hand-held nets. Overall, the number of net licences issued between 1985 and 2001 has decreased by an average of about 3% per year (total decrease, 57%).

The national measures to safeguard spring salmon, introduced in 1999, continued to apply in 2001. Under these measures, netmen 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 2000 is summarised in the text table below:

Fishery	Netting Method	Start of phase out	Number of nets:		Reduction %
			before start	in 2001	
North East Coast	drift nets	1993	142	70	51%
Anglian Coast	coastal nets	1996	59	46	22%
River Ogwen	seine nets	1997	2	0	100%

Table 2. Numbers of rod licences (1994-2001) and net and fixed engine licences (1983-2001) 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*	8,950	14,149	113	99	143	33	24	388

Notes: Rod short-term licences are for 1 or 8 days; annual licences are valid from the date of issue to 31 March following; the rod licence data for 2001 are provisional.

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.

Key: # Combined drift/T net licences (issued in Northumbria (northern area)) have been included in the gill net totals.

* Provisional.

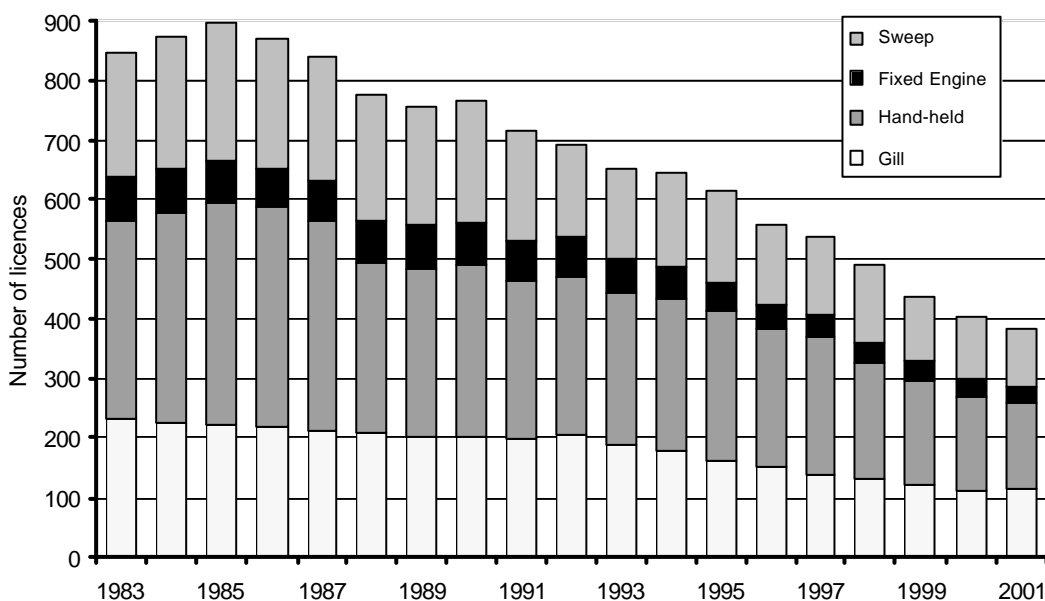


Figure 3. Numbers of salmon net and fixed engine licences issued in England and Wales, 1983-2001

In 2001, new NLOs were introduced in only one fishery, in SW England, which reduced the number of nets permitted as follows:

Region	Fishery	Method	Number of nets:	
			Previous NLO	New NLO
SW	River Tavy	seine nets	5	1

Arrangements were also made to reduce netting effort in the following fisheries in 2001 (as in 2000) 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)	
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	129 of the 131 fish caught were released (scheme operating since 1998)	Wessex Salmon Rivers Trust & Tesco
Severn Estuary (Usk) drift nets		complete season (in perpetuity*) (commenced 2000) (1 June - 31 August)	Local owners/angling interests, NASF & River Wye 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.

1.2.2 Allowable effort in rod fisheries

No new statutory effort restrictions were imposed on rod fisheries in 2001. However, the FMD outbreak resulted in access being denied to many river fisheries; the extent and duration of these restrictions varied from region to region (see 2.1.3). The national measures to safeguard spring salmon, introduced in 1999, continued to apply in 2001. 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 2001. 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 2001. 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 to 2000, there was a decrease in the numbers of tides fished in the Midlands (down 25%), Wales (down 12%), North West (down 9%) and South West (down 9%) Regions, but an increase in the number of days fished in the North East Region (up 7%). The decreases in utilised effort accompanied a decrease in the number of licences issued in all regions except the South West, where there was a small overall increase in the number of licences issued in 2001.

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 (36%). 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 2001 are shown in Table 2; the data for 2001 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. The total number of rod licences issued has fallen by 38% over this eight year period and the number of annual licences has fallen by 47%. The number of short-term (one day and eight day) licences issued remained relatively stable until 2001, when it fell by 18% on 2000, and the proportion they represent of the total has increased from about 28% in 1994-5 to about 39% in 2001. 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. In 2001, a further significant factor thought to have adversely affected licence uptake was the outbreak of FMD, which resulted in anglers having reduced access to many fisheries.

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, a more complete list of anglers was available in November compared to 2000. Also, a second reminder was issued some 10 weeks after the first, to anglers who had failed to send in a return by 11 January 2002, reflecting NASCO's resolution to reduce the level of unreported catch. This represented a change on previous years when only a single reminder was issued.

Data on return rates have been calculated since 1998 and are presented in the text table below:

The proportion (%) of salmon rod licence holders making a catch return, by licence type, 1998-2001.

Year	Licence Type	
	Annual (Full & concessionary)	Short-term (1 & 8 day)
1998	78	51
1999	76	53
2000	71	53
2001*	86	67
Mean 1998-2000	75	52

** Provisional data and including impact from second reminder.*

Reporting rates for all licence categories improved in 2001 compared with 2000 and the previous two years. Provisionally, 86% of annual licence holders made a return in 2001 compared with 71% in 2000, and 67% of short-term licence holders made a return in 2001 compared with a previous three-year mean of 52%. This improvement is believed to be partly as a result of the larger proportion of licence holders receiving a reminder in 2001. The impact of the second reminder on the return rate has not yet been fully evaluated, though initial results suggest that it has contributed significantly to the observed improvement in the reporting rate for 2001. 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 than those anglers who hold an annual licence. A more detailed analysis of catch return data for 2001 for the River Dee (North Wales) indicated that 85% of short-term licence holders making a return declared a nil catch, and that 92% 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 3 shows the total declared number of rod days fished by anglers in each of the regions in each year from 1994 to 2001. Overall, most of the salmon and sea trout angling in 2001 took place in Wales (37%) and the North West Region (27%), as in 1999 and 2000, and there was relatively little angling for these species in Thames and Southern Regions. In all regions except Southern, there was a substantial reduction in the number of days fished compared with 2000 (33% reduction overall), and the number of days fished in 2001 was well below the average of the previous five years (as in most regions in 1999 and 2000). Rod fishing effort has decreased by 56% since 1997. 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, though restricted access to rivers due to

Table 3. Total number of rod days fished from catch returns for each EA Region, 1994-2001

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*	24,646	110	1,796	15,759	3,849	51,164	20,782	118,106
Mean (1996-00)	35,459	187	2,029	30,128	10,366	82,138	59,769	220,076
% change:								
2001 on 2000	-24	-23	+1	-30	-28	-23	-58	-33
2001 on 5-yr mean	-30	-41	-11	-48	-63	-38	-65	-46

* Provisional, excludes data from second reminder.

Table 4. Number and proportion of rod days fished in 2001 before (<) and from (≥) 16 June (based on a sample of 3,000 anglers)

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	545	3,168	3,713	15	85	16	12
Thames	3	17	20	15	85	0	0
Southern	56	411	467	12	88	2	2
South West	621	3,483	4,103	15	85	18	13
Midlands	190	670	860	22	78	6	3
Wales	1,222	11,185	12,393	10	90	36	42
North West	745	7,673	8,417	9	91	22	29
Total	3,382	26,607	29,973	11	89		

FMD in 2001 will have had a significant effect on effort. The latter appears to have been particularly marked in the South West and North West Regions. The distribution of fishing effort before and after 16 June for 2001 is shown in Table 4, as extracted from a random sample of 3,000 rod catch returns. Based on this sample, 11% of the overall angling effort was prior to June 16, with the proportion varying regionally from 9% (North West) to 22% (Midlands). 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 (36%). Comparable data for previous years are not available; however, a telephone survey of anglers in 1999 indicated that fishing effort before 16 June fell by about 40%.

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 retained after August 1
	Torridge	2	2	7	
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 2001 are based upon returns received up until 20 March 2001. 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 to anglers issued in 2001; 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 2001

Table 5 presents the provisional total salmon catch for England and Wales for 2001, compared with confirmed catches for the previous 5 years. A breakdown of the provisional 2001 rod and net catches for each Region is provided in Table 6.

Table 5. Declared catch of salmon for England and Wales for 1996-2001

Year	Nets & Fixed Engines		Rods (inc. released fish)		Total caught		Total retained	
	No.	Wt (t)	No.	Wt (t)	No.	Wt (t)	No.	Wt (t)
1996	32,680	125.7	17,444	71.5	50,124	197.2	46,696	183.2
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*	43,251	152.8	14,383	56.2	57,634	209.0	51,315	182.6
Mean (1996-2000)	34,897	124.9	15,538	59.3	50,434	184.2	45,407	163.3

* Provisional

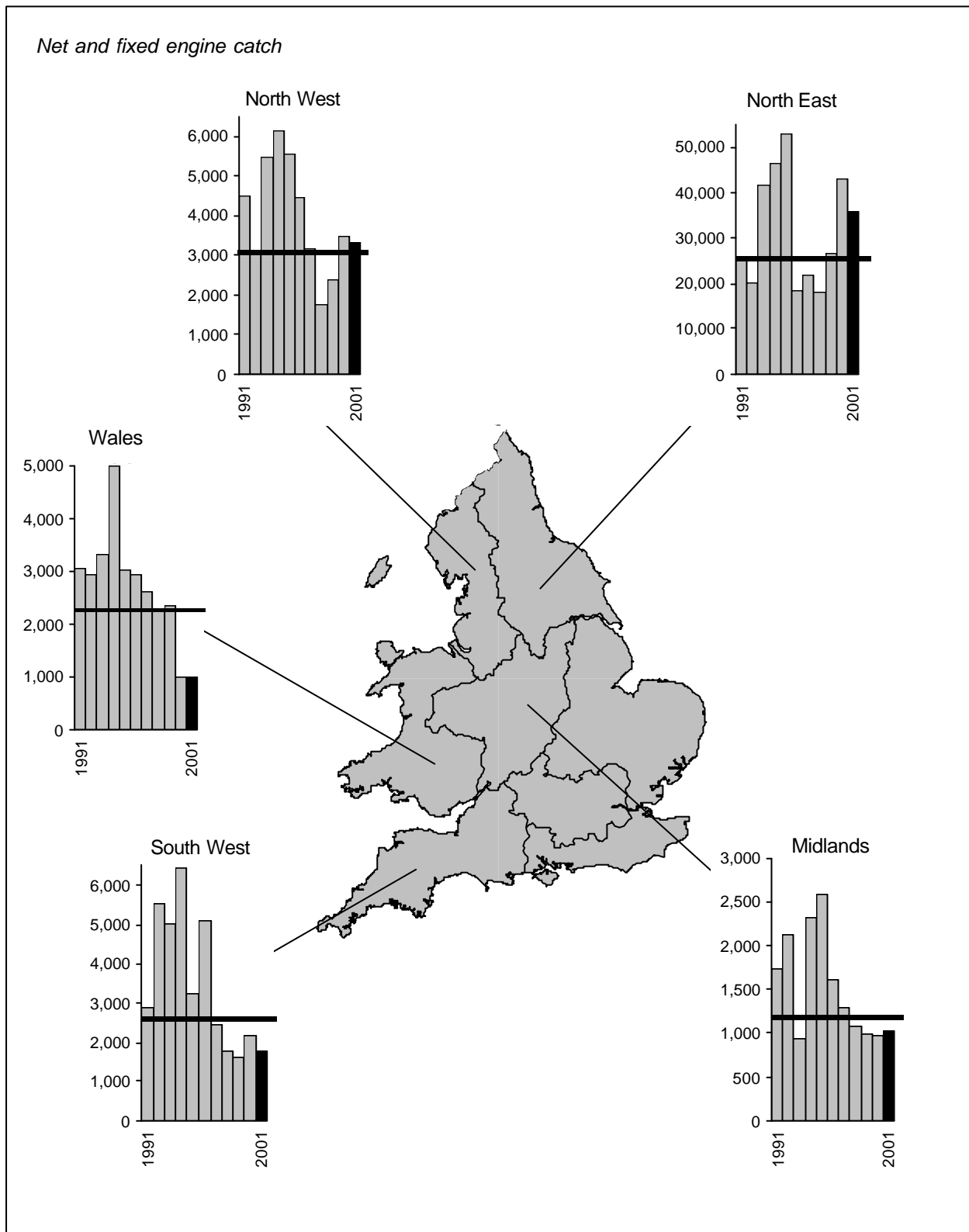


Figure 4. Regional declared salmon net and fixed engine catches. The histograms display data for the eleven years 1991 to 2001, together with the five-year mean for the period 1996-2000 (displayed as a horizontal line). Note that the histograms are not drawn to the same scale. Data for 2001 are provisional.

Table 6. Provisional regional salmon catches (including released fish) for England and Wales - 2001 season

Region	Net catch		Rod catch		Total catch	
	No.	Weight (kg)	No.	Weight (kg)	No.	Weight (kg)
North East	36,115	126,234	3,733	16,603	39,848	142,837
Anglian	0	0	0	0	0	0
Thames	0	0	0	0	0	0
Southern	0	0	405	1,407	405	1,407
South West	1,804	5,776	1,396	4,736	3,200	10,512
Midlands	1,027	4,656	273	1,385	1,300	6,041
Wales	995	3,701	4,351	16,259	5,346	19,960
North West	3,310	12,482	4,209	15,767	7,519	28,249
Unknown	0	0	16	34	16	34
Total	43,251	152,849	14,383	56,191	57,634	209,040

The total declared catch for nets and fixed engines in 2001 was 15% lower than in 2000, but still 24% higher than the average for the previous 5 years (Table 7, 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 1992-2001 (84% in 2001). 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 1996-98 and 1999-2001, there has been a substantial decline in the average net catches in most regions; the greatest reductions have occurred in Wales (45%), the South West (40%) and the Midlands (25%), with a small reduction in the North West (2%). However, there has been a substantial increase in the average catches between these two periods in the North East (81%), 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 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 this fishery (Section 2.1.3).

Table 7. Summary of declared regional salmon and grilse net and fixed engine catches (including released fish), 1992-2001

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* (provisional)	36,115	0	1,804	1,027	995	3,310	43,251
Mean (1996 - 2000)	25,791	2	2,619	1,185	2,242	3,057	34,897
% change:							
2001 on 2000	-17		-17	+6	-1	-5	-15
2001 on 5-yr mean	+40		-31	-13	-56	+8	+24

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 (Wales & SW Region only)

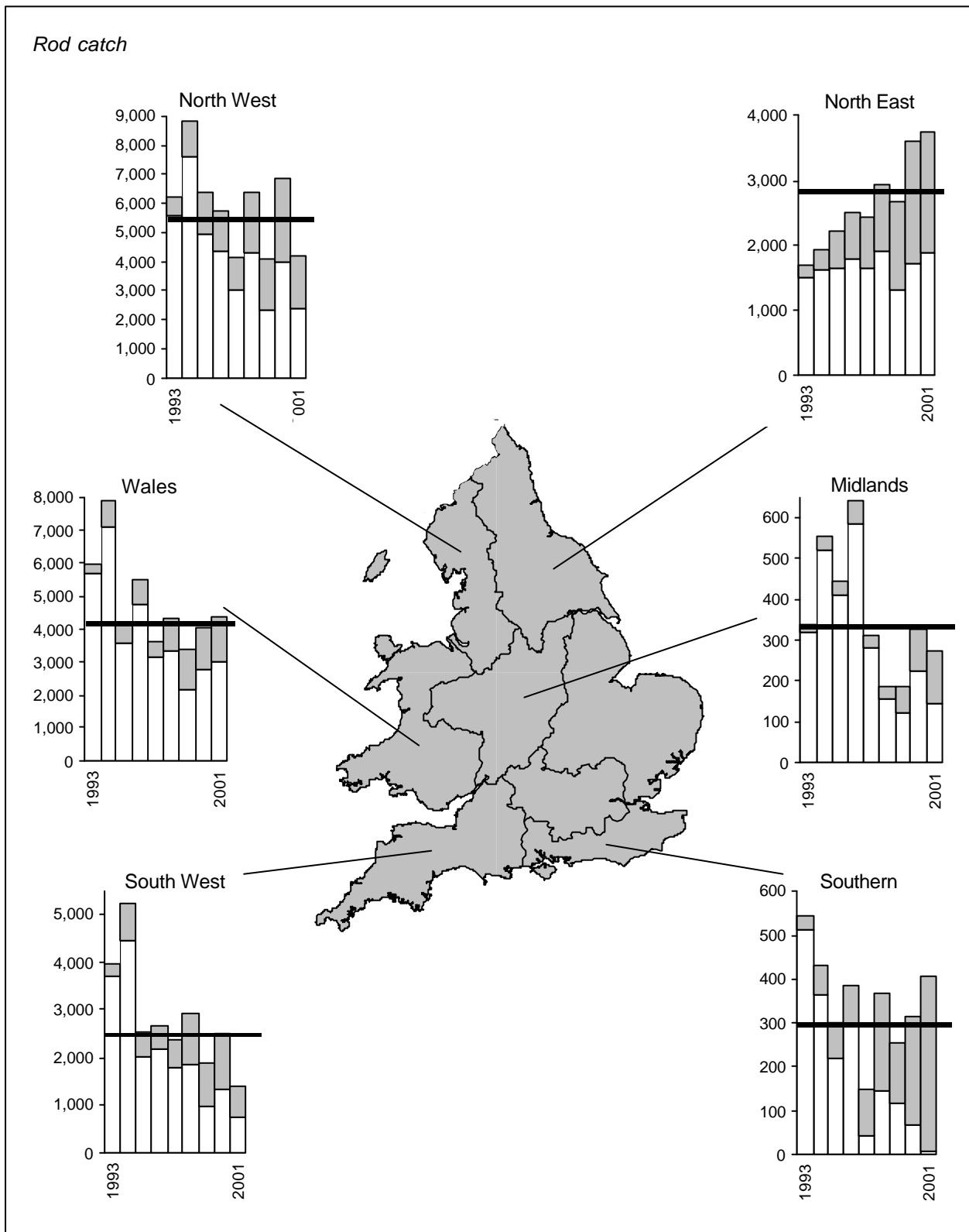


Figure 5. Regional declared rod catch. The histograms display total declared catch, with the shaded area denoting fish caught and released, for the nine years 1993-2001. The horizontal line provides the five-year mean total catch for the period 1996-2000. Data for 2001 are provisional.

Table 8. Summary of declared regional salmon and grilse rod catches, 1996-2001 - 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)								
1996	1,782	9	296	2,171	586	4,784	4,388	14,016
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 (provisional)	1,878	0	8	761	145	3,004	2,430	8,240
Declared catch (fish released)								
1996	732	25	88	510	57	684	1,332	3,428
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 (provisional)	1,855	0	397	635	128	1,347	1,779	6,143
% of fish released								
1996	29	74	23	19	9	13	23	20
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 (provisional)	50		98	45	47	31	42	43
Declared catch (including fish caught and released)								
1996	2,514	34	384	2,681	643	5,468	5,720	17,444
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 (provisional)	3,733	0	405	1,396	273	4,351	4,209	14,383
Mean - including fish caught & released (1996-2000)	2,834	7	294	2,468	331	4,167	5,434	15,538
% change:								
2001 on 2000	+4		+28	-44	-17	+7	-38	-18
2001 on 5-yr mean	+32		+38	-43	-17	+4	-23	-7

* Totals include some fish of unknown Region of capture.

Most 2001 figures are angler's catch returns received up to 20 March 2001 (including data from second reminders); data for the Rivers Wye, Test and Itchen are based upon owners returns.

The rod catches (both retained and released fish) for recent years are shown in Table 8 and Figure 5. Following an improvement in the rod catches in 2000, which were better than those in 1999 in all regions (up 39% overall), rod catches of salmon in 2001 fell by some 18% compared to 2000. This was especially noticeable in the South West (44% fall), North West (38% fall) and Midland (17% fall) Regions. Catches in these regions were also substantially down on the previous five-year average. In the North East Region and Wales, catches in 2001 were above the five-year average (up 32% and 4% respectively) and catches in the Southern Region in 2001, although few in number, were the highest since 1994. Almost all the fish caught in the Southern Region were released alive. These reductions are likely to have been largely the result of reduced access to fisheries caused by FMD restrictions and do not necessarily indicate reduced in-river abundance.

Table 9. Declared catch of salmon (fish caught and retained only) in coastal, estuarine and riverine fisheries, 1996-2001

Year	Coastal		Estuarine		Riverine		Total Wt (t)
	Wt (t)	%	Wt (t)	%	Wt (t)	%	
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	23.8	13	30.2	17	182.6
Mean (1996-00)	97.3	60	27.4	17	38.6	24	163.3

* 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.

2.1.2 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 1996 to 2001 are presented in Table 9. 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 coast and in the Bristol Channel. A full list of the fisheries included in the coastal category appears in the footnote to Table 9. In 2001, only three coastal fisheries remained in operation, and one of these, Anglian, had no salmon catch. 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 1996-2001, coastal catches have comprised 60% of the total (fish caught and retained), estuarine catches 17% and riverine catches 24%. In 2000 and again in 2001, the coastal catch comprised 72% of the total, the highest proportion in the six-year time series.

2.1.3 Effects of significant management measures (and other events) 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 8 and 10 and in Figure 5. In 2001, this amounted to 5,494 fish (22 tonnes). The proportion of rod-caught salmon released by anglers has increased steadily from 10% in 1993 to 44% in 1999, and appears to have remained at about this level subsequently; 42% in 2000 and 43%, provisionally, in 2001.

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 2001, a total of 176 salmon, weighing 0.4 t, were reported to

Table 10. Number, weight and proportion of declared salmon rod catch released by anglers, and number and weight of net catch released, 1993-2001

Year	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	0.40
2000	7,470	30.70	42.5	171	0.65
2001*	6,143	26.05	42.7	176	0.40

* Provisional

Note: 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).

have been caught and released by netmen. The majority of these fish (129) were actually released as a result of a compensation scheme on the River Avon (see Section 1.2.1), thus only 47 salmon, originating from a number of sea trout fisheries in the Welsh Region, arose from the derogation to the national measures. Summary data are included in Table 10.

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 2001, is shown at Table 11. 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 58% in 2001 (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).

Table 11. Number and proportion (%) of salmon released, by weight category (lbs) and season, 1998-2001.

Season	April to June			July to August			September to October			April to October		
	<8	8 - 14	> 14	<8	8 - 14	> 14	<8	8 - 14	> 14	<8	8 - 14	> 14
Wt. Category (lbs)												
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*	157	558	100	430	270	45	1,825	1,084	349	2,412	1,912	494
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

* Provisional, excludes data from second reminders.

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.

Table 12. Number and proportion of declared salmon net and rod catch taken before (<) and from (³) 1 June, 1989-2001

Year	Net catch				Rod catch (including released fish)			
	Numbers			%	Numbers			%
	< 1 June	≥ 1 June	Total	< 1 June	< 1 June	≥ 1 June	Total	< 1 June
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	43,204	43,251	0.11	650	12,066	12,716	5.1
Mean (1994-98)	2,997	41,687	44,684	6.71	1,898	15,491	17,388	10.9

* Provisional, excludes rod catch data derived from second reminder.

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).

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 to 116 in 1999, 19 in 2000 and 47 in 2001 (Table 12). For rods, the number of fish caught before June fell from 1,898 prior to the introduction of the national measures (1994-97) to 920 in 1999, 760 in 2000 and 650 in 2001. 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.

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, 7 of which are no longer operating, while the remaining two are in the process of been phased out. 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. Negotiations have continued in 2001, but to date no agreement has been reached regarding a possible accelerated phase out of the north east coast fishery. Although there have been large annual fluctuations in the declared catches, the overall effect has been to reduce the catches in these coastal fisheries from an average of about 41,000 fish for the period 1988-92 to just over 30,000 for the period 1997-2001.

Foot and mouth disease (FMD): While clearly not a management measure, there is little doubt that the outbreak of FMD, and the resulting restrictions on access to the countryside (including rivers) and tourism in general, had a large impact on salmon catches in 2001 in England and Wales. The FMD outbreak started in February and lasted until late in the year, thus affecting access to fisheries throughout most, if not all, of the salmon fishing season in many areas. It is difficult to gauge the overall impact that FMD had, not least since the extent of the restrictions varied in their

severity and duration from region to region. However, there is no doubt that FMD significantly reduced licence uptake and fishing effort, but the magnitude of its impact on catches is uncertain.

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 (84% in 2001). 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 3), 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. 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 2001, compared with previous years, are shown in Table 13. 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 13 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 1993-2001; the CPUE in 2001 was 10.1 salmon per day, the third highest value over the period.

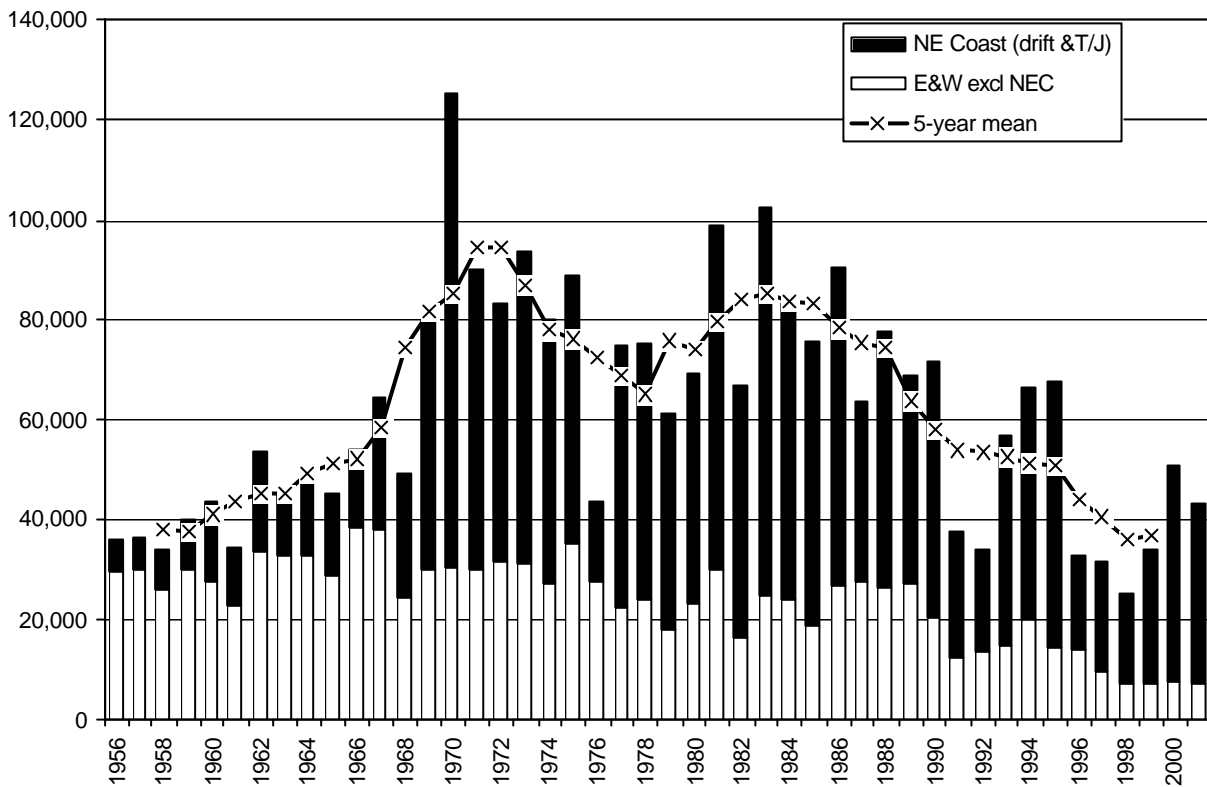


Figure 6. Total declared salmon net and fixed engine catch for England and Wales 1956-2001, with a five-year running mean; shaded area indicates the catch in the north east coast fishery

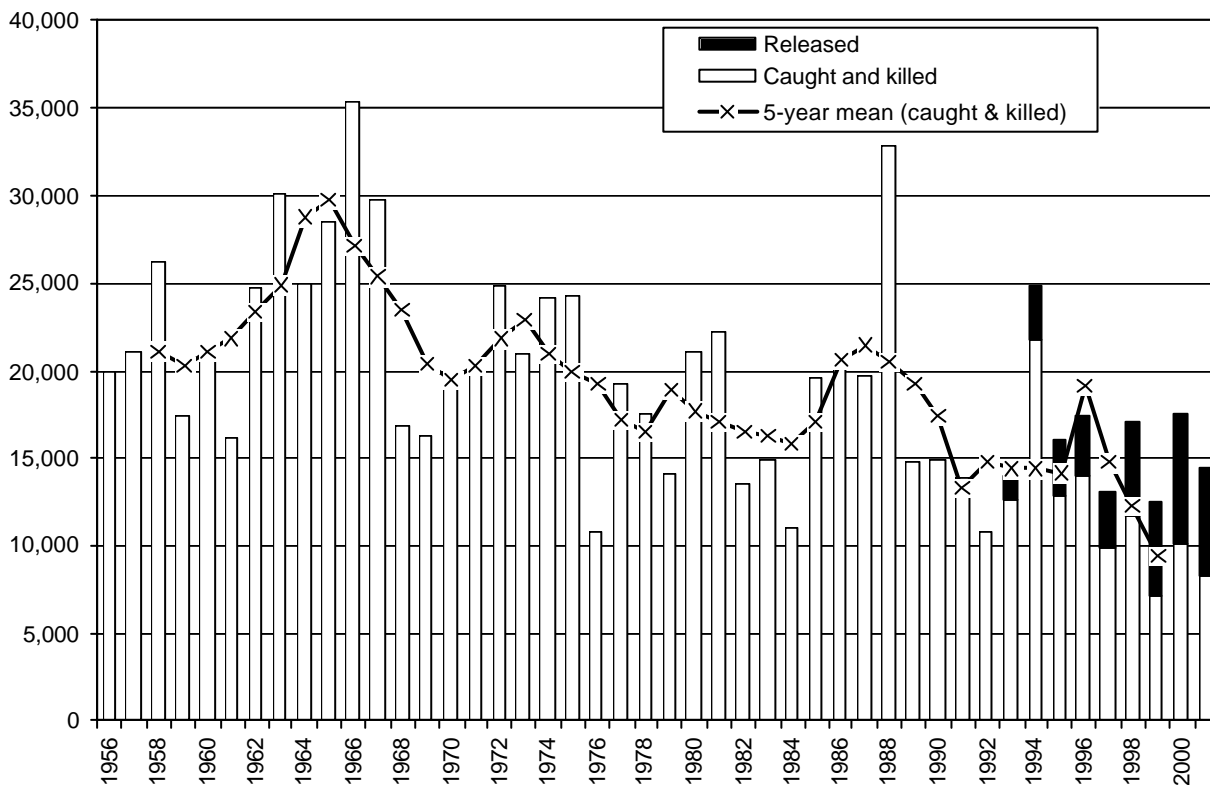


Figure 7. Total declared salmon rod catch for England and Wales 1956-2001, with a five-year running mean of fish caught and killed; shaded area indicates fish caught and released. (N.B. Data for 2001 are provisional and include catch derived from second reminder).

Table 13. Regional CPUE data for net and fixed engine salmon fisheries, 1988-2000

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 Drift nets (June-August)	Region (aggregated data, various methods)					
		NE	Southern	SW (a)	Midlands	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	“	0.69	0.43	0.40	0.64
2001 (Provisional)	10.06	8.70	“	0.62	0.42	0.47	0.56
Mean (1996 - 2000)	7.85	6.39		0.54	0.35	0.68	0.45

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

Data for the SW Region thus differ from that recorded in previous reports.

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

In 2001, the CPUE value for nets and fixed engines in Wales was below the mean of the previous five years, reflecting the buy-out of the Severn Estuary (Usk) drift nets and putcher fisheries from 2000. However, the CPUE for all the other regions was above the recent average, notably for the North East Region, where CPUE was the second highest recorded value in the series (since 1988). Although the latter may reflect increased abundance of salmon, it has also been suggested that the declared catch might have been influenced by the prospect of an accelerated phase out as recommended by the recent Review of Salmon and Freshwater Fisheries. Generally, CPUE levels were highest in the period 1993-95 and then lower from 1996 onwards, with an increase again in 1999 - 2001. In addition to other factors mentioned above, the recent increase 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.

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 14 for the period 1996 to 2001. 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) 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. The rod CPUE in 2001 was the highest recorded in the period in all regions except the South West (which was close to the five-year average), showing a further improvement on 2000, the previous highest in most regions. This suggests relatively high in-season availability of fish and

Table 14. Rod CPUE - number of salmon (including fish released) caught per 100 days fished for regional rod fisheries, 1996-2001. (Catches shown in Table 8)

Year	Region							England & Wales Total
	NE	Thames	Southern	SW	Mids	Welsh	NW	
1996	6.0	3.2	9.2	6.9	3.9	4.7	7.8	6.0
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*	11.4	0.0	9.7	6.4	5.5	5.7	15.4	8.7
Mean (1996 - 2000)	6.8	0.8	5.3	6.9	2.8	3.8	8.2	5.9
% change:								
2001 on 2000	+24		+87	-27	+12	+30	+32	+10
2001 on 5-yr mean	+67		+83	-8	+98	+49	+89	+48

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

* Provisional, excludes data derived from second reminder.

an overall improvement in angling success, possibly due to increased abundance of fish in more recent years or reduced fishing effort by less efficient anglers. Restrictions on river access due to FMD are also likely to have led to an increase in CPUE in 2001 because rod effort was focussed at times when salmon were most available to anglers. Thus, as with nets, the inter-relationship between CPUE and salmon abundance is 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 that 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 2000 and 2001.

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 since 1994 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), but since the trials of the second reminder in January 2002, this process will be reviewed. 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.

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.

2.3.3 *Under-reporting and illegal catch estimate for 2001*

On the basis of the above estimates, the non-reported and illegal catch for England and Wales in 2001 is estimated at about 33 tonnes, which represents approximately 15% of the total weight 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 grilse or MSW salmon based upon weight splits, which result in some grilse being classed as MSW salmon and some MSW fish as grilse. Such data are available for 2001 for a number of regions as shown in the text table below:

	Grilse		MSW Salmon		Total
	(<8 lbs)	%	(>8 lbs)	%	
NE	23,699	66	12,416	34	36,115
NW	1,976	60	1,334	40	3,310
Mid	390	38	637	62	1,027
Wales	597	60	398	40	995
SW	1,028	62	633	38	1,661
Total	27,690	64	15,418	36	43,108

Where the reporting systems have been consistent, these data provide an indication of changes in the age-composition of the catches. In the North East Region, MSW salmon are estimated to have made up 33-35 % of the catch in each of the years 1997 to 2001, which is below the long-term average of 42% (1965-2001). The proportion of MSW salmon 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, whilst in the North West and Midlands Regions the proportion of MSW salmon in 2001 was higher than in 2000.

The proportions of MSW salmon recorded in 2000 and 2001 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.

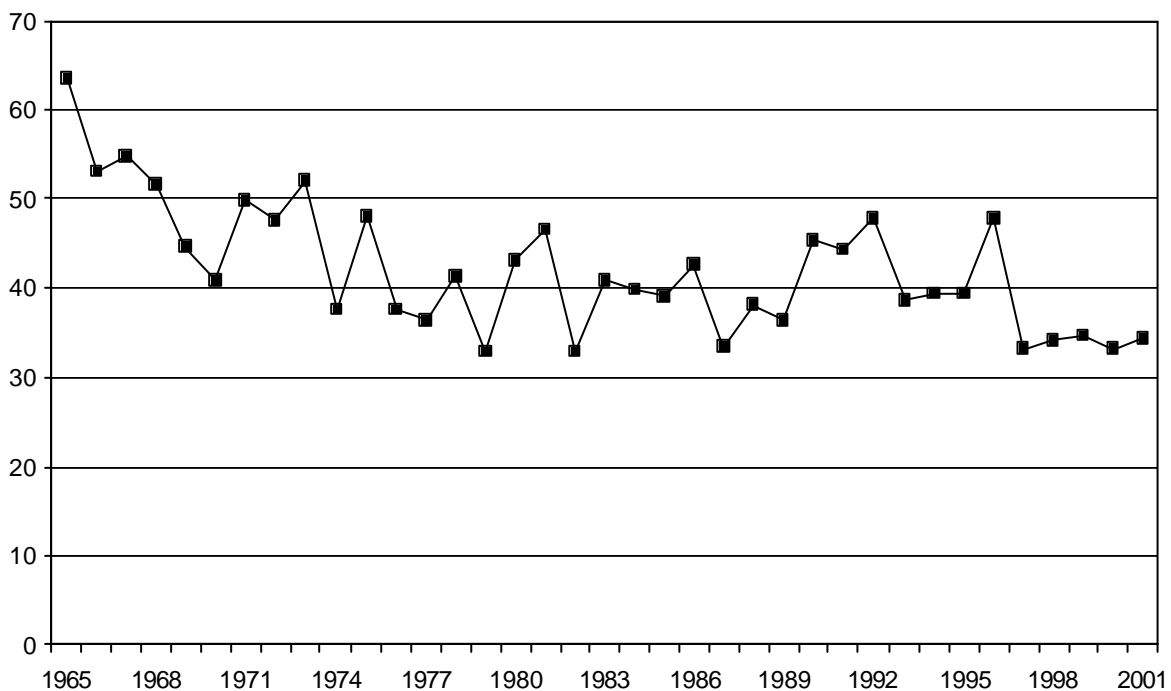


Figure 8. Estimated proportion of MSW salmon (salmon >8lb, as declared by netsmen) in the north east coast fishery, 1965-2001.

Table 15. Proportions of grilse and MSW salmon in provisional declared 2001 rod catches, including fish released.

Region	River	No. grilse	%	No. MSW	%
NE	Coquet	354	67	175	33
	Tyne	1,287	58	941	42
	Wear	317	83	67	17
Southern	Itchen	116	91	11	9
	Test	50	81	12	19
SW	Hants Avon	8	31	18	69
	Frome	40	51	38	49
	Exe	149	85	26	15
	Teign	37	88	5	12
	Dart	30	83	6	17
	Tavy	45	92	4	8
	Tamar	76	81	18	19
	Lynher	35	100	0	0
	Fowey	77	92	7	8
	Camel	151	88	20	12
	Taw	84	68	40	32
	Torrige	2	22	7	78
	Lyn	210	95	12	5
Midlands	Severn	67	27	180	73
Wales	Wye	171	37	293	63
	Usk	559	73	204	27
	Ogmore	43	93	3	7
	Tywi	162	81	39	19
	Tawe	93	88	13	12
	Taf	59	63	34	37
	E & W Cleddau	37	88	5	12
	Teifi	440	87	65	13
	Dyfi	108	87	16	13
	Mawddach	101	91	10	9
	Ogwen	96	97	3	3
	Conwy	186	93	15	7
	Dee	433	77	127	23
	NW	Ribble	266	83	56
Lune		392	82	86	18
Kent		216	94	14	6
Leven		3	100	0	0
Irt		26	93	2	7
Ehen		117	100	0	0
Derwent		802	89	100	11
Eden		826	81	189	19
Border Esk		391	84	74	16
Total		8,662	75	2,935	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. Excludes data derived from second reminder.

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 1992-2001, and these have been used to estimate the age composition of catches for the principal salmon rivers (Table 15). These estimates were derived from the declared catches where a weight and date of capture have been provided.

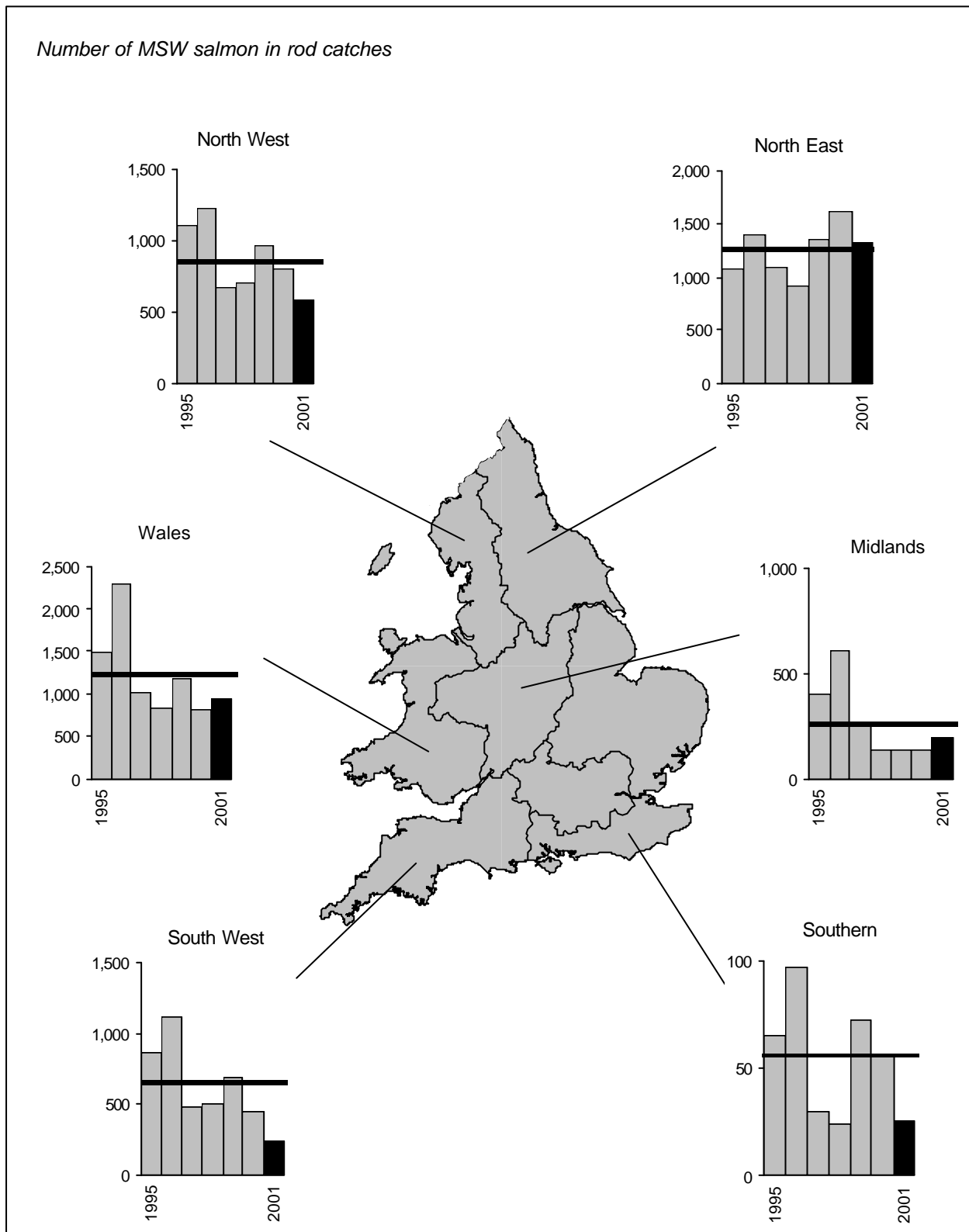


Figure 9. Estimated number of MSW salmon in regional rod catches. The histograms display data for the seven years 1995 to 2001, together with the five-year mean for the period 1996-2000 (displayed as a horizontal line). Note that the histograms are not drawn to the same scale. Data for 2001 are provisional.

Table 16. 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, 1996-2001 (including fish caught and released)

Numbers																
Year	Region														All Regions	
	NE		Southern		SW		Midlands		Wales		NW					
	Grilse	MSW	Grilse	MSW	Grilse	MSW	Grilse	MSW	Grilse	MSW	Grilse	MSW	Grilse	MSW		
1996	1,360	1,405	287	97	1,833	1,116	104	603	3,728	2,287	5,064	1,228	12,376	6,736		
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*	2,263	1,331	182	26	1,085	239	74	198	3,018	941	3,446	584	10,068	3,319		
Mean (1996-00)	1,733	1,273	256	56	1,985	645	99	254	3,027	1,228	4,968	871	11,614	4,317		
% change:																
2001 on 2000	+3	-18	-38	-54	-52	-46	-63	+42	-6	+15	-47	-28	-19	-13		
2001 on 5-year mean	+31	+5	-29	-53	-45	-63	-25	-22	-0.3	-23	-31	-33	-13	-23		

Percentage MSW

Year	Region							All Regions
	NE	Southern	SW	Midlands	Wales	NW		
1996	51	25	38	85	38	20	35	
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*	37	13	18	73	24	14	25	
Mean (1996-00)	42	18	25	72	29	15	27	

* Provisional, excludes data from second reminder.

In 2001, four of the principal salmon rivers listed in Table 15 (Hants Avon, Torridge, Severn and Wye) had over 50% MSW salmon in the rod catch (including fish subsequently released). As in 1999 and 2000, ten rivers had at least 25% MSW salmon in the rod catch. 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 1996 to 2001 are shown in Table 16 and Figure 9.

Whilst there were more MSW salmon taken by rods in 2001 than in 2000 in the Midlands Region and Wales, numbers fell elsewhere. The proportion of MSW salmon in the 2001 catch was higher than that in 2000 in most regions, but lower in the North East and Southern Regions. Overall, the MSW catch in 2001 was 13% below the figure in 2000 and 23% below the recent five-year mean. In 2001, MSW salmon comprised 25% of the catch nationally, compared with 24% in 2000 and 32% in 1999. There has been an overall downward trend in the MSW catches over the past 6 years in most regions, although no such trend is evident for the North East Region.

Overall rod catches of grilse in 2001 were below those in 2000 (down 19%) and below the mean of the previous five years in most regions except the North East. Grilse catches in 2001 were at their lowest levels in the past six years in the North West and South West Regions. The decrease in the numbers of grilse taken by rods relative to the five-year mean ranged from <1% in Wales to 45% in the South West Region, but there was a 31% increase in the North East. 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. It is likely that catches of grilse in 2001 were less affected by FMD restrictions than those of MSW fish, which tend to run earlier.

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 have not been recorded in catches in England and Wales in previous years. However, an estimated 180 farmed-origin fish were recorded in fisheries in North West England and North Wales in autumn 2001 (Table 17). The majority were caught in October and weighed between 1.5 and 3 kg (average 2 kg), and those examined internally appeared to have relatively under-developed gonads for the time of year. Anglers were readily able to distinguish these fish from wild salmon on the basis of their appearance (e.g. small size, reduced gill covers and eroded fins), and were encouraged to kill these fish. The source of these fish was believed to have been a salmon cage-rearing facility in Glenarm Bay, County Armagh, Northern Ireland. There were press reports of a substantial escape of fish from this facility on 21 August as a result of structural damage to the fish cages following heavy storms. Whilst some of these fish were recorded on anglers' catch returns, they were excluded from the catch data compiled for this report.

Table 17. Reported captures of farmed origin salmon in England and Wales in 2001 (approximate figures)

Region	River/Fishery	No. reported
Wales	River Dee trap	6
	Conwy rods	7
	Sub-total	13
North West	Border Esk	30
	Solway haaf nets	30
	Eden rods	25
	Ellen	3
	Derwent rods	60
	Duddon	1
	Kent	2
	Cumbrian Esk	2
	Lune trap	2
	Lune rods	12
	Sub-total	167
England & Wales	Total	180

Notes: Weight range of fish reported at 1.4 to 3.2 kg (average 2.0 kg).

Majority of fish caught in October (small numbers also in September and November).

Anglers were encouraged to kill these fish.

Farmed fish noted on catch returns not included in declared catch data.

The capture of a mature female pink salmon (*Oncorhynchus gorbuscha*) was recorded in the English north east coast fishery in June 2001; identification was confirmed on the basis of morphometric characteristics. There were two other unconfirmed reports of pink salmon captures in the same fishery during the year. It appears likely these fish originate from North West Russia. The Russian Delegation to NASCO are understood to have reported ongoing releases of pink salmon in this region. It was suggested that they anticipate returns of 30-40,000 pink salmon adults 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 suggest that these initiatives have only 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 1980s, approximately 80% of the salmon caught in the English north east coast fishery were estimated to be returning to rivers in Scotland. On this basis, this would represent ~ 29,000 fish in 2001, although given the continued improvement in the status of the stocks in the North East Region, and the River Tyne in particular, this is likely to be an over-estimate. 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 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 flow, which probably acts by influencing the behaviour and availability of the fish, and angler behaviour.

Very few rivers have independent measures of run size to compare against catch. However, such data, obtained from counters and a trap (Dee) are available for nine rivers in England and Wales (Table 21 and Figure 10). The total catch (retained and released combined) has been used in Table 18 to estimate exploitation rates and these show varying trends. However, 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 43% between 1993 and 2001.

Catches were generally lower in 2001 than in 2000, and levels of exploitation in 2001 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 grilse component on the Dee and for 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. The lower levels of exploitation are associated with a substantial reduction in rod fishing activity in 2001 due to FMD restrictions. Exploitation rates are also available for three net fisheries, the Dee, Kent and the Lune, and these were also below the average of the previous five years.

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 exploitation rates vary significantly between rivers. While exploitation rates are comparatively stable within rivers, there is nevertheless some

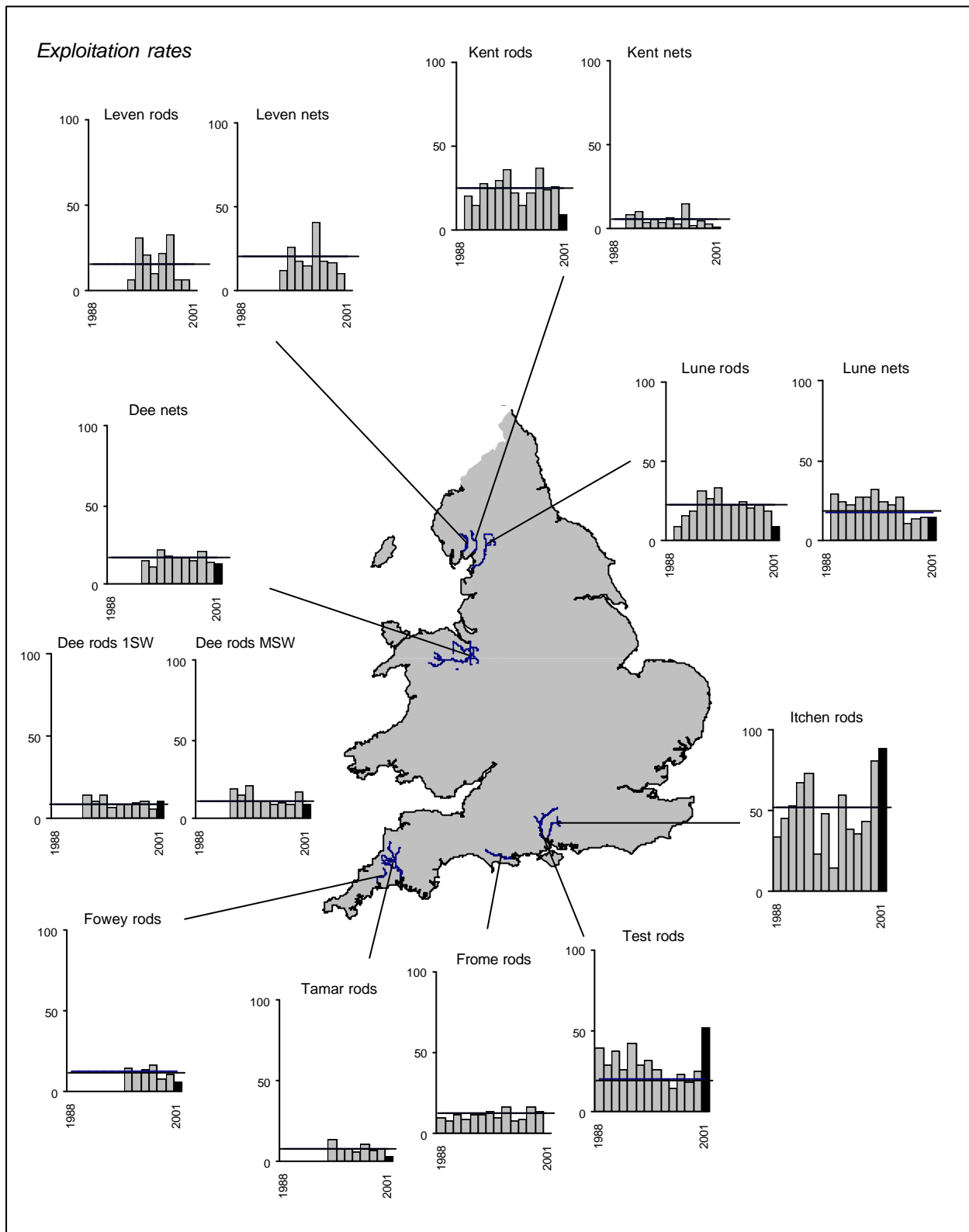


Figure 10. Exploitation rates (%), including fish released, for selected rod and net salmon fisheries in England and Wales. The histograms display all available data for the years 1988 to 2001, together with the five-year mean for the period 1996-2000 (displayed as a horizontal line). Data for 2001 are provisional. Note also that estimates for the Dee have been split by age class (1SW and MSW), all other estimates are combined for all ages.

Table 18. Estimated exploitation rates (%) for selected fisheries in England and Wales, 1988-2001 (rates include released fish and corrected for under-reporting).

River Fishery Hatchery/Wild	Region													
	Southern			SW		Welsh			NW					
	Test rods	Itchen rods	Frome rods	Tamar rods	Fowey rods	Dee rods	Dee rods	Dee nets	Leven rods	Leven nets	Kent rods	Kent nets	Lune rods	Lune nets
	W/H	W	W	W	W	W	W	W	W	W	W	W	W	W
Year	(c)	(c)	(a)			1SW (b)	MSW (b)		(d)					
1988	40	34	10											
1989	29	45	8							20	24	9	29	
1990	37	53	11							15	8	16	25	
1991	26	68	9							28	10	19	22	
1992	42	73	11			14	18	15		25	4	31	27	
1993	29	23	12			11	15	11	7	3	30	6	27	
1994	32	48	14	14		15	21	22	31	6	36	4	34	
1995	26	15	10	8	15	7	11	18	21	8	22	4	23	
1996	20	60	16	8	13	9	11	17	10	6	15	1	22	
1997	14	39	8	6	14	8	9	17	22	14	22	6	25	
1998	23	36	9	11	16	10	10	15	33	12	37	1	21	
1999	18	43	16	7	8	11	9	21	7	17	24	5	23	
2000	25	81	14	8	11	6	17	14	6	10	26	3	19	
2001*	52	88	n/a	3	6	11	9	13	n/a	n/a	9	1	9	
Mean (1996 - 2000)	20	52	13	8	12	9	11	17	16	12	25	3	22	
% change														
2001 on 2000	+108	+8		-57	-48	+83	-47	-7			-67	-74	-50	
2001 on 5-yr mean	+164	+69		-58	-54	+27	-18	-23			-65	-75	-58	

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, excludes rod catch data derived from second reminder.

Note: Estimates for Dee, Kent, Leven and Lune net fisheries are based on declared catches and are minimum estimates.

variation between years and more substantial variation within season. From a tagging and recapture programme on the River Dee, North Wales, it has been shown that early season entrants to the river were subject to much higher exploitation than those entering later, though exploitation rates of Dee spring salmon have 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 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 estimated 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 an increased quota was 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.

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 the spring of 2001.

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

Ireland

Provisional estimates of the levels of exploitation, prior to the introduction of new fisheries regulations in 1997, vary substantially between stocks in different English and Welsh regions and from year to year. Exploitation rates were low (~1%) for stocks in 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 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 in 1999, 2000 and 2001 (232 fish of 272 recaptured over three years). These fish were derived from imported River Shannon origin eggs.

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 efforts are being made through ICES to investigate this issue. No new data are available on the possible effects of these fisheries on salmon post-smolts. 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 2001

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.

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.

CLs 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 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, work which was severely curtailed in 2001 because of FMD.

Table 19. Conservation Limits (CL) and the proportion of CL attained for the period 1994-2001 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/100m ²	Conservation Limit eggs (millions)	2001 egg deposition (millions) ***			Proportion of Conservation Limit attained (%)							Current compliance #				
					1SW	MSW	All	1994	1995	1996	***1997	***1998	***1999	***2000		***2001			
								All	All	All	All	All	All	All		All			
NE	** Coquet	144	316	4.54	-	-	8.93	107	93	109	159	131	117	181	197	Pass			
	** Tyne	542	289	15.65	-	-	47.31	115	129	177	157	173	221	255	302	Pass			
	** Wear	232	336	7.81	-	-	6.24	41	52	60	38	62	52	90	80	Fail			
	** Tees	620	330	20.46	0.54	1.86	2.39	8	15	5	4	20	18	17	12	Fail			
	* Esk-Yorks	86	322	2.76	0.62	0.12	0.74	77	21	9	31	17	9	21	27	Fail			
	Total			51.22	1.16	1.97	65.61												
Southern	** Test	138	246	3.40	-	-	0.97	40	32	35	23	57	65	39	29	Fail			
	** Itchen	69	234	1.63	-	-	0.53	34	101	42	31	63	27	29	32	Fail			
	Total			5.03	-	-	1.50												
SW	** Avon-Hants	360	237	8.53	-	-	3.77	25	32	61	13	22	30	48	44	Fail			
	* Stour	199	142	2.82	-	-	0.26	9	6	5	8	5	6	11	9	Fail			
	Piddle	25	194	0.49	0.00	0.03	0.03				22	12	36	3	6	n/a			
	** Frome	90	223	2.00	-	-	1.58	127	128	154	147	150	98	73	79	Fail			
	Axe	57	247	1.40	0.47	0.19	0.67				6	9	11	9	48	n/a			
	Exe	210	343	7.20			Data unavailable				129	137	85	118	-	n/a			
	* Teign	98	352	3.47			Data unavailable	121	55	62	53	54	24	54	-	n/a			
	* Dart	132	294	3.87			Data unavailable	88	40	39	46	42	18	46	-	n/a			
	Avon-Devon	18	294	0.52	0.51	0.25	0.76				44	50	31	67	145	n/a			
	Erme	10	300	0.31	0.09	0.00	0.09				32	19	43	22	30	n/a			
	Yealm	8	297	0.25			Data unavailable				57	144	13	89	-	n/a			
	Plym	17	436	0.75	0.28	0.10	0.38				52	43	19	33	51	n/a			
	** Tavy	79	257	2.02	-	-	0.56	139	48	39	64	124	44	37	28	Fail			
	** Tamar	197	293	5.77	-	-	9.88	218	224	172	119	164	145	141	171	Pass			
	** Lynher	29	294	0.86	-	-	0.41	152	27	31	60	124	50	103	48	Fail			
	Fowey	34	430	1.47	2.08	0.23	2.31				83	78	49	98	157	n/a			
	* Camel	56	243	1.35	-	-	1.35				216	208	192	131	138	94	139	100	Pass
	* Taw	273	299	8.16	-	-	2.79	65	40	71	45	77	71	93	34	Fail			
	* Torridge	200	284	5.69	-	-	0.21	79	36	29	15	25	16	28	4	Fail			
	Lyn	27	556	1.50	5.42	0.34	5.76				114	103	69	136	384	n/a			
Total			43.66	-	-	30.80													
Midlands	* Severn	898	190	17.06	1.10	13.64	14.74	184	194	257	104	55	54	70	86	Fail			
Total			17.06	1.10	13.64	14.74													

Wales	** Wye	1402	245	34.50	3.53	10.86	14.39	44	46	92	40	34	38	28	42	Fail
	* Usk	407	350	14.25	-	-	21.22	129	92	110	87	105	110	128	149	Pass
	* Taff & Ely	146	314	4.58	-	-	0.23	17	35	17	12	12	24	12	5	n/a
	* Ogmore	61	231	1.41	0.51	0.18	0.69	61	36	56	73	69	55	69	49	Fail
	Afan	17	450	0.76	0.08	0.00	0.08				16	25	8	6	10	n/a
	Neath	37	419	1.55	0.66	0.13	0.79				15	35	45	47	51	n/a
	* Tawe	76	312	2.36	1.05	0.31	1.36	81	68	34	35	38	32	19	58	Fail
	Loughor	35	289	1.02	0.11	0.03	0.13				7	7	9	16	13	n/a
	* Tywi	500	314	15.70	4.05	0.95	4.99	126	71	73	43	65	103	128	32	Pass
	** Taf	90	256	2.31	1.56	0.71	2.27	127	23	39	61	40	63	79	98	Fail
	* E&W Cleddau	87	236	2.04	0.51	0.16	0.67	62	27	22	35	38	26	40	33	Fail
	* Teifi	296	401	11.89	11.82	2.40	14.21	135	56	160	101	96	105	104	120	Pass
	Aeron	35	417	1.44	0.07	0.00	0.08				2	1	4	4	5	n/a
	Ystwyth	46	397	1.83	0.19	0.00	0.19				24	29	10	18	10	n/a
	* Rheidol	31	276	0.85	0.31	0.12	0.43	80	73	133	72	55	57	47	51	Fail
	* Dyfi	179	311	5.57	2.93	0.66	3.59	115	66	100	45	62	44	55	64	Fail
	* Dysinni	-	-	0.88	0.04	0.00	0.04	43	6	19	22	31	6	18	5	Fail
	** Mawddach	57	312	1.77	0.87	0.17	1.05	170	73	81	76	83	91	52	59	Fail
	Artro	9	423	0.37	0.06	0.00	0.06				9	18	8	5	16	n/a
	* Dwyryd	9	246	0.23	0.27	0.11	0.38	334	242	229	229	230	114	65	167	Pass
* Glaslyn	25	242	0.61	0.16	0.04	0.20	126	137	86	107	57	31	19	33	Fail	
** Dwyfawr	33	322	1.07	0.27	0.04	0.31	105	42	47	48	28	28	41	29	Fail	
** Seiont	21	288	0.61	1.00	0.10	1.09	148	115	115	124	155	87	168	181	Pass	
** Ogwen	24	449	1.07	3.16	0.15	3.31	273	187	145	209	271	133	225	308	Pass	
** Conwy	50	171	0.85	2.32	0.26	2.58	316	288	298	168	198	128	256	303	Pass	
** Clwyd	84	312	2.62	1.45	0.17	1.62	127	51	36	21	97	58	47	62	Fail	
** Dee	617	248	15.30	6.13	7.46	13.60	79	97	86	91	107	83	63	89	Fail	
	Total			127.44	43.11	24.99	89.55									
NW	** Ribble	351	242	8.49			Data unavailable	81	29	52	26	63	63	81	-	Fail
	Wyre	46	264	1.22	0.43	0.01	0.43				5	34	5	5	35	n/a
	** Lune	423	280	11.84			Data unavailable	85	74	78	51	105	86	135	-	Pass
	* Kent	68	223	1.52	-	-	6.30	308	250	218	140	367	117	271	415	Pass
	** Leven	46	249	1.14			Data unavailable	62	56	33	36	44	23	68	-	Fail
	** Crake	16	243	0.40			Data unavailable	64	73	40	12	64	26	51	-	???
	Duddon	11	402	0.45	0.91	0.00	0.91				30	104	39	38	203	n/a
	Esk	14	401	0.55	1.78	0.25	2.04				50	154	181	266	368	n/a
	Irt	20	317	0.63	0.65	0.06	0.72				88	151	46	114	115	n/a
	* Ehen	41	283	1.16			Data unavailable	182	156	119	83	244	42	279	-	Fail
	* Calder	13	326	0.41			Data unavailable	72	86	90	123	99	21	141	-	???
	* Derwent	213	271	5.77			Data unavailable	154	119	92	95	100	98	205	-	???
	Ellen	17	322	0.54	0.29	0.01	0.29				6	61	16	44	54	n/a
	** Eden	688	300	20.63			Data unavailable	181	148	125	84	75	74	68	-	Fail
	Esk-Border	144	440	6.31	18.68	5.96	24.64				166	159	116	190	390	n/a
	Total			11.23	0.00	0.00	35.33									
Total	Total			255.64	-	-	237.54	-	-	-	67	77	71	86	93	

* Refined conservation limit identified in draft or published SAP Consultation Document or Local Environment Agency Plan (LEAP).

** Refined conservation limit identified in Final Salmon Action Plan (SAP).

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.

Basis for current compliance explained in Section 3.1.1

??? No compliance assessment possible due to missing data in 2001 (impact of FMD).

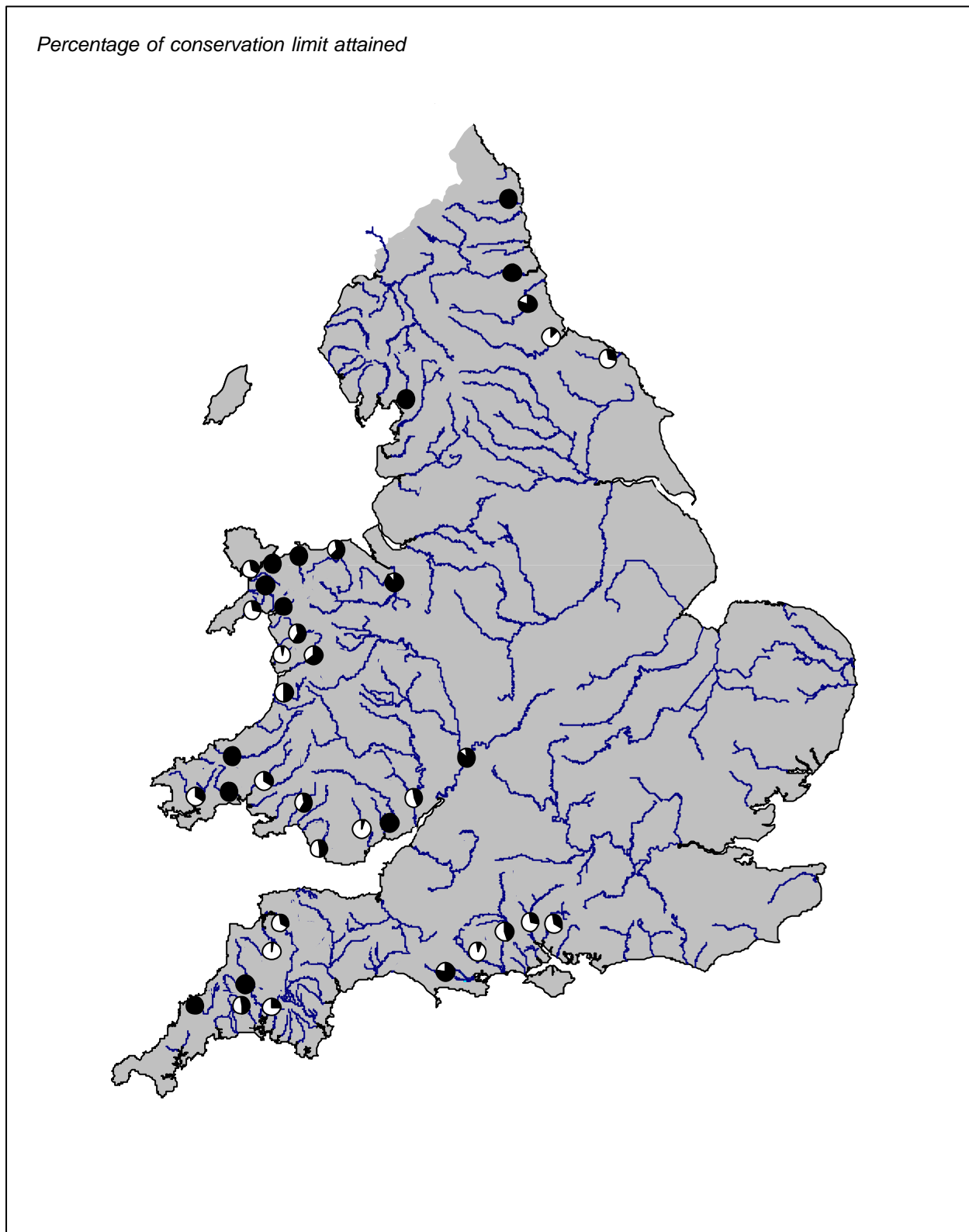


Figure 11. *Pie charts for individual rivers for which refined limits have been set (Table 19) showing the % of the conservation limit attained in 2001. A black circle indicates that the target was met or exceeded*

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 2001

Egg deposition estimates for 2001 are given for 70 rivers in England and Wales in Table 19.

In a number of areas, FMD will have significantly reduced angling effort below normal levels because of restricted bank access. However, on many rivers without traps or counters, the effect of this on egg deposition estimates is unlikely to have been adequately accounted for, as current procedures to derive run size from rod catch are based on estimates of exploitation, which ignore annual changes in fishing effort. On 12 rivers in the worst affected areas, no estimates of egg deposition were made because of uncertainty about the FMD effect.

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 will be available in 2002 and should be able to be applied retrospectively to the 2001 data set and earlier years.

For the egg deposition figures published in Table 19, some attempt was made to account for FMD effects on rivers with provisional CLs in the North West and South West Regions, both particularly badly affected by the disease. Here, angling exploitation rates were assumed to have fallen to 40% and 50% of the average, respectively, based on observed declines in effort in each region.

Across England and Wales, 29% of rivers exceeded their CL in 2001 - the third highest percentage since 1997 - with a similar overall performance to 2000 (Table 20). However, the percentage of rivers in the middle class (50-100% of the CL) was the lowest to date at 24%.

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, 1997-2001

Year	>CL		50-100% CL		<50% CL	
	No.	%	No.	%	No.	%
1997	17	24	18	26	35	50
1998	23	33	22	31	25	36
1999	12	17	20	29	38	54
2000	21	30	18	26	31	44
2001	17	29	14	24	27	47

River-to-river variation in the proportion of the CL attained is illustrated in Figure 11 for rivers with refined CL values. Again, there are few obvious regional trends. Spawning escapement remained well below the CL in the south coast chalkstream catchments, and 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.

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 49 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 43 of these rivers in 2001, of which 30 (70%) 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 2001 were mostly below the levels recorded in 2000, although the returning stock estimate for the River Dee (Wales) and the run count on the River Kent (North West) were markedly higher. In comparison with the averages for the previous five years (1996-2000), one third of the adult stock abundance values for 2001 were higher. The counts in Table 21 now show an overall downward trend on southern rivers (Tamar, Thames, Frome, Test and Itchen) over the past five years, whilst the counts on the rivers in the North West (Lune, Leven, Caldew and Kent) show an upward trend over the past 5 years. This conforms with the indications from the rod catch data and estimates of exploitation, which suggest that salmon stock abundance in England and Wales was relatively poor in 2001 in most areas except the North West and North East. However, there are no direct measures of adult stock abundance for rivers in the North East. 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 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 catches 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.

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

Stage: Region:	Smolts	Adults													
	S	NE	Thames	Southern		SW			Wales		NW				
River:	Test#	Coquet	Thames#	Test	Itchen	Frome	Tamar	Fowey	Dee	Wye	Lune	Kent	Leven	Calder	Caldew
Method:	Run estimate	RSE ¹	T	RSE ¹	RSE ¹	RSE ¹	RSE ¹	C	RSE ²	C*	RSE ¹	C(>4lb)	C(>4lb)	C(>4lb)	T
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					7,591	1,861			
1992	11,967		247	614	357	954			4,643		4,066	1,816			
1993	7,131		259	1,155	852	1,280			9,757		7,883	1,526	469		
1994	3,381	2,254	143	775	378	1,156	6,381		8,285		6,254	2,072	562		1,590
1995	6,853	2,508	162	647	880	1,074	5,656	890	5,703		4,589	2,762	370	379	1,417
1996	4,712	2,509	122	623	433	1,501	4,011	1,187	4,931		4,739	3,246	474	212	1,289
1997	7,229	n/a	25	361	246	1,207	2,989	1,075	5,495	4,451	3,121	1,473	233	224	889
1998	14,672	n/a	6	898	453	1,266	4,181	882	6,661	4,712	7,457	2,166	94	n/a	1,106
1999	4,138	n/a	36	867	213	815	3,590	1,262	3,664	2,686	4,936	1,022	99	n/a	1,022
2000	3,516	n/a	56	583	208	641	3,547	1,692	3,751	4,913	8,383	2,354	322	n/a	1,566
2001	2,625	n/a	11	410	217	n/a	3,139	1,611	4,914	1,834	6,385	2,882	n/a	n/a	n/a
Mean	6,853	2,509	49	666	311	1,086	3,664	1,220	4,900	4,191	5,727	2,052	244	218	1,174

Key to methods: *T* = adult trap

C = adult salmon count

C(>4lb) = Adult count (fish greater than 4 lb in weight)

RSE¹ = returning in-river stock estimate (validated count + catch below counter)

RSE² = returning in-river 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.

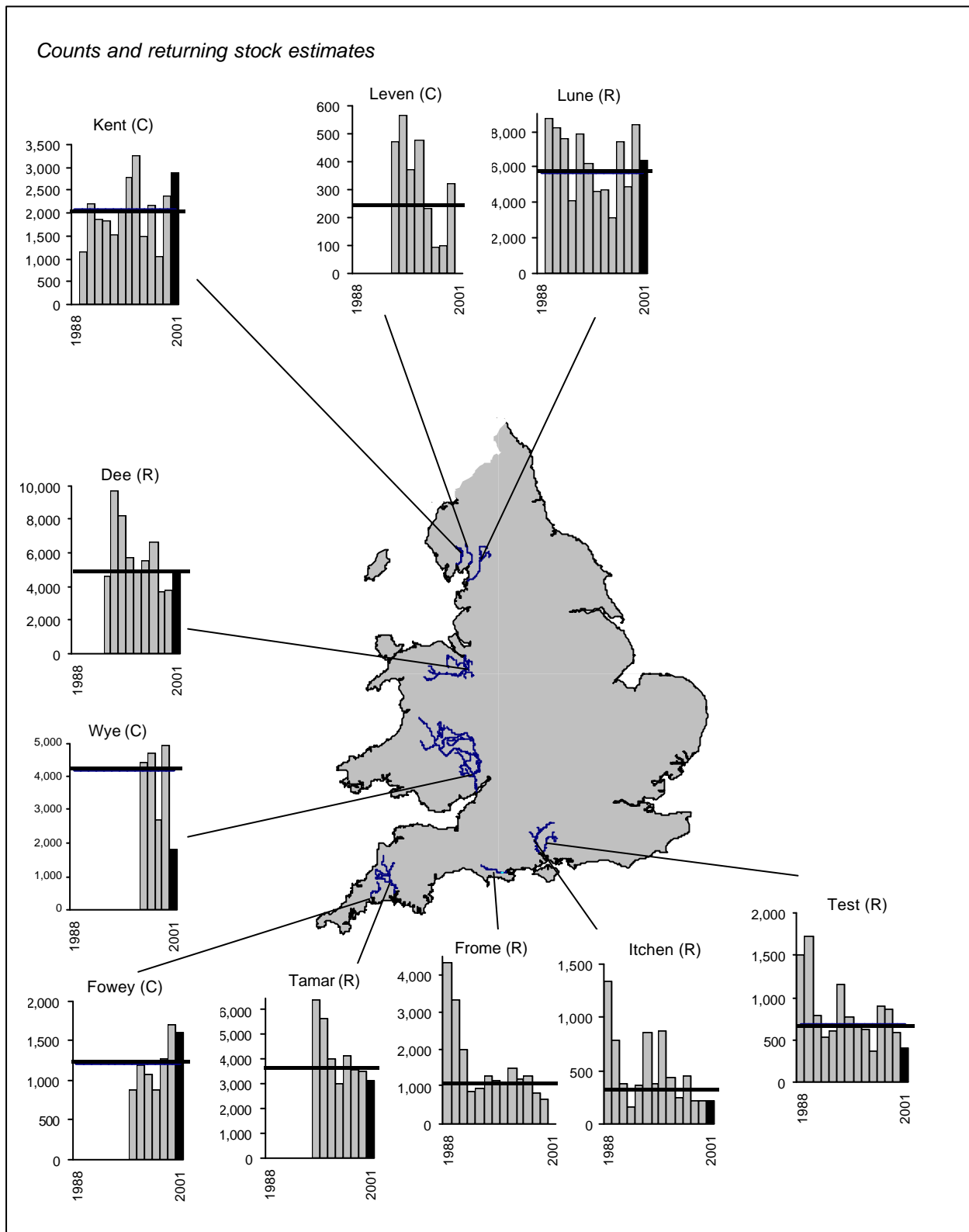


Figure 12. *Counts (C) and returning stock estimates (R) for selected salmon stocks in England and Wales. The histograms display all available data for the years 1988 to 2001, together with the five-year mean for the period 1996-2000 (displayed as a horizontal line). Note that the histograms are not drawn to the same scale. Data for 2001 are provisional. Data for River Wye are partial hydroacoustic counts.*

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., 2001)

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

4. Microtag, fin clip and external tag releases

Details of all marking and tagging of salmon undertaken in England and Wales in 2001 are included at Annex 5.

In 2001, 55,000 hatchery-reared salmon parr and smolts and 400 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. The planned wild smolt tagging programmes in 2001 were severely constrained by FMD restrictions. A further 136,000 hatchery parr and smolts and 2,000 wild parr were marked with adipose fin clips, around 7,000 of which also had other tags or marks (elastomer & PIT tags). Almost 1,200 adult salmon were tagged for the assessment of returning stocks or in conjunction with the use of radio tags in behaviour studies.

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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. 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 <i>ad hoc</i> 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
1984-85	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.

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 60cm 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 (CNL(01)66)

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 2001;
 - 1.2. report on significant developments which might assist NASCO with the management of salmon stocks;
 - 1.3. provide compilation of tag releases by country in 2001.

2. With respect to Atlantic salmon in the North-East Atlantic Commission area:
 - 2.1. describe the key events of the 2001 fisheries and the status of the stocks;
 - 2.2. update the evaluation of the effects on stocks and fisheries of significant management measures introduced since 1991;
 - 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 with an assessment of risks relative to the objective of exceeding stock conservation limits;
 - 2.5. provide an estimate of by-catch of salmon post-smolts in pelagic fisheries based on the scientific information currently available;
 - 2.6. 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 2001 fisheries and the status of the stocks;
 - 3.2. update the evaluation of the effects on US and Canadian stocks and fisheries of management measures implemented after 1991 in the Canadian commercial salmon fisheries;
 - 3.3. update age-specific stock conservation limits based on new information as available;
 - 3.4. characterise the reliability of input data used to estimate the lagged spawner variable, with special emphasis on the Labrador region, and evaluate sensitivity of resulting pre-fishery abundance estimates;
 - 3.5. provide catch options or alternative management advice with an assessment of risks relative to the objective of exceeding stock conservation limits;
 - 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 2001 fisheries and the status of the stocks;
 - 4.2. update the evaluation of the effects on European and North American stocks of the Greenlandic quota management measures and compensation arrangements since 1993;
 - 4.3. characterise the historical and current temporal and spatial distribution and relative abundance of North American and European Atlantic salmon and, where possible, smaller stock groups, in fisheries at West Greenland;
 - 4.4. provide catch options or alternative management advice with an assessment of risks relative to the objective of exceeding stock conservation limits;
 - 5.5. 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;
 - 5.6. evaluate the ad hoc management programme and advise on an appropriate management system for the fishery in future years, taking account of the stocks of both North American and European origin;
 - 4.7. identify relevant data deficiencies, monitoring needs and research requirements.

Notes:

1. *In response 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. *In response to question 2.4 advise on potential biases in the catch advice resulting from the inclusion of fish farm escapees in the assessment models.*
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.

A Ministerial Direction issued to the Environment Agency in September 1998 required all SAPs to be completed by the year 2002. However this deadline has been extended for rivers in England because of grant-in-aid funding cuts in 2001 and 2002. The schedule below identifies the timetable for production of final plans on individual rivers to comply with the new deadline.

Environment Agency's schedule for production of SAPs for salmon rivers in England and Wales (at 19 December 2001)

Region	Scheduled date for completion of Final SAPs - given as calendar year ending:						
	1997	1998	1999	2000	2001	2002	2003
North East	Coquet**	Wear** Esk*	Tyne** Tees**				
Thames			Thames				
Southern	Test**	Itchen**					
South West	Tamar** Avon (Hants)**	Frome**	Taw* Torrige* Lynher**	Teign Axe Dart Tavy** Camel* Stour*		Exe Erme Avon (Devon) Lyn Yealm Plym Fowey Piddle	
Midlands	Severn*			Severn Estuary*			
Welsh	Dee** Mawddach** Teifi* Wye**	Ogwen** Seiont** Dwyfawr** Tywi**	Clwyd** Conwy** Taf** Taff	Dyfi Tawe* Loughor Cleddau** Nevern Usk	Ogmore <i>Neath</i> <i>Afan</i> Glaslyn/Dwryyd	Rheidol <i>Aeron</i> <i>Ystwyth</i> Dysynni	
North West	Eden** Leven (& Crake)** Lune**		Ehen (& Calder)**	Kent** Ribble**	Derwent Duddon	Wyre	Border Esk Irt Cumbrian Esk
Total	12	8	11	15	6	13	3

Note: Rivers in italics are those where there is no ministerial requirement to produce a plan but where regions have elected to do so to support LEAPs.

** Rivers with completed Final SAPs.

* Rivers with completed SAP Consultation Documents.

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 netmen 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 netmen 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: 2001

Country: England and Wales

Totals:	Origin	Primary Tag or Mark			Total
		Microtag	External Mark	Adipose Clip	
	Hatchery juvenile	55,445	5,136	136,231	192,257
	Wild juvenile	364	1,715	1,715	2,079
	Adult		1,187		1,187
	Total fish marked	55,809	8,038	137,946	195,523

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	83		None	Various	Tyne
EA North East	Various	Adult	W	Coquet	Needle tag	8		None	Various	Coquet
EA North East	Various	Smolt	H	Tyne	None	215		Adipose	Mar - May	Tyne
EA North West	S1	Smolt	H	Lune	None	16,000		Adipose	Mar-01	Lune
EA North West	S1	Smolt	H	Lune	None	4,000		Adipose	Mar-01	Lune (Rawthey)
EA North West	S1	Smolt	H	Lune	None	1,000		Adipose	Mar-01	Lune (Wenning)
EA North West	S1	Smolt	H	Lune	None	1,000		Adipose	Mar-01	Lune (Greta)
EA North West	S1	Smolt	H	Lune	None	1,000		Adipose	Mar-01	Lune (Hindburn)
EA Wales	Various	Adult	W	Dee	Floy tag	906		None	Various	Dee
EA Wales	S2	Smolt	H	Taff	Microtag	10,200	20/42/28	Adipose	Apr-01	Taff
EA Wales	S1	Smolt	H	Taff	None	7,300		Adipose	10/04/01	Taff
EA Wales	S1	Smolt	H	Taff	None	4,500		Adipose	11/04/01	Taff
EA Wales	S1	Smolt	H	Taff	None	7,000		Adipose	10/05/01	Taff
EA Wales	S1	Smolt	H	Conwy (Lledr)	Microtag	4,025	23/42/05	Adipose	05/04/01	Conwy (Lledr)
EA Wales	S1	Smolt	H	Dee	None	5,000		Adipose	20/02/01	Dee (Alwen)
EA Wales	S1	Smolt	H	Dee	None	10,000		Adipose	Feb-01	Dee (Tryweryn)
EA Wales	S1	Smolt	H	Dee	None	12,000		Adipose	Apr-01	Dee
EA Wales	S1	Smolt	H	Dee	None	10,500		Adipose	May-01	Dee
EA Wales	Various	Adult	W	Taff	CART tag	31		Floy tag	Various	Taff
EA Wales	Various	Adult	W	Taff	Floy tag	47		None	Various	Taff
EA Thames	Various	Adult	W	Thames	Radio tag	7	SAL3 R0.	Floy tag	Various	Thames
EA Thames	Various	Adult	W	Thames	Floy tag	2	Yellow	None	Various	Thames
EA Thames	S2	Smolt	H	Delphi	None	9,280		Adipose	17/04/01	Thames (Kennet)
EA Thames	S1	Smolt	H	Shannon	Microtag	10,179	01/42//54	Adipose	19/03/01	Thames (Kennet)
EA Thames	S1	Smolt	H	Shannon	Microtag	10,021	01/42//55	Adipose	19/03/01	Thames (Kennet)
EA Thames	S1	Smolt	H	Shannon	Microtag	10,060	01/42//53	Adipose	21/03/01	Thames (Kennet)
EA Thames	S1	Smolt	H	Shannon	Microtag	10,960	01/42//58	Adipose	21/03/01	Thames (Kennet)
EA Thames	S1	Smolt	H	Delphi	None	4,071		Adipose	20/03/01	Thames (Kennet)
EA Thames	S1	Smolt	H	Delphi	Elastomer	2,000		Adipose	22/03/01	Thames (Kennet)
EA Thames	S1	Smolt	H	Delphi	Elastomer	2,555		Adipose	23/03/01	Thames (Kennet)
EA Thames	S1	Smolt	H	Delphi	None	4,397		Adipose	11/04/01	Thames (Kennet)
EA Thames	S1	Smolt	H	Delphi	None	2,913		Adipose	26/04/01	Thames (Kennet)
EA Southern	0+	Parr	H	Test	PIT	581		None	08/01/01	Test
EA Southern	0+	Parr	H	Test	None	10,500		Adipose	14/11/01	Test
EA Southern	0+	Parr	H	Test	None	21,000		Adipose	17/12/01	Test
CEFAS/EA Wales	Various	Smolt	W	Dee	Microtag	364	01/42/22	Adipose	May-01	Dee (Ceiriog)
CEFAS	Various	Parr	W	Itchen	PIT	247	DC0000....	Adipose	29/08/01	Itchen
CEFAS	Various	Parr	W	Dee (Ceiriog)	PIT	1,468	DC0000....	Adipose	Sep-01	Dee (Ceiriog)
CEFAS	Various	Adult	W	Tees	Floy tag	103	E772723 - E772799 & E779450 - E779699	None	Jan - Nov-01	Tees

