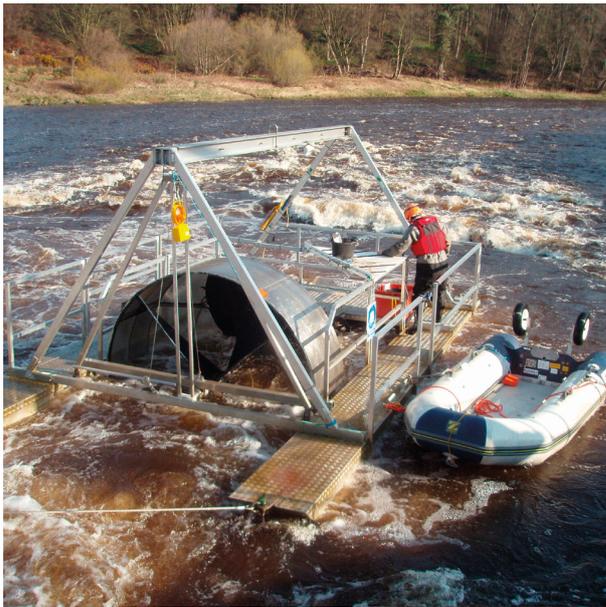


# Salmon Stocks and Fisheries in England and Wales in 2017





# SALMON STOCKS AND FISHERIES IN ENGLAND AND WALES, 2017

Preliminary assessment prepared for ICES, April 2018



**Acknowledgement:**

This report has been compiled jointly by staff from the Cefas Salmon and Freshwater Fisheries Team at Lowestoft and fisheries personnel from the Environment Agency and Natural Resources Wales. The monitoring and assessment of salmon stocks is funded by Defra and Welsh Government. All the participating organisations would like to extend their thanks and recognition to the various operational fisheries staff who have collected and compiled the data for this report. Thanks are also due to: the National River Flow Archive at the Centre for Ecology and Hydrology for providing river flow data; to the Game and Wildlife Conservation Trust for data relating to the River Frome; to the General Secretary of ICES for permission to cite the reports of the ICES Working Group on North Atlantic Salmon; to NASCO for permission to include their summary of regulatory measures for the high seas fisheries; and to Graphic Solutions (E.A.) Limited for preparation of the final report.

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## ***FOREWORD***

Annual reports on the status of salmon stocks and fisheries in England and Wales have been produced since 1997. These reports present a preliminary assessment for the latest year to assist ICES in providing scientific advice to NASCO and to provide early feedback to fishery managers and anglers. The list of questions posed by NASCO to ICES for consideration in 2018 is provided at Annex 1 of this report.

For much of the period, the annual reports were prepared by the Centre for Environment, Fisheries and Aquaculture Science (Cefas) and the Environment Agency. However, from 1 April 2013, the functions of the Environment Agency in Wales transferred to a new body, Natural Resources Wales (Cyfoeth Naturiol Cymru) (NRW). This body is now responsible for salmon management and regulation in Wales. All three organisations have therefore contributed to production of the annual assessment report since 2013.

Until 2013, each annual assessment report was designed to stand alone, to avoid the need to refer to previous reports for background information. However, this resulted in much of the descriptive text being very similar year-on-year. From 2014, therefore, and in the interest of streamlining procedures, the report has been split into two separate documents. A background report provides the regulatory framework and describes the various methods and approaches used in the assessment process; this report is expected to change relatively little year on year. The most recent annual assessment (this report) then provides a relatively short description of developments in the latest year together with updated tables and figures. Both reports are available on line at the same location on the Gov.UK website.

It should be noted that the data for the most recent year are provisional and will be updated and confirmed as complete catch data are obtained and records validated. The final confirmed data for the current year will be included in next year's report. The Environment Agency and Natural Resources Wales also publish separate Salmonid and Freshwater Fisheries Statistics reports. These are also available at Gov.UK: <https://www.gov.uk/government/collections/salmonid-and-freshwater-fisheries-statistics>.

## **HIGHLIGHTS FOR 2017**

- The provisional declared salmon catch by nets and fixed engines in 2017 (10,133 fish; 40.2 t) was 50% less than the catch in 2016 and below the average of the previous five years. These figures include a small number of fish (253) that were released alive. Most of the catch (90%) was taken in the north east coast fishery. There has been a marked decline in net catches over the past 15-20 years due to increased regulatory controls and the phasing out of mixed stock fisheries, as well as a reduction in stock abundance.
- The provisional declared rod catch in 2017 (13,458 fish) increased by 12% on the confirmed catch for 2016, but remains among the lowest in the available time series. The catch of 1SW salmon (grilse) increased slightly on 2016, but was also among the lowest in the available time series. In contrast, the catch of MSW salmon was among the highest in the time series.
- Rod catch reporting rates have fallen in the last three years, due, in part at least, to new on-line reporting arrangements. Raising factors have been applied where appropriate to take account of this in undertaking stock status assessments.
- Since 1993, rod catches include an increasing proportion of fish that have been caught and released. In 2017, it is provisionally estimated that 11,174 salmon (83% of the catch) were released, the highest percentage ever recorded. Released fish are estimated to have contributed 22 million eggs to the breeding population.
- Around half of the returning stock estimates and counts (Table 23) were above the values recorded in 2016, but for two rivers estimated returns were the lowest in the time series. In most rivers, particularly those on the west coast and in Wales, there has been a marked decline in the numbers of returning salmon over the last decade. However, for some rivers, notably some of those on the south coast of England, there is evidence of an increase in the number of returns.
- Spawning escapement in 2017 was estimated to be above the conservation limit (CL) in 32 of the 64 principal salmon rivers in England and Wales (50%). This is an increase on 2016 (22 rivers) and the highest level of CL compliance since 2012. Rivers where spawning escapement was below CL were widely distributed.
- Formal compliance assessment in 2017 indicated that only 7 rivers (11%) were classified within the top two categories – i.e. had a greater than 50% probability of achieving the management objective (MO) of exceeding the CL in 4 years out of 5. No rivers were classified as 'not at risk' (> 95% probability of meeting the MO) and 19 rivers (30%) were classified as 'at risk' – having a low probability ( $p < 5\%$ ) of achieving the MO). In England, there has been a general decrease in the number of rivers classified as 'at risk' over the time series.
- Salmon with swollen and/or bleeding vents (Red Vent Syndrome) continued to be observed in 2017. Affected fish show a degree of recovery in freshwater and appear to be able to spawn successfully.
- Densities of juvenile salmon (particularly 0+ fry) were well below average in many English and Welsh rivers in 2016. Data from the River Frome, where smolts migrate almost exclusively at one year old, indicated very low smolt output in 2017, consistent with this decline in recruitment. For many rivers where two-year-old smolts predominate, smolt output may well be reduced in 2018.

# REPORT ON SALMON FISHERIES IN 2017

## 1. DESCRIPTION OF STOCKS AND FISHERIES

There are 49 rivers in England and 31 rivers in Wales that regularly support salmon (Figure 1), although some of the stocks are very small and support minimal catches; of these, 64 rivers have been designated 'principal salmon rivers'. Conservation limits (CLs) and Management Targets (MTs) have been set for the 42 principal salmon rivers in England and 22 in Wales and are used to give annual advice on stock status and to assess the need for management and conservation measures.

Rod fishing for salmon is permitted on all rivers supporting salmon stocks, and net or fixed engine fisheries operate on a proportion of these, usually in the river estuaries. Descriptions of the different salmon fishing methods employed in England and Wales can be found in the background report.

Many of the tables and figures presented in this report summarise statistics for England and Wales at a regional level. Following a reorganisation in 2014, the Environment Agency ceased to operate on a regional basis. However, in the interests of maintaining existing time series, data are still aggregated and reported by region in this report. The full statistics, reported on a river by river basis, are provided in the catch statistics reports which are published annually by the Environment Agency and Natural Resources Wales. A list of the individual rivers falling within each region is provided in Table 1.

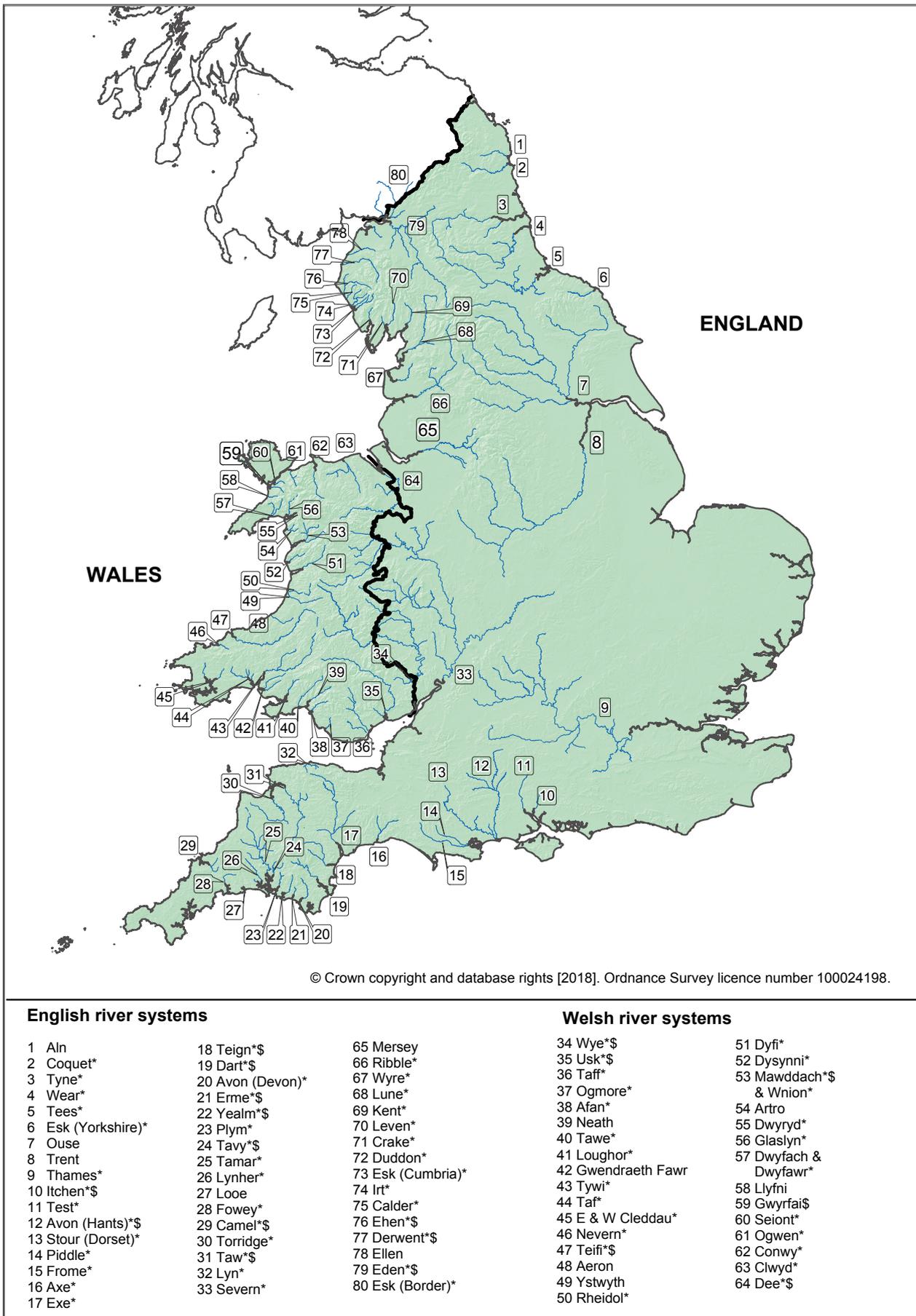
**Table 1. The main salmon rivers in England and Wales aggregated by their earlier regional jurisdictions. The table also provides details of those rivers with Salmon Action Plans and those designated as Special Areas of Conservation (SAC) for which salmon are a qualifying species.**

Country	Region (pre 2014)	Region (pre 2011 where different)	River	SAP for river	SAC designation	Comments
England	North East		Aln			
			Coquet	Yes		
			Tyne	Yes		
			Wear	Yes		
			Tees	Yes		
			Yorkshire Esk	Yes		
		Anglian				No salmon producing rivers, but has coastal fishery
	South East	Thames	Thames	Yes		
		Southern	Itchen	Yes	Yes	
			Test	Yes		
	South West		Hampshire Avon	Yes	Yes	
			Stour	Yes		
			Piddle	Yes		
			Frome	Yes		
		Axe	Yes			
		Exe	Yes			
		Teign	Yes	Yes		
		Dart	Yes	Yes		
		Avon (Devon)	Yes			
		Erme	Yes	Yes		
		Yealm	Yes	Yes		
	Plym	Yes				
	Tavy	Yes	Yes			
	Tamar	Yes				
	Lynher	Yes				

**Table 1. continued**

		Looe		
		Fowey	Yes	
		Camel	Yes	Yes
		Taw	Yes	Yes
		Torr ridge	Yes	
		Lyn	Yes	
Midlands		Ouse		
		Trent	Yes	
		Severn	Yes	
North West		Mersey		
		Ribble	Yes	
		Wyre	Yes	
		Lune	Yes	
		Kent	Yes	
		Leven	Yes	
		Crake	Yes	
		Duddon	Yes	
		Esk (Cumbria)	Yes	
		Irt	Yes	
		Ehen	Yes	Yes
		Calder	Yes	
		Derwent	Yes	Yes
		Ellen		
		Eden	Yes	Yes
		Esk (Border)	Yes	
Wales	Welsh	Wye	Yes	Yes
		Usk	Yes	Yes
		Taff	Yes	
		Ogmore	Yes	
		Afan	Yes	
		Neath		
		Tawe	Yes	
		Loughor	Yes	
		Gwendraeth Fawr & Fach		
		Tywi	Yes	
		Taf	Yes	
		E & W Cleddau	Yes	
		Nevern	Yes	
		Teifi	Yes	Yes
		Aeron		
		Ystwyth		
		Rheidol	Yes	
		Dyfi	Yes	
		Dysynni	Yes	
		Mawddach	Yes	Yes
		Wnion		
		Artro		
		Dwvryd	Yes	
		Glaslyn	Yes	
		Dwyfach & Dwyfawr	Yes	
		Llyfni		
		Gwyrfa		Yes
		Seiont	Yes	
		Ogwen	Yes	
		Conwy	Yes	
		Clwyd	Yes	
		Dee	Yes	Yes

Note: Those rivers designated as SACs have salmon identified as a qualifying species in all or part of the catchment. This confers additional protection measures specifically for salmon in these rivers and any associated on-line lakes. In some of these rivers, salmon are a primary reason for SAC designation.



**Figure 1. Map of England and Wales showing the main salmon rivers and denoting those with Salmon Action Plans (\*) and those designated as Special Areas of Conservation (\$) in which salmon must be maintained or restored to favourable conservation status.**

## 2. FISHERY REGULATION MEASURES

Salmon fisheries in England and Wales are primarily regulated by effort controls, which specify the nature of the gear that may be operated, along with where, when and how it may be used. A full description of these controls is provided in the background report; summary details of the current Net Limitation Orders (NLOs) and byelaws related to rod fisheries are provided in this report at Annex 2 and Annex 3, respectively. The following tables summarise some of the other current controls:

- Table 2 provides details of the rod bag limits and catch limits on net and fixed engine fisheries that are currently in force.
- Table 3 summarises the progress in phasing out those net fisheries that exploit predominantly mixed-stocks where our capacity to manage individual stocks is compromised. A policy to phase out such fisheries has been in place since 1996.
- Table 4 provides details of other arrangements to reduce netting effort operating in 2017, principally by agreement to release fish alive or by compensating netsmen not to fish for the periods shown.
- Table 5 provides a summary of the effort restrictions recorded in Table 4 over the available time series, 1993 – present.

In response to the widespread decline in stocks of early-running multi-sea-winter (MSW) salmon, national measures were introduced in 1999 to reduce the levels of exploitation of this stock component. Most netsmen were banned from fishing for salmon before 1 June, with a small number allowed to continue where netting is predominantly for sea trout, on the basis that any salmon caught are returned alive. The national measures also introduced mandatory catch-and-release of salmon by anglers prior to 16 June and imposed other method restrictions. Following review and consultation, the total package of national spring salmon measures was renewed for a further 10 years in December 2008. A brief evaluation of the effect of these measures is included in Section 4.

In response to declining stock status, proposals for further controls on exploitation have been developed in both England and Wales in 2017. These include proposals for closure of many net fisheries (or for requirements to release salmon where a fishery is authorised to continue to operate for sea trout) and for requirements to achieve very high levels of catch-and-release in rod fisheries (including mandatory catch-and-release on rivers with the lowest stock status in England and for all rivers in Wales). These proposals have been subject to public consultation and new measures will be implemented through appropriate legislative provisions. Final proposals (post-consultation) will be subject to approval by the regulatory bodies and government; the aim is to introduce the measures in 2019.

**Table 2. Statutory rod bag limits in force for salmon in 2017.**

EA Region / NRW	River	Rod fishery bag limits			Other constraints	Net/FE catch limits	
		Salmon Bag Limits - per				Fishery	Measure
		day	week	season			
North East		No bag limits apply					
Anglian		No bag limits apply					
South East	Thames	2					
South West	Taw	2	3	10	No fish > 70 cm to be retained after 1 August		
	Torridge	2	2	7			
	Tavy					Tavy seine nets	Seasonal catch limits apply
	Tamar					Tamar seine nets	
Midlands		No bag limits apply					
						Severn fixed engines	Seasonal catch limits apply
						Severn lave nets	
						Severn seine nets	
North West	Ribble			2	Additional voluntary carcass tagging scheme of 1 fish per angler per season		
	Lune			4			
	Leven			3	Limit applies to catch on whole river by all anglers; mandatory carcass tagging scheme		
	Crake			3			
	Derwent	2			No female fish to be retained after 30 Sept. Voluntary 1 fish per day and 5 fish per season limit encouraged by Derwent Owners Association		
	Eden	2					
						Solway haaf nets and Eden coops	Seasonal catch limits apply. For 2014-2017, salmon catch restricted to 10 salmon per season for haaf nets and 3 salmon per season for coops. No limits on sea trout.
	Border Esk	2					
Wales	Taf	2	5		No fish to be retained after 8 Oct.		
	Tywi	2	5		No fish to be retained after 8 Oct.		
	E&W Cleddau	2	5		No fish to be retained after 8 Oct.		
	Nevern	2	5				
	Teifi	2	5				
	Aeron	2	5				
	Ystwyth	2	5				
	Rheidol	2	5				

**Table 3. Number of licences issued each year in net fisheries subject to phase outs (zero NLOs) and closures, 1992-2017.**

Fishery	Phase Outs														Closures [a]									
	Phase out commenced	1993	1996	1997	1997	1997	1997	1997	1997	1997	1997	1998	2000	2002	2003	2004	2004	2004	2004	2005	2005	2005	2014	2015
Year	1992	142	129	17	2	2	2	2	2	2	2	4	1	14 <sup>[b]</sup>	6	14	5	4	4	4	13			
	1993	124	93	11	1	1	3	0	2	2	4	1	14 <sup>[b]</sup>	6	14	5	4	4	4	21				
	1994	114	72	16	2	2	2	0	2	2	4	1	14 <sup>[b]</sup>	6	14	5	5	4	4	18				
	1995	99	65	9	2	1	2	0	2	2	4	1	14 <sup>[b]</sup>	6	14	5	5	4	4	14				
	1996	89	59	0	2	1	2	1	2	2	4	1	12	6	14	5	4	4	14					
	1997	81	56	1	2	1	2	0	2	2	4	1	14	6	14	5	5	4	15					
	1998	75	54	<b>0</b>	2	<b>0</b>	<b>0</b>	0	1	1	4	1	14	6	15	5	5	4	14					
	1999	72	54		2	2		1	1	1	1	1	14	6	14	5	4	4	12					
	2000	71	46		1	1	<b>0</b>	1	<b>0</b>	1	1	1	14	6	14	5	4	4	10					
	2001	70	46		<b>0</b>	<b>0</b>		1	1	1	1	1	14	6	14	5	4	4	8					
	2002	69	46					1	1	1	1	1	3*	6	14	5	4	4	12					
	2003	16*	45					1	1	1	1	1	3	4	14	5	4	4	12					
	2004	16	40	#				<b>0</b>	#	#	<b>0</b>	1	3	4	3* <sup>[b]</sup>	1* <sup>[b]</sup>	2* <sup>[b]</sup>	4	11					
	2005	16	39					#	#	#	#	1	3	4	3 <sup>[b]</sup>	1 <sup>[b]</sup>	2 <sup>[b]</sup>	4	13					
	2006	16	36					1	1	1	1	1	3	3	3 <sup>[b]</sup>	1 <sup>[b]</sup>	2 <sup>[b]</sup>	3*	9*					
	2007	16	35					1	1	1	1	1	3	3	3 <sup>[b]</sup>	1 <sup>[b]</sup>	2 <sup>[b]</sup>	2*	4*					
	2008	16	33					1	1	1	1	1	3	3	3 <sup>[b]</sup>	1 <sup>[b]</sup>	2 <sup>[b]</sup>	<b>0</b>	3*					
	2009	15	30					<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	3	2	2	3 <sup>[b]</sup>	1 <sup>[b]</sup>	2 <sup>[b]</sup>	<b>0</b> *					
	2010	14	30										3	2	2	3 <sup>[b]</sup>	1 <sup>[b]</sup>	2 <sup>[b]</sup>	<b>0</b> *					
	2011	14	26										3	2	2	3 <sup>[b]</sup>	1 <sup>[b]</sup>	2 <sup>[b]</sup>						
	2012	14	25										3 <sup>[c]</sup>	2	2	3 <sup>[b]</sup>	1 <sup>[b]</sup>	2 <sup>[b]</sup>						
	2013	13	24										3	1 <sup>[d]</sup>	3 <sup>[b]</sup>	3 <sup>[b]</sup>	1 <sup>[b]</sup>	2 <sup>[b]</sup>						
	2014	13	22										3	2	2	3 <sup>[e]</sup>	<b>0</b>	1 <sup>[e]</sup>				1		
	2015	12	20										3	2	2	3 <sup>[e]</sup>	1 <sup>[e]</sup>	1 <sup>[e]</sup>				1	1	
	2016	11	18										3	2	2	3 <sup>[e]</sup>	1 <sup>[e]</sup>	1 <sup>[e]</sup>				1	<b>0</b> *	
	2017	11	17										3	2	2	3 <sup>[e]</sup>	1 <sup>[e]</sup>	1 <sup>[e]</sup>				1	1	

Note: **Bold text denotes target reached.** Key: \* Phase out accelerated by full or partial buy-off.

# Denotes fishery closed by byelaw.

<sup>[a]</sup> Fisheries have not operated for a number of years, now formally closed through byelaw.

<sup>[b]</sup> Licences issued but fishermen compensated not to fish in these years.

<sup>[c]</sup> Phase out replaced by new NLO in 2012 permitting the use of 1 net.

<sup>[d]</sup> Phase out replaced by new NLO in 2013 permitting the use of 2 nets.

<sup>[e]</sup> Phase out remains in place, but under new NLO existing licensees able to resume fishing following 10-year buy-off, subject to catch limits.

**Table 4. Buy off arrangements operating on net fisheries in 2017.**

River/ Fishery	Method	Period without netting (full season in parentheses)	Brokers / Funding agency
Fowey	seine nets (all)	complete season (2007 to present) (2 March–31 August)	Brokered by: Environment Agency / South West Water plc
Piddle and Frome (Poole Harbour)	seine nets (all)	All salmon & sea trout caught to be released (2008 to present) (1 June–31 July)	Brokered by: Environment Agency and funded by the Frome and Piddle Association <sup>1a)</sup>

Notes: Fowey buy-off - fishing from 2 March to 31 May applies to sea trout only.

<sup>1a)</sup> Local arrangements apply in respect of provision of compensation.

**Table 5. Summary of buy off arrangements and local agreements operating on net fisheries, 1993-2017. (X denotes compensation measure applied; O denotes fishery closed or no licences issued/available).**

Year	Fishery																							
	Itchen seine net #	Avon & Stour seine nets \$	Piddle & Frome seine net \$	Exe seine nets	Teign seine nets	Dart seine nets	Tavy seine nets	Tamar seine nets	Lynher seine nets	Fowey seine nets	Camel drift nets	Taw & Torridge seine nets	Lyn fixed engine	Severn fixed engine	Wye fixed engines	Usk Drift nets	Usk fixed engines	Tywi seine nets	Dee seine nets	Dee trammel nets	Ribble drift nets	Leven lave nets	Cumbrian coastal drift nets	
1993	X											X												
1994	X											X												
1995	O											X												
1996	O																							
1997	O	X					X	X	X	X														
1998	O	X		X			X	X	X	X														X
1999	O	X		X			X	X	X	X														X
2000	O	X					X	X	X	X					X	X	X							X
2001	O	X					X	X	X	X					X	O	X							X
2002	O	X					X	X	X	X	X	X			X	O	X					X		X
2003	O	X					X	X	X	X	X		X		X	O	X							X
2004	O	X					X	X	X	X	X		O	X	X	O	X							X
2005	O	X					X	X	X	X	X		O		O	O	O					X		O
2006	O	X		X	X		X	X	X	X	X		O		O	O	O		X	X				O
2007	O	X		X			X	X	X	X	X		O		O	O	O		X	X				O
2008	O	X	X	X			X	X	X	X	X		O		O	O	O	X	X	X				O
2009	O	X	X	X			X	X	X	X	X		O		O	O	O	X	X	O				O
2010	O	X	X	X			X	X	X	X	X		O	X	O	O	O	X	O	O				O
2011	O	X	X	X		X	X	X	X	X	X		O	X	O	O	O	X	O	O				O
2012	O	O	X			X	X	X	X	X			O	X	O	O	O	X	O	O				O
2013	O	O	X		X	X	X	X	X	X			O		O	O	O		O	O				O
2014	O	O	X						O	X			O		O	O	O		O	O	X			O
2015	O	O	X						O	X			O		O	O	O		O	O				O
2016	O	O	X						O	X			O		O	O	O		O	O				O
2017	O	O	X						O	X			O		O	O	O		O	O				O

Key: # Fishery operated for scientific purposes - all fish released alive in tracking investigation (no compensation agreement).  
\$ Agreement for all salmon caught to be released alive.

### 3. FISHING EFFORT

The regulatory measures outlined above provide overall limits on the 'allowable' fishing effort in England and Wales; this has fallen in recent years as measures have been introduced to regulate exploitation. The amount that both netsmen and anglers actually fish (the 'utilised' effort) also varies due to weather conditions, perceptions about the numbers of fish returning, and other factors. The following tables and figures summarise changes in allowable and utilised effort:

**Net fisheries** – Table 6 and Figure 2 illustrate the long-term decline in the numbers of licences issued for all types of nets and traps over the period since 1971. The rate of decline in the number of fishing days available, covering a more recent, shorter time period, has been greater over this time as a result of additional effort restrictions on remaining licensees (Figure 3). Table 7 provides details of the allowable and utilised effort in salmon net fisheries for the latest season. The percentage of available days that are utilised varies markedly. Figure 3 also illustrates the overall changes in allowable and utilised effort, and the percentage of available days utilised by netsmen, over the available time series.

**Rod fisheries** – Numbers of rod licences (annual and short-term) from 1994 are shown in Table 6 and Figure 4. No comparable data are available for earlier years because of changes in licensing arrangements. Regional summaries of the total rod days fished, over available time series, are provided in Table 8 and Figure 5. It should be noted that effort data (days fished) submitted via rod licence returns do not distinguish between times spent fishing separately for salmon and sea trout.

#### Overview of fishing effort in 2017

There has been a progressive decline in the number of net and fixed engine licences issued, and hence in fishing effort, over the time series. There was a small decrease in the number of licences issued in 2017 compared with 2016 (3 fewer licences issued), with total licence numbers in 2017 the lowest in the time series. The percentage of the available days utilised by netsmen in 2017 was typically below the levels seen in recent years. Utilised effort in 2017 was below that in 2016 in all regions except the Midlands Region (River Severn), where effort remained particularly low. This may be related to the recent introduction of catch limits for the Severn net and fixed engine fishery. As in previous years, there was marked variation between the levels of utilised effort in individual fisheries, ranging from 82-84% (North East coast drift nets) to zero, where licences were available but no fishing for salmon took place. The overall percentage of available days utilised by netsmen declined steadily between 2000 and 2009, from a little over 34% to about 20% (Figure 3). However, percentage utilisation has been higher and more variable since this time, with values increasing to around 25-30% in many years, associated with relatively good catches. This suggests that the take-up of available fishing opportunities is strongly influenced by catch rates. There was a marked downturn in utilised effort in 2017, with the value among the lowest in the time series.

The numbers of salmon rod licences issued over the shorter available time series (1994 on) show variable patterns. The number of short term (one-day and eight-day) rod licences issued has shown a slow decline over the period, from a 5-year mean of about 11,000 licences at the start of the period to a 5-year mean of around 7,800 recently. There has been greater variation in the number of annual licences issued; these account for the majority of the salmon caught by anglers. Annual licence numbers decreased sharply from over 26,000 in 1994 to about 15,000 in 2001. This was thought to reflect the decline in salmon stocks and the introduction of restrictions on angling, especially those to protect early-run MSW fish, although licence sales were particularly low in 2001 due to

the restrictions on access to many rivers as a result of an outbreak of the 'foot and mouth' livestock disease. Sales of annual licences increased again after this date, reflecting Environment Agency efforts to promote angling and to reduce levels of licence evasion through targeted enforcement efforts. Licence sales in the period 2009 to 2012 were in excess of 26,000, similar to levels at the start of the time period. Season licence numbers declined again after this, but there was a marked increase in numbers in 2017 due to the introduction of a new free licence for juveniles (under 18s). Over 7,000 of these licences were issued; the data for 2017 remain provisional.

The number of days fished by anglers closely followed the reduction in rod licence numbers over the period 1994 to 2001. However, while annual licence sales then recovered to the levels at the start of the time series, the number of days fished by anglers has not. Provisionally, the overall number of days fished by anglers in 2017 has been estimated at about 140,300, which is 8% below the average of the previous five years. There is some variation in the pattern of fishing effort between regions (Figure 5). For Wales and a number of regions in England (North West, South West and Midlands), the number of days fished has fallen by about a half between the start and end of the time series. In contrast, fishing effort in the North East and Southern Regions has remained relatively consistent.

**Table 6. Numbers of rod licences (1994-2017) and net & fixed engine licences (1971-2017).**

Year	Rod licences		Gear Type				Total net licences	
	Short-term	Annual	Gill	Sweep	Hand-held	FE		Combined drift/T net #
1971			437	230	294	79	75	1040
1972			308	224	315	76	75	923
1973			291	230	335	70	75	926
1974			280	240	329	69	75	918
1975			269	243	341	69	75	922
1976			275	247	355	70	75	947
1977			273	251	365	71	75	960
1978			249	244	376	70	75	939
1979			241	225	322	68	75	856
1980			233	238	339	69	75	879
1981			232	219	336	72	75	859
1982			232	221	319	72	75	844
1983			232	209	333	73	75	847
1984			226	223	354	74	75	877
1985			223	232	375	69	75	899
1986			220	221	369	64	75	874
1987			213	206	352	68	75	839
1988			210	212	284	70	75	776
1989			208	199	282	75	75	764
1990			207	204	292	70	75	773
1991			199	187	264	66	75	716
1992			203	158	267	65	75	693
1993			187	151	259	55	36	652
1994	10,637	26,641	177	158	257	53	30	645
1995	9,992	24,949	163	156	249	47	29	615
1996	12,508	22,773	151	132	232	42	29	557
1997	11,640	21,146	139	131	231	35	27	536
1998	11,364	21,161	130	129	196	35	26	490
1999	10,709	18,423	120	109	178	30	26	437
2000	10,916	19,223	110	103	158	32	25	403
2001	9,434	14,916	113	99	143	33	24	388
2002	10,039	19,368	113	94	147	32	24	386
2003	8,683	21,253	58	96	160	57	5	371
2004	10,628	22,138	57	75	157	65	5	354
2005	10,170	23,870	59	73	148	65	5	345
2006	9,460	22,146	52	57	147	65	5	321
2007	9,065	23,116	53	45	157	66	5	321
2008	9,761	24,139	55	42	130	66	5	293
2009	9,353	27,108	50	42	118	66	4	276
2010	10,024	26,135	51	41	118	66	4	276
2011	10,121	26,870	53	41	117	66	3	277
2012	9,045	26,090	51	34	115	73	3	273
2013	8,264	25,037	49	29	111	62	3	251
2014	7,691	23,914	48	34	109	65	3	256
2015	8,017	22,830	52	33	102	63	3	250
2016	8,055	22,159	49	34	105	62	2	250
2017	7,098	28,064	46	32	112	57	2	247

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

Gill nets include: drift, trammel, sling and coracle nets.

Sweep nets include: seine (draft and draw) and wade nets.

Hand-held nets include: haaf/heave and lave/dip nets.

Fixed engines include: T-nets, J-nets, stop (compass) nets, putcher ranks, traps, weirs and cribs (coops).

East Anglian coastal nets & Southern seine net are not included, as they are targeted primarily at sea trout and catch few salmon.

Table only includes data for gear licences that are fished (i.e. excluding licences that remain available, but which cannot be fished due to compensation arrangements or other similar provisions).

Data for 2017 are provisional.

Free annual licences were introduced for junior anglers in 2017; this accounts for the observed increase in licence numbers.

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

**Table 7. Allowable and utilised effort for the principal salmon net fisheries in 2017**

EA Region / NRW	River/ Fishery <sup>[a]</sup>	Method	No. of licences	NLO <sup>[c]</sup>	Days available <sup>[a,f]</sup>	Allowable effort net days <sup>[h]</sup>	Utilised effort		% days utilised	Av. day/ lic.
							net days	net tides		
NE	N Coastal (N)	Drift & T	2	0	113	226				
	N Coastal (N)	Drift	8	0	66	528	616	863	82	62
	N Coastal (N) <sup>[b]</sup>	T	20	0	113	2,260	637	892	28	32
	N Coastal (S)	Drift	0	0	0	0	0	0	0	0
	N Coastal (S) <sup>[b]</sup>	T	0	0	0	0	0	0	0	0
	Y Coastal	Drift	1	0	66	66	56	78	84	56
	Y Coastal <sup>[b]</sup>	T or J	27	0	113	3,051	890	1,246	29	33
	<b>Region total</b>		<b>58</b>			<b>6,131</b>	<b>2,199</b>	<b>3,079</b>	<b>36</b>	
SW	Avon & Stour	Seine	0	0	0	0	0	0	0	0
	Poole Harbour <sup>[g]</sup>	Seine	1	1	44	44	14	20	32	14
	Exe	Seine	3	3	54	162	86	121	53	29
	Teign <sup>[b]</sup>	Seine	3	3	99	297	77	108	26	26
	Dart <sup>[b]</sup>	Seine	0	0	0	0	0	0	0	0
	Camel	Drift	3	6	21	126	14	20	11	5
	Tavy	Seine <sup>[i]</sup>	1	0	65	65	10	14	15	10
	Tamar	Seine <sup>[i]</sup>	3	0	65	195	86	120	44	29
	Lynher	Seine	0	0	0	0	0	0	0	0
	Fowey <sup>[b,g]</sup>	Seine	0	1	131	131	0	0	0	0
	Taw/Torrige	Seine	3	1	53	159	34	47	21	11
	<b>Region total</b>		<b>17</b>			<b>1,179</b>	<b>321</b>	<b>450</b>	<b>27</b>	
Midlands	Severn	Putchers <sup>[d,i]</sup>	1		76	76	0	0	0	0
	Severn	Seine <sup>[i]</sup>	1	0	66	66	19	27	29	19
	Severn	Lave <sup>[i]</sup>	21	15	66	1,386	84	118	6	4
	<b>Region total</b>		<b>23</b>			<b>1,528</b>	<b>104</b>	<b>145</b>	<b>7</b>	
NW	Ribble	Drift	4	2	66	264	49	68	18	12
	Lune	Haaf	12	12	66	792	257	360	32	21
	Lune	Drift	7	7	66	462	127	178	28	18
	Lune	Seine	0	0	0	0	0	0	0	0
	Kent	Lave	3	6	66	396	39	54	10	13
	Leven	Lave	2	2	44	88	29	40	32	14
	Eden & Esk	Haaf <sup>[i]</sup>	66	105	72	7,560	954	1336	13	14
	Eden & Esk	Coops <sup>[d,i]</sup>	3		66	198	0	0	0	0
	<b>Region total</b>		<b>97</b>			<b>9,760</b>	<b>1,454</b>	<b>2,036</b>	<b>15</b>	
Wales	Wye	Lave	8	<sup>[e]</sup>	66	528	260	308	49	33
	Tywi <sup>[b]</sup>	Seine	3	3	109	327	205	246	63	68
	Tywi <sup>[b]</sup>	Coracles	8	8	109	872	198	187	23	25
	Taf	Coracles	1	1	44	44	0	0	0	0
	Taf	Wade	1	1	44	44	10	10	23	10
	E/W Cleddau	Compass	6	6	66	396	34	34	9	6
	Nevern <sup>[b]</sup>	Seine	1	1	109	109	9	11	8	9
	Teifi <sup>[b]</sup>	Seine	3	3	109	327	37	48	11	12
	Teifi <sup>[b]</sup>	Coracles	12	12	109	1,308	375	373	29	31
	Dyfi <sup>[b]</sup>	Seine	3	3	109	327	39	39	12	13
	Dysynni	Seine	1	1	66	66	31	48	47	31
	Mawddach	Seine	2	3	66	198	19	31	10	10
	Conwy	Seine	3	3	66	198	39	46	20	13
	Conwy	Basket <sup>[d]</sup>	0		0	0	0	0	0	0
	Dee	Trammel	0	0	0	0	0	0	0	0
	Dee	Seine	0	0	0	0	0	0	0	0
	<b>Wales total</b>		<b>52</b>			<b>4,744</b>	<b>1,256</b>	<b>1,381</b>	<b>26</b>	

Key: <sup>[a]</sup> National spring salmon byelaws apply - all net fisheries closed until June 1.

<sup>[b]</sup> Sea trout fisheries - exempted from national spring salmon byelaws (all salmon caught before 1 June to be released).

<sup>[c]</sup> NLO refers to number of nets allowed under the terms of the net limitation order for that fishery. Where the number of licences exceeds the NLO, numbers are being reduced as licensees leave the fishery. For coastal mixed stock fisheries a zero NLO means the fishery is being phased out permanently, but for other fisheries the zero limit may only apply for the duration of the NLO.

<sup>[d]</sup> Denotes fishery operates under an historical certificate of privilege.

<sup>[e]</sup> No NLO, but number of licences capped.

<sup>[f]</sup> In calculating the days available, any day, or part day, on which fishing has been allowed is included. Days available have been adjusted to take account of partial buy-off arrangements and the national measures.

<sup>[g]</sup> Buy-off applies for all or part season (see Table 4 for details).

<sup>[h]</sup> 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.

<sup>[i]</sup> Fishery subject to seasonal catch limit.

Notes: Effort data incomplete for some licence returns; minor corrections were applied based on catch and effort data for other licensees fishing in same area and time period. For all regions in England, days fished were calculated from data provided on tides fished, using an average of 1.4 tides per day. For Wales, days fished were as reported.

**Table 8. Total number of rod days fished, as reported in catch returns, 1994-2017.**

Total days	Former Environment Agency Region						NRW Wales	E&W Total
	NE	Thames	Southern	SW	Midlands	NW		
1994	37,937	343	2,446	41,087	13,596	78,176	118,862	292,447
1995	38,724	414	2,696	35,853	14,893	65,601	85,107	243,288
1996	34,726	154	1,928	32,504	13,056	64,454	84,922	231,744
1997	40,345	181	2,332	38,809	14,886	70,222	102,930	269,705
1998	38,229	145	2,095	31,285	11,493	64,248	85,906	233,401
1999	31,676	311	2,018	25,642	7,024	50,667	70,660	187,998
2000	32,319	143	1,771	22,401	5,373	49,255	66,270	177,532
2001	27,485	111	2,117	18,573	4,084	23,320	59,163	134,853
2002	34,423	91	2,462	25,526	4,720	43,278	72,328	182,828
2003	31,030	126	2,663	23,322	5,302	37,567	72,719	172,729
2004	37,677	110	2,344	24,730	4,633	48,174	72,846	190,514
2005	37,355	86	2,096	22,427	5,221	49,698	69,786	186,669
2006	30,441	21	1,602	17,704	4,124	40,782	53,441	148,115
2007	33,292	64	1,816	19,979	3,800	40,828	64,694	164,473
2008	35,633	53	2,132	20,708	4,211	44,499	63,776	171,012
2009	37,366	46	2,046	22,828	4,819	47,509	69,144	183,758
2010	42,061	37	2,652	23,279	5,052	51,774	70,201	195,056
2011	42,982	22	2,873	24,122	5,105	53,340	68,453	196,897
2012	38,349	13	2,284	20,763	3,521	47,352	63,131	175,413
2013	38,785	17	2,709	18,497	4,211	46,163	56,634	167,016
2014	35,366	55	2,812	16,476	4,198	36,592	49,456	144,955
2015	32,892	68	3,022	18,359	4,584	30,573	52,232	141,730
2016	33,018	73	2,974	15,573	3,611	30,521	49,586	135,356
2017	35,857	160	2,983	17,766	3,851	32,565	47,092	140,274
Mean (2012-16)	35,682	45	2,760	17,934	4,025	38,240	54,208	152,894
% change:								
2017 on 2016	+9	+135	-1	-3	-16	+7	-10	-1
2017 on 5-yr mean	+0.5	+254	+8	-1	-4	-15	-13	-8

Notes: Includes effort targeted at both salmon and sea trout.

Table does not include rod days fished in the Anglian Region, where there are not thought to be any directed rod fisheries.

Not all catch returns report effort data.

Data for 2017 are provisional.

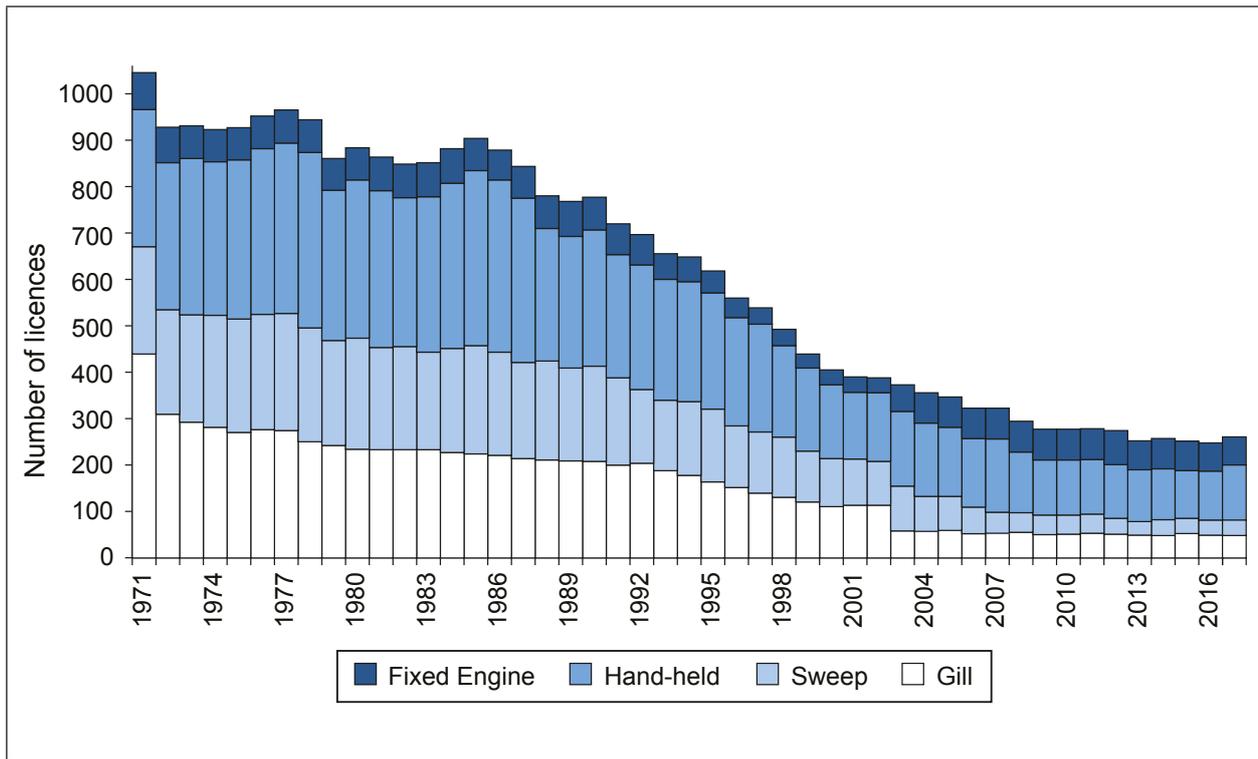


Figure 2. Numbers of salmon net & fixed engine licences issued in England and Wales, 1971-2017.

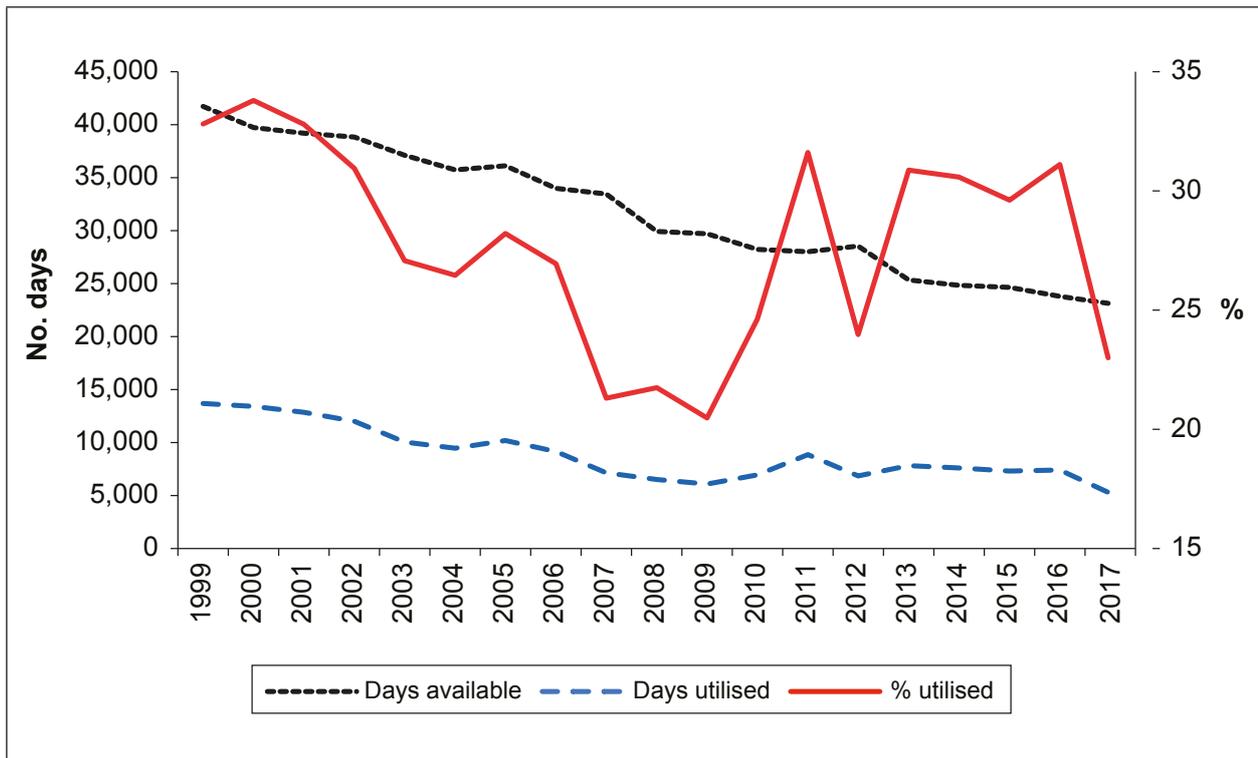
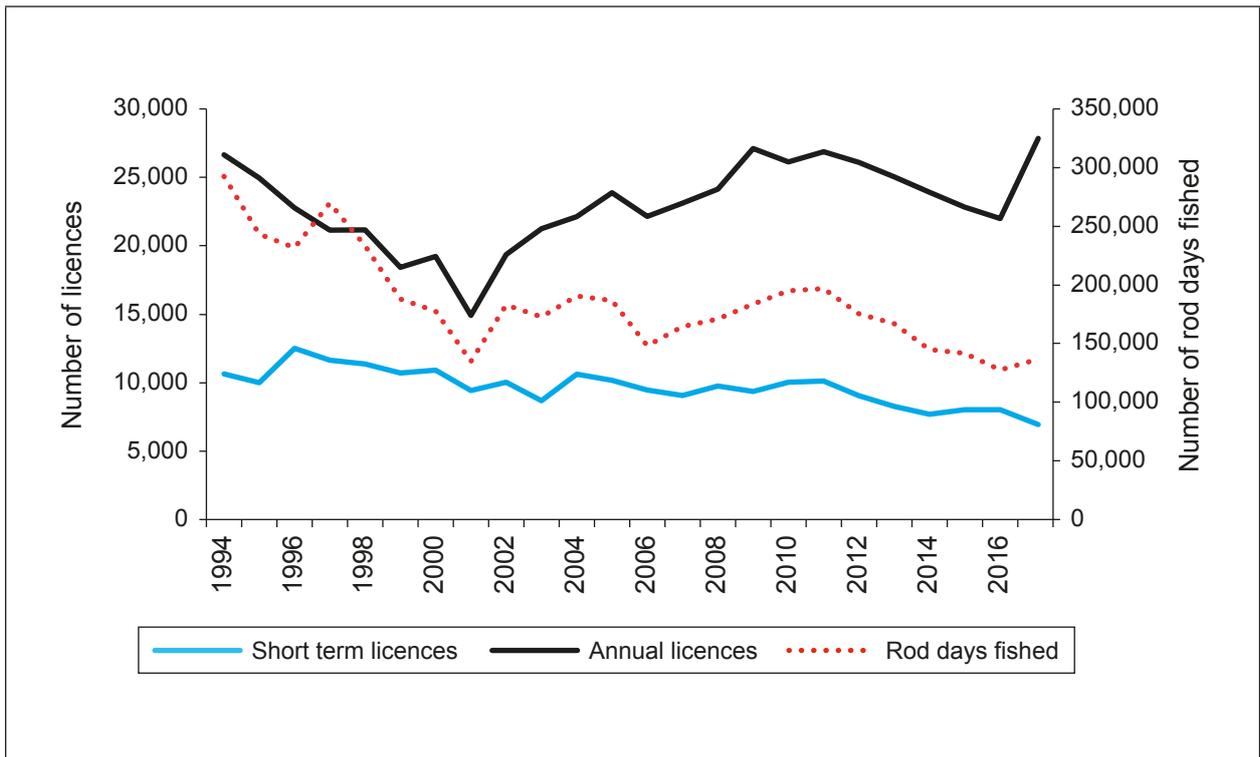
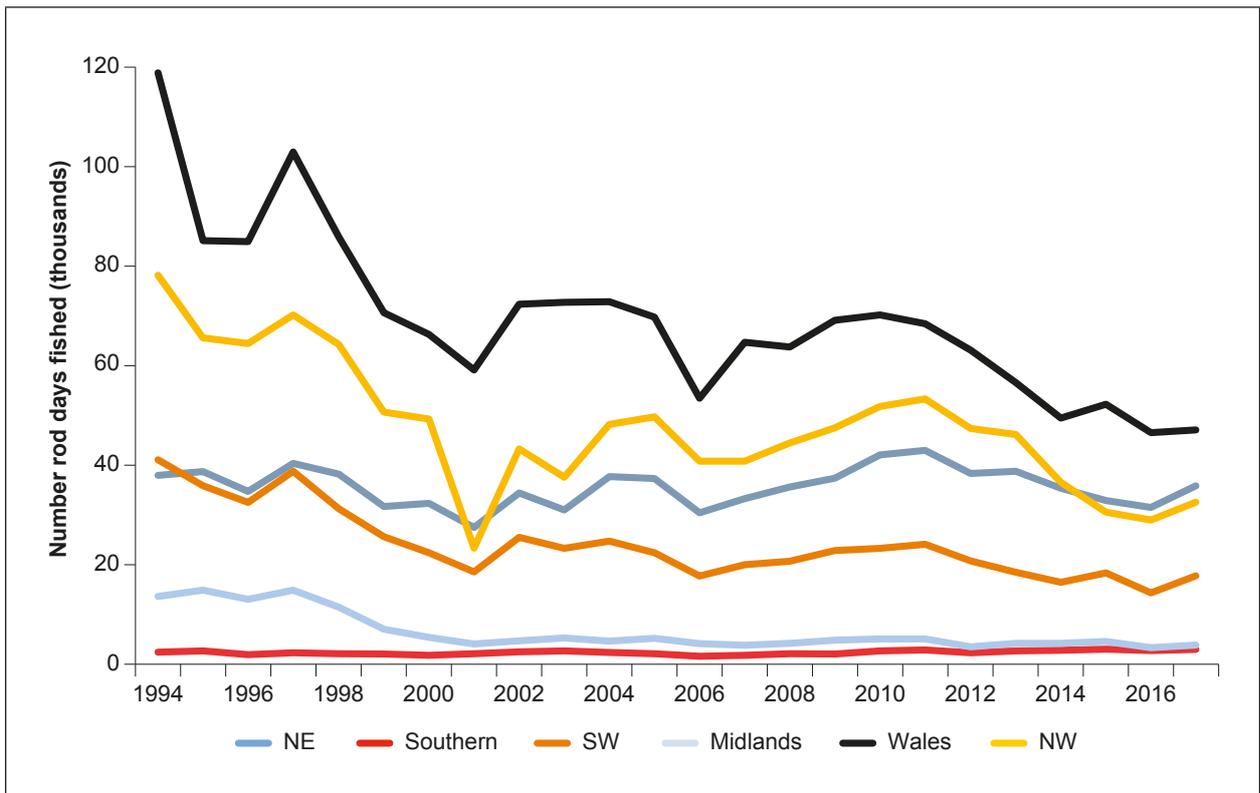


Figure 3. Numbers of fishing days available to net and fixed engine fisheries in England and Wales, and number and percentage of available days utilised, 1999-2017.



**Figure 4. Numbers of annual and short-term rod licences issued, and the number of rod days fished in England and Wales, 1994-2017.**



**Figure 5. Numbers of rod days fished (as reported in catch returns), 1994-2017.**

## 4. DECLARED CATCHES

The chief indicators of the state of salmon stocks are the catches taken by rod and net fisheries. It should be remembered that the data presented here for 2017 are provisional. Final confirmed data for 2017 will be reported in the Environment Agency and Natural Resources Wales annual compilation of catch statistics, which will be available later in the year (see, for example, Environment Agency, 2017).

Assessment of rod catch data in 2015 identified a decrease in the level of catch reporting, which is believed to have been associated with changes to the rod catch reporting system and the introduction of on-line data entry. Similar concerns have also applied to the rod catch data for 2016 and 2017. The majority of tables presented in this report present the catches for these years as they were declared; this is consistent with the annual catch statistics report which also presents declared catches. However, in order to ensure that assessments of stock status use the most complete catch information, additional correction factors to allow for the increased level of under-reporting have been applied to catches for the last three years. The methodology used in this adjustment process, as well as the catch reporting procedures for both net and rod fisheries, are described in the background report. Footnotes to the tables in this report indicate where adjusted data have been used.

**Net and rod fisheries** – The following tables and figures provide provisional declared catches for 2017 together with confirmed catches for earlier years:

- Table 9 provides the total declared number and weight of salmon caught by nets & fixed engines and by rods in England and Wales since 1988, and provides overall catch totals for England and Wales for both total catch and retained catch (excluding fish that have been caught and released).
- Table 10 gives a regional breakdown of the provisional 2017 rod and net catches (based on the former Environment Agency regions). These data are total catches only and include fish that have been caught and released by both nets and rods.
- Table 11 and Figure 6 provide time series of regional net and fixed engine catches from 1971 on.
- Table 12 and Figure 7 provide time series of regional rod catches from 1993 on, distinguishing fish caught and released from those caught and retained (data on catch-and-release were not recorded prior to 1993).

**Catches in coastal, estuary and river fisheries** – ICES requests that catch data (fish caught and retained only) are grouped by coastal, estuary and river fisheries. Data for the available time series, since 1988, are presented in Table 13 and Figure 8. Details of the fisheries included in the various categories are provided in the footnotes to the table. The catch for the coastal zone mainly reflects the catch in the north east drift and fixed net fishery. Only two coastal fisheries remained in operation in 2017 and one of these, Anglian, takes very few salmon and none in 2017 (Table 11). The catches in each of the categories have been subjected to downward pressures over recent years, in the case of the coastal and estuarine categories due to the substantial reductions in fishing effort, and, in the case of rod fisheries, due to the increasing use of catch and release.

**Catch and release (C&R)** – C&R data were first collected in England and Wales in 1993, and the practice has been used increasingly by salmon anglers in recent years. This is largely a result of voluntary measures, but also reflects the national measures to protect spring salmon and the introduction of mandatory C&R on some rivers (details available in Annex 3). As noted above, new proposals have been developed which, if approved, will introduce requirements for enhanced levels of C&R in the future. Regional C&R rates are provided in Table 12 and Figure 7 and a summary for England and Wales as a whole is given in Table 14 and Figure 9. C&R rates for each major salmon river in England and Wales are published in the annual catch statistics.

**Long-term catch trends** – The annual declared net and fixed engine catch for England and Wales since 1956 is shown in Figure 10; this distinguishes the catch taken in the north east coast fishery from net catches elsewhere. Figure 11 presents the declared rod catch of salmon from 1956, including (since 1993) fish that have been caught and released. It is unclear to what extent fish may be caught and recorded more than once as a result of C&R.

**Undeclared and illegal catches** – The non-reported and illegal catch for England and Wales in 2017 (only fish retained) is estimated at about 6 tonnes. This represents approximately 11% of the total weight (including the unreported and illegal catch) of salmon caught and killed.

Of the total unreported and illegal catch in 2017 (about 1,600 salmon), 41% by number is estimated to have derived from under-reporting in rod fisheries, 47% from illegal catches and 13% from under-reporting in net fisheries. These estimates exclude the additional under-reporting of rod caught fish that are assumed to have been subject to catch and release. The methodology used to derive these crude estimates is provided in the background report. No other substantial sources of non-catch fishing mortality, such as reports of significant mortalities of fish in rivers / estuaries due to elevated temperatures or water quality issues, were noted in 2017.

**Effect of the national spring salmon measures** – The restrictions imposed as a result of the national measures, since 1999, have affected both net and rod fisheries. Table 15 and Figures 12a (nets) and 12b (rods) show the reduction in the number of fish caught before June. Table 16 and Figure 13 show the numbers of salmon released by weight category (<3.6 kg (8 lbs), 3.6–6.4 kg, and >6.4 kg (14 lbs)) and season, since 1998. This illustrates that anglers have been voluntarily releasing an increased proportion of all fish caught after June, and large salmon in particular.

**Age composition of catches** – The annual salmon stock assessments carried out by ICES are conducted on two separate stock components: those fish that mature after one winter at sea (i.e. one-sea-winter fish / 1SW or grilse) and those that mature after two or more years at sea (i.e. multi-sea-winter / MSW fish). The relative proportions of the different sea-age groups have shown marked variability over time (Figure 14), and the different sea-age classes tend to have different patterns of run-timing. It is therefore necessary to be able to estimate the relative proportions of 1SW and MSW fish in catches; details of the approaches used are provided in the background report.

- **Nets** – The relative proportions of 1SW and MSW fish in regional net catches in 2017 are provided in Table 17 and available time series are presented in Figures 15 and 16. The longer time series for the North East Region reflects the consistent reporting arrangements that have applied in this fishery since the mid-1960s.

- **Rods** – The estimated age composition of catches for many of the principal salmon rivers in 2017 is provided in Table 18. Of these, 18 rivers (44%) were estimated to contain 50% or more MSW salmon (including fish subsequently released), 20 rivers (49%) had between 25% and 49% MSW salmon and just 3 rivers (7%) less than 25% MSW salmon in the rod catch. Changes in the relative proportions of fish in these different categories (for the same rivers) are presented in Figure 17. There has been a notable increase in the proportion of MSW fish in rod catches in the last 6 years.

The estimated numbers of 1SW and MSW salmon (including fish released), and the percentage of MSW fish, in regional rod catches over the period since 1992 are provided in Table 19; these data have been corrected for under-reporting – a scaling factor of 1.1 has typically applied. However, larger adjustments have been made for the catches since 2015 as noted above (see background report for details). The number and percentage of MSW salmon in regional rod catches are illustrated in Figure 18. A summary of the estimated rod catch of 1SW and MSW salmon for England and Wales as a whole, for the same period, is provided at Figure 19.

### Overview of catches in 2017

The total salmon catch for 2017 (including those fish released alive by netsmen and anglers) is provisionally estimated at 101.1 t, representing 23,591 fish, and comprising 40.2 t (10,133 fish) by nets and fixed engines and 59.9 t (13,458 fish) by rods. A total of 253 fish (0.8 t) were released from nets and fixed engines. Of the rod caught fish, 11,174 were released (50.4 t), representing 83% of the catch by number. Thus, 9,880 fish (39.4 t) were retained by netsmen and 2,284 fish (9.5 t) were retained by anglers. 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 6 t of additional fish caught in 2017.

The total declared catch by nets and fixed engines in 2017 decreased by 50% on the catch recorded in 2016, and was 33% below the average of the previous five years. There has been a marked decline in net catches over the past 15-20 years as a consequence of increased regulatory controls and the phasing out of some fisheries.

The policy to phase out salmon fisheries predominantly exploiting mixed stocks, where the capacity to manage individual river stocks is compromised, has had a major effect on catches. The largest phase out has occurred in the north east coast fishery. This was enhanced by a partial buy out in 2003, which reduced the number of drift net licences from 69 in 2002 to 16 (an immediate reduction of 77%). The ongoing phase out has resulted in the number of drift net licences continuing to fall; this currently stands at 11. The T/J nets have also been subject to a reducing NLO since 2012 with licence numbers falling from 63 in 2012 to 47 currently. Despite this, the north east coast fishery still accounts for the majority of the England and Wales net catch. In the past seven years, the fishery has accounted for between 86% and 93% of the total net catch (90% in 2017).

The provisional estimated rod catch in 2017 (including released fish) increased by 12% on 2016, and was 2% above the average of the previous 5 years. Long-term trends in rod catch (Figure 11) indicate a progressive decline from the peak in the mid-1960's to the early 2000's. This was followed by a general improvement in the rod catch between 2004 and 2011, suggesting some degree of reversal in the declining trend, when catches, including fish caught and released, were typically above the long-term average. However, there has been a decline in catches since 2012 and the provisional rod catch for 2017 remains among the lowest in the entire time series. As

noted above, rod catch reporting rates appear to have reduced since 2015 due, in part at least, to changes in the reporting procedures and this will have contributed to the low catches declared over the last three years. Nonetheless, catches corrected for under-reporting (Table 19, Figure 19) remain among the lowest recorded. It should also be noted that rod catch trends on individual rivers have varied from much more severe declines to substantial recoveries. The percentage of rod caught fish released by anglers has increased progressively since such data were first recorded in 1993; it is provisionally estimated that 83% of rod caught fish were released in 2017. It should be noted that rod catches have not been adjusted to account for repeat capture of salmon arising from C&R practices.

Rod catches of 1SW salmon show substantially greater year to year variability than those of MSW fish in numerical terms (Figure 19). Since the early 1990s, catches of 1SW salmon have ranged from a high of over 24,200 to just 5,600. Catches in the period 2004 to 2011 were generally higher than those in the early part of the time series. However, there was a sharp downturn in the 1SW rod catch from 2012 to 2014 that subsequently stabilised at low levels. The provisional corrected catch in 2017 was the fourth lowest in the time series, the lowest being in 2014. In contrast, rod catches of MSW salmon have demonstrated comparatively small numerical changes (range 3,100 to 10,900), and have been trending positively over the period as a whole. Catches of MSW salmon in 2017 were the second highest in the time series, and MSW salmon have comprised over 40% of the estimated total rod catch, on average, over the past seven years, compared with an average of 25% in the preceding period back to 1992. In total, the declared number of salmon retained in catches by rods, nets and fixed engines in 2017 (12,164) was the lowest in the time series, representing 52% of the 23,591 salmon caught.

### **Assessment of national catch trend**

The annual assessment of the status of salmon stocks in the northeast Atlantic carried out by the ICES North Atlantic Salmon Working Group, requires the best available time series of nominal catch data (i.e. fish retained) for each country. Figure 20 provides the current best estimate of the total catches of 1SW and MSW salmon in England and Wales, for the period since 1971. These data have been adjusted to take account of non-reported and illegal catches, and exclude Scottish origin fish taken in the north east coast fishery. Further details on the procedures used in deriving these estimates are provided in the background report.

The data indicate that catches of salmon in England and Wales (fish caught and killed only) have declined by nearly 90% from the early 1970s to the present time. There was a particularly marked decline in catch around 1990, which is consistent with the general perception of a decrease in the marine survival for many stocks around the North Atlantic, and consequently in the abundance of returning fish, at about this time. For much of the period, the decline has been greater in the non-maturing (i.e. potential MSW) fish than for the maturing (i.e. potential 1SW) component. However, there has been a marked increase in the proportion of MSW salmon in the catch in the last seven years (Figure 20) and the overall reduction in catches between the start and end of the time series is now very similar (85%-88%) for both age groups of fish.

**Table 9. Declared number and weight of salmon caught by nets & fixed engines and by rods in England and Wales, 1988-2017.**

Year	Nets & Fixed Engines		Rods (inc. released fish)		Total caught		Total retained	
	No.	Wt (t)	No.	Wt (t)	No.	Wt (t)	No.	Wt (t)
1988	77,317	271.1	32,846	123.6	110,163	394.8	110,163	394.8
1989	68,940	239.3	14,728	56.6	83,668	295.9	83,668	295.9
1990	71,827	277.8	14,849	60.3	86,676	338.1	86,676	338.1
1991	37,675	144.6	13,974	55.5	51,649	200.1	51,649	200.1
1992	33,849	130.4	10,737	40.2	44,586	170.5	44,586	170.5
1993	56,566	202.3	14,059	51.1	70,625	253.4	69,177	248.1
1994	66,457	241.9	24,891	94.0	91,348	335.9	88,121	323.7
1995	67,659	245.7	16,008	61.0	83,667	306.7	80,478	294.6
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	12,505	49.8	46,672	174.2	41,107	150.0
2000	50,998	182.7	17,596	67.5	68,594	250.2	60,953	218.8
2001	43,243	153.3	14,383	56.8	57,626	210.1	51,307	184.2
2002	38,279	133.2	15,282	60.4	53,561	193.6	45,669	161.0
2003	17,219	69.2	11,519	48.5	28,738	117.7	22,206	89.0
2004	16,581	59.1	27,332	104.5	43,913	163.6	30,559	111.4
2005	16,811	60.9	21,418	85.8	38,229	146.7	26,162	96.5
2006	13,578	50.5	19,509	72.1	33,087	122.6	22,056	79.8
2007	10,922	37.9	19,984	71.6	30,906	109.5	19,914	67.1
2008	8,647	30.2	23,512	83.7	32,159	113.9	19,036	63.7
2009	7,505	29.3	15,563	62.0	23,068	91.3	13,910	54.0
2010	22,615	72.9	25,153	89.4	47,768	162.3	32,695	108.7
2011	26,193	101.2	23,199	98.5	49,392	199.7	34,575	135.8
2012	8,484	31.0	18,450	81.1	26,934	112.1	14,926	58.0
2013	18,176	67.2	14,920	62.2	33,096	129.4	22,608	84.1
2014	11,976	45.2	10,307	43.4	22,283	88.6	14,218	54.3
2015	17,320	60.4	10,263	42.8	27,583	103.1	19,261	67.6
2016	20,312	76.9	12,068	52.9	32,380	129.8	22,494	85.9
2017	10,133	40.2	13,458	59.9	23,591	100.1	12,164	49.0
Mean (2012-2016)	15,254	56.1	13,202	56.5	28,455	112.6	18,701	70.0

Note: Data for 2017 are provisional.

**Table 10. Provisional regional declared number and weight of salmon caught by nets and rods (including released fish), 2017.**

Former EA Region / NRW	Net catch		Rod catch		Total catch	
	No.	Weight (kg)	No.	Weight (kg)	No.	Weight (kg)
North East	9,157	36,359	4,943	24,264	14,100	60,623
Anglian	0	0	0	0	0	0
Southern	0	0	285	945	285	945
South West	246	737	1,603	5,571	1,849	6,307
Midlands	42	164	328	1,630	370	1,794
North West	424	1,918	3,107	13,281	3,531	15,199
Wales	264	1,019	3,192	14,226	3,456	15,245
Unknown	0	0	0	0	0	0
<b>E&amp;W Total</b>	<b>10,133</b>	<b>40,197</b>	<b>13,458</b>	<b>59,917</b>	<b>23,591</b>	<b>100,113</b>

Note: Rod catch data for 2017 were, in part, derived from a new on-line catch reporting system. Concerns have been raised about the completeness of the resulting data. Declared catches are reported in this table, however, adjusted values have been used for assessment purposes (see Table 19).

**Table 11. Declared number of salmon caught by nets and fixed engines, 1971-2017. (N.B. Since 1999, catches include fish that were subsequently released).**

Year	Environment Agency Region						NRW Wales	E&W Total
	NE	Anglian <sup>1a</sup>	Southern	SW	Midlands	NW		
1971	60,353		186	11,827	3,629	4,989	9,008	89,992
1972	51,681		317	13,146	4,467	3,941	9,633	83,185
1973	62,842		455	12,637	3,887	4,939	9,006	93,766
1974	52,756		346	8,709	3,152	6,282	8,883	80,128
1975	53,451		384	14,736	3,833	5,251	11,107	88,762
1976	15,701		195	11,365	3,194	5,348	7,712	43,515
1977	52,888		212	7,566	2,593	5,312	6,492	75,063
1978	51,630		163	6,653	2,327	7,321	7,426	75,520
1979	43,464		282	7,853	1,404	3,723	4,552	61,278
1980	45,780		137	9,303	3,204	3,769	6,880	69,073
1981	69,113		233	11,391	4,014	5,048	9,050	98,849
1982	50,167		94	6,341	1,738	3,944	4,481	66,765
1983	77,277		163	8,718	2,699	8,489	4,834	102,180
1984	59,295		157	8,489	3,376	7,957	3,947	83,221
1985	57,356		251	9,876	2,423	2,559	3,465	75,930
1986	63,425		461	11,548	3,300	6,682	5,031	90,447
1987	36,143		505	14,530	2,963	5,052	4,535	63,728
1988	50,849		477	11,799	3,511	5,671	5,010	77,317
1989	41,453	4	83	10,684	4,364	7,294	5,058	68,940
1990	51,530	9	43	5,892	4,397	5,579	4,377	71,827
1991	25,429	34	25	2,897	1,747	4,499	3,044	37,675
1992	20,144	11		5,521	2,117	3,123	2,927	33,843
1993	41,800	4		5,017	950	5,460	3,324	56,555
1994	46,554	3		6,437	2,321	6,143	4,995	66,453
1995	53,210	5		3,251	2,588	5,566	3,039	67,659
1996	18,581	3		5,093	1,608	4,464	2,931	32,680
1997	21,922	0		2,466	1,282	3,161	2,628	31,459
1998	18,265	3		1,759	1,074	1,778	2,300	25,179
1999	26,833	6		1,605	989	2,387	2,347	34,167
2000	43,354	0		2,171	973	3,496	1,004	50,998
2001	36,115	0		1,794	1,027	3,310	997	43,243
2002	30,980	112		1,404	1,190	3,318	1,275	38,279
2003	10,435	24		1,444	1,540	2,801	975	17,219
2004	11,017	53		1,295	769	2,477	970	16,581
2005	8,987	15		572	938	5,178	1,121	16,811
2006	7,566	15		477	864	3,977	679	13,578
2007	7,091	7		211	676	2,324	613	10,922
2008	6,241	9		587	871	981	160	8,849
2009	5,395	3		285	883	846	93	7,505
2010	19,982	1		506	238	1,665	223	22,615
2011	24,214	5		363	171	915	228	25,896
2012	7,276	2		258	210	577	106	8,429
2013	16,643	2		286	131	877	204	18,143
2014	10,800	7		291	177	479	222	11,976
2015	15,863	1		402	135	543	188	17,132
2016	18,824	0		338	162	742	241	20,307
2017	9,157	0		246	42	424	264	10,133
Mean (2012-2016)	13,881	2		315	163	644	192	15,197
% change:								
2017 on 2016	-51			-27	-74	-43	+10	-50
2017 on 5-yr mean	-34			-22	-74	-34	+37	-33

Note: Data for 2017 are provisional.

Key: <sup>1a</sup> Returns not required before 1989. It is unusual for salmonids positively identified as salmon to be caught in this sea trout fishery in any numbers; some reported fish may have been misidentified in some years. Hence, no period means are reported.

**Table 12. Declared number of salmon caught by rods and the number and percentage of salmon released, 1993-2017.**

Year	Environment Agency Region						NRW Wales	E&W Total #
	NE	Thames	Southern	SW	Midlands	NW		
<b>Number caught</b>								
1993	1,696	2	84	2,806	336	5,055	4,080	14,059
1994	1,939	11	432	5,213	555	8,840	7,901	24,891
1995	2,201	13	302	2,554	442	6,348	4,146	16,006
1996	2,514	34	384	2,681	643	5,720	5,468	17,444
1997	2,445	2	149	2,372	312	4,144	3,622	13,047
1998	2,941	0	366	2,919	186	6,359	4,325	17,109
1999	2,670	1	253	1,881	185	4,133	3,369	12,493
2000	3,600	0	316	2,487	327	6,814	4,049	17,596
2001	3,733	0	405	1,396	273	4,209	4,351	14,383
2002	3,967	0	531	1,737	195	5,532	3,312	15,282
2003	3,507	0	225	1,266	333	3,547	2,632	11,519
2004	6,788	0	609	2,799	319	10,022	6,648	27,332
2005	5,933	0	438	1,725	430	8,446	4,408	21,418
2006	5,774	0	331	1,802	356	6,771	4,355	19,509
2007	4,872	0	466	2,071	280	7,151	5,136	19,984
2008	5,634	0	711	2,686	294	8,065	6,122	23,512
2009	4,421	0	391	1,648	213	5,532	3,356	15,563
2010	7,947	2	590	2,628	235	8,074	5,676	25,153
2011	8,373	0	606	2,402	362	6,672	4,784	23,199
2012	6,465	0	364	2,022	249	4,609	4,740	18,450
2013	6,469	0	271	1,085	332	3,539	3,224	14,920
2014	4,269	0	336	799	211	2,530	2,162	10,307
2015	2,936	0	451	1,592	469	2,179	2,636	10,263
2016	4,460	0	368	1,178	334	2,590	3,137	12,067
2017	4,943	0	285	1,603	328	3,107	3,192	13,458
<b>Number released</b>								
1993	191	1	36	262	17	668	273	1,448
1994	322	0	69	745	36	1,253	802	3,227
1995	555	7	83	526	32	1,393	593	3,189
1996	732	25	88	510	57	1,332	684	3,428
1997	797	1	107	586	30	1,131	480	3,132
1998	1,037	0	222	1,077	31	2,019	979	5,371
1999	1,348	1	137	898	65	1,795	1,203	5,447
2000	1,888	0	247	1,152	103	2,816	1,264	7,470
2001	1,855	0	397	635	128	1,779	1,347	6,143
2002	2,257	0	528	920	73	2,534	1,346	7,658
2003	2,265	0	225	746	153	1,859	1,172	6,425
2004	3,612	0	609	1,572	174	4,672	2,487	13,211
2005	3,426	0	438	1,130	271	4,376	2,310	11,983
2006	3,283	0	331	1,342	210	3,450	2,285	10,959
2007	2,545	0	466	1,406	145	3,838	2,517	10,922
2008	2,831	0	711	1,825	155	4,360	3,153	13,035
2009	2,533	0	391	1,080	119	3,236	1,736	9,096
2010	4,714	2	587	1,795	133	4,807	2,974	15,012
2011	5,232	0	604	1,678	222	3,904	2,766	14,406
2012	3,995	0	358	1,454	185	2,774	3,186	11,952
2013	4,444	0	266	870	227	2,320	2,331	10,458
2014	3,193	0	332	657	166	1,953	1,691	7,992
2015	2,114	0	449	1,338	340	1,708	2,164	8,113
2016	3,448	0	366	989	260	2,027	2,610	9,700
2017	3,952	0	284	1,377	252	2,552	2,757	11,174
<b>Number retained</b>								
1993	1,505	1	48	2,544	319	4,387	3,807	12,611
1994	1,617	11	363	4,468	519	7,587	7,099	21,664
1995	1,646	6	219	2,028	410	4,955	3,553	12,817

**Table 12. continued**

1996	1,782	9	296	2,171	586	4,388	4,784	14,016
1997	1,648	1	42	1,786	282	3,013	3,142	9,915
1998	1,904	0	144	1,842	155	4,340	3,346	11,738
1999	1,322	0	116	983	120	2,338	2,166	7,046
2000	1,712	0	69	1,335	224	3,998	2,785	10,126
2001	1,878	0	8	761	145	2,430	3,004	8,240
2002	1,710	0	3	817	122	2,998	1,966	7,624
2003	1,242	0	0	520	180	1,688	1,460	5,094
2004	3,176	0	0	1,227	145	5,350	4,161	14,121
2005	2,507	0	0	595	159	4,070	2,098	9,435
2006	2,491	0	0	460	146	3,321	2,070	8,550
2007	2,327	0	0	665	135	3,313	2,619	9,062
2008	2,803	0	0	861	139	3,705	2,969	10,477
2009	1,888	0	0	568	94	2,296	1,620	6,467
2010	3,233	0	3	833	102	3,267	2,702	10,141
2011	3,141	0	2	724	140	2,768	2,018	8,793
2012	2,470	0	6	568	64	1,835	1,554	6,498
2013	2,025	0	5	215	105	1,219	893	4,462
2014	1,076	0	4	142	45	577	471	2,315
2015	822	0	2	254	129	471	472	2,150
2016	1,012	0	2	189	74	563	527	2,367
2017	991	0	1	226	76	555	435	2,284
<b>% of fish released</b>								
1993	11	50	43	9	5	13	7	10
1994	17	0	16	14	6	14	10	13
1995	25	54	27	21	7	22	14	20
1996	29	74	23	19	9	23	13	20
1997	33	50	72	25	10	27	13	24
1998	35		61	37	17	32	23	31
1999	50	100	54	48	35	43	36	44
2000	52		78	46	31	41	31	42
2001	50		98	45	47	42	31	43
2002	57		99	53	37	46	41	50
2003	65		100	59	46	52	45	56
2004	53		100	56	55	47	37	48
2005	58		100	66	63	52	52	56
2006	57		100	74	59	51	52	56
2007	52		100	68	52	54	49	55
2008	50		100	68	53	54	52	55
2009	57		100	66	56	58	52	58
2010	59	100	99	68	57	60	52	60
2011	62		99.7	70	61	59	58	62
2012	62		98	72	74	60	67	65
2013	69		98	80	68	66	72	70
2014	75		99	82	79	77	78	78
2015	72		100	84	72	78	82	79
2016	77		99	84	78	78	83	80
2017	80		100	86	77	82	86	83
Mean total catch - including fish caught & released (2012-2016)	4,920		358	1,335	319	3,089	3,180	13,201
% change:								
2017 on 2016	+11		-23	+36	-2	+20	+2	+12
2017 on 5-yr mean	+0.5		-20	+20	+3	+1	+0.4	+2

Key: # Totals include some fish of unknown region of capture.

Notes: Rod catch data since 2015 have, in part, been derived from a new on-line catch reporting system. Concerns have been raised about the completeness of the resulting data. Declared catches are reported in this table, however, adjusted values have been used for assessment purposes (see Table 19).  
Data for 2017 are provisional.

**Table 13. Declared weight of salmon caught (retained fish only) and percentage of catch by weight taken in coastal, estuarine and riverine fisheries in England & Wales, 1988-2017.**

Year	Coastal		Estuarine		Riverine		Total
	Wt (t)	%	Wt (t)	%	Wt (t)	%	Wt (t)
1988	218.1	55	53.0	13	123.6	31	394.8
1989	159.3	54	80.0	27	56.6	19	295.9
1990	212.4	63	65.5	19	60.3	18	338.1
1991	105.9	53	38.7	19	55.6	28	200.1
1992	90.7	53	39.6	23	40.2	24	170.5
1993	158.8	64	43.4	18	45.9	18	248.1
1994	183.5	57	58.4	18	81.9	25	323.8
1995	200.3	68	45.4	15	48.9	17	294.6
1996	83.3	45	42.3	23	57.5	31	183.2
1997	80.5	57	26.7	19	34.6	24	141.8
1998	65.2	53	19.4	16	38.2	31	122.9
1999	101.0	67	23.1	15	26.0	17	150.0
2000	156.6	72	25.4	12	36.9	17	218.8
2001	128.6	70	24.2	13	31.3	17	184.2
2002	107.9	67	24.4	15	28.7	18	161.0
2003	42.0	47	26.6	30	20.4	23	89.0
2004	39.2	35	19.4	17	52.8	47	111.4
2005	32.2	33	28.3	29	36.0	37	96.5
2006	29.5	37	20.7	26	29.6	37	79.8
2007	23.9	36	13.4	20	29.8	44	67.1
2008	21.7	34	8.1	13	34.0	53	63.7
2009	20.2	37	8.6	16	25.2	47	54.0
2010	63.8	59	8.8	8	36.2	33	108.7
2011	93.1	69	6.4	5	36.3	27	135.8
2012	26.1	45	4.6	8	27.2	47	58.0
2013	61.5	73	5.6	7	17.0	20	84.1
2014	40.6	75	4.3	8	9.3	17	54.3
2015	55.2	82	4.4	6	8.0	12	67.6
2016	70.7	82	5.6	6	9.7	11	85.9
2017	36.0	73	3.5	7	9.5	19	49.0
Mean (2012-16)	50.8	73	4.9	7	14.2	20	70.0

Notes: Coastal catches in 2017 from North East coast nets and Anglian coastal nets, but previously included River Parrett putcher rank (last fished 1999), River Usk drift nets (1997) & putcher rank (1999), SW Wales coastal wade (1995) & seine nets (1997), River Ogwen seine nets (2000), River Seiont/Gwyrfaï seine nets (1997), River Dwyfawr seine nets (1999), N. Caernarvonshire seine nets (1996), River Clwyd sling (drift) nets (1997) and the SW Cumbria drift nets (2003).

Riverine catches in 2017 from rod catches and River Eden coops; River Conwy basket trap (also operated in freshwater) was last fished in 2002.

Estuarine fisheries include all other nets and fixed engines not mentioned above.

Data for 2017 are provisional.

**Table 14. Declared number, weight and percentage of salmon released by rods, and declared number and weight of salmon released by nets in England & Wales, 1993-2017.**

Year	Salmon released by rods			Salmon released by nets	
	Number released	Weight (t)	% of declared catch	Number	Weight (t)
1993	1,448	5.26	10		
1994	3,227	12.19	13		
1995	3,189	12.11	20		
1996	3,428	13.99	20		
1997	3,132	13.77	24		
1998	5,371	20.98	31		
1999	5,447	23.87	44	118	0.4
2000	7,470	30.70	42	171	0.7
2001	6,143	25.50	43	176	0.4
2002	7,658	31.80	50	234	0.9
2003	6,425	28.20	56	107	0.5
2004	13,211	51.70	48	143	0.5
2005	11,983	49.80	56	84	0.4
2006	10,959	42.50	56	72	0.3
2007	10,922	42.00	55	70	0.3
2008	13,035	49.80	55	88	0.3
2009	9,096	37.00	58	62	0.3
2010	15,012	53.38	60	61	0.2
2011	14,406	62.40	62	411	1.5
2012	11,952	53.89	65	56	0.2
2013	10,458	45.26	70	30	0.1
2014	7,992	34.19	78	73	0.2
2015	8,113	34.74	79	209	0.8
2016	9,700	43.25	80	185	0.6
2017	11,174	50.38	83	253	0.8

Notes: A proportion of the salmon released by nets are fish caught pre June, which, since 1999, are required to be released. Catch limits now apply on a number of net and fixed engine fisheries necessitating salmon to be released once limits are reached.

A small proportion of the salmon released by nets have previously resulted from an agreement between the Environment Agency and netsmen fishing the estuary of the River Avon (Hants); this fishery ceased to operate in 2012.

There was no requirement for net caught salmon to be released prior to 1999.

Rod catch data since 2015 have, in part, been derived from a new on-line catch reporting system. Concerns have been raised about the completeness of the resulting data. Declared catches are reported in this table, but somewhat underestimate the total catch. Adjusted values have been used for assessment purposes (see Table 19).

Data for 2017 are provisional.

**Table 15. Declared number and percentage of salmon caught by nets and rods taken before (<) and from (≥) 1 June, 1989-2017.**

Year	Net catch (including released fish)				Rod catch (including released fish)			
	Number			%	Number #			%
	< 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	43,196	43,243	0.11	708	13,675	14,383	4.9
2002	32	38,247	38,279	0.08	815	14,250	15,065	5.4
2003	42	17,177	17,219	0.24	1,037	10,373	11,410	9.1
2004	35	16,546	16,581	0.21	1,168	25,777	26,945	4.3
2005	29	16,782	16,811	0.17	1,652	19,239	20,891	7.9
2006	17	13,561	13,578	0.13	1,618	17,891	19,509	8.3
2007	14	10,908	10,922	0.13	908	18,733	19,641	4.6
2008	17	8,630	8,647	0.20	1,068	22,444	23,512	4.5
2009 <sup>[a]</sup>	1	7,504	7,505	0.01	925	14,638	15,563	5.9
2010 <sup>[a]</sup>	1	22,614	22,615	0.00	682	23,811	24,493	2.8
2011 <sup>[b]</sup>	367	25,826	26,193	1.40	1,255	21,383	22,638	5.5
2012	59	8,425	8,484	0.70	1,175	17,025	18,200	6.5
2013	30	18,146	18,176	0.17	1,236	13,541	14,777	8.4
2014	47	11,417	11,464	0.41	957	9,350	10,307	9.3
2015	133	17,188	17,321	0.77	1,348	8,843	10,191	13.2
2016	104	20,203	20,307	0.51	1,173	10,801	11,974	9.8
2017	172	9,961	10,133	1.70	1,090	12,368	13,458	8.1
Mean (1994-98)	2,997	41,687	44,684	6.7	1,898	15,491	17,388	10.9
Mean (1999-17)	67	20,598	20,665	0.3	1,079	15,887	16,965	6.4

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. Those net fisheries still allowed to operate before June (mainly targeted at sea trout) are required to release all salmon alive.

Rod catch data since 2015 have, in part, been derived from a new on-line catch reporting system. Concerns have been raised about the completeness of the resulting data. Declared catches are reported in this table, however, adjusted values have been used for assessment purposes (see Table 19).

Data for 2017 are provisional.

Key: # Excludes fish for which no capture date recorded.

<sup>[a]</sup> No requirement to record net-released fish on new logbooks, so pre-June catch under-estimated.

<sup>[b]</sup> The increase in the pre-June catch from 2011 reflects the fact that salmon caught and released by T&J nets operating in the NE Region were not recorded over the period 1999-2010.

**Table 16. Declared number of salmon caught by rods, and number and percentage of fish released, by weight category and season, 1998-2017.**

Season	April to June			July to August			September to October			April to October		
	<3.6	3.6-6.4	>6.4	<3.6	3.6-6.4	>6.4	<3.6	3.6-6.4	>6.4	<3.6	3.6-6.4	>6.4
<b>Number caught</b>												
1998	523	753	111	3782	857	222	5767	2045	562	10,072	3,655	896
1999	354	864	262	1283	627	203	3667	2209	879	5,303	3,699	1,345
2000	388	771	206	2495	818	240	5813	3111	896	8,695	4,700	1,342
2001	205	971	203	1758	1041	200	4290	2536	724	6,253	4,548	1,127
2002	377	1014	300	2033	767	173	4434	2728	775	6,844	4,508	1,247
2003	282	817	241	885	839	188	2879	2400	862	4,046	4,056	1,292
2004	516	832	241	3374	1587	283	11124	6120	1212	15,014	8,539	1,736
2005	546	1454	327	2007	1198	169	8048	4941	974	10,601	7,593	1,470
2006	567	1505	269	1422	779	110	9176	3593	766	11,165	5,877	1,145

**Table 16. continued**

2007	565	931	161	2936	1897	233	7876	3445	707	11,377	6,273	1,101
2008	719	1,381	215	3,367	2,213	288	8,908	4,028	1,018	12,994	7,622	1,521
2009	500	849	172	2,163	1,933	221	4,955	3,096	802	7,618	5,878	1,195
2010	441	469	117	3740	1418	215	11284	4986	1099	15,465	6,873	1,431
2011	643	1,426	364	2,606	2,777	574	6,831	5,255	1,567	10,080	9,458	2,505
2012	597	1,395	512	2,504	2,750	558	4,476	3,762	1,185	7,577	7,907	2,255
2013	437	1,200	486	1,644	1,146	228	5,202	3,130	1,006	7,283	5,476	1,720
2014	388	879	214	1,296	1,096	184	2,993	2,270	647	4,677	4,245	1,045
2015	547	1,236	461	1,826	1,182	292	2,465	1,403	575	4,838	3,821	1,328
2016	614	1,184	574	1,996	1,527	580	2,534	1,715	1,101	5,144	4,426	2,255
2017	572	1,223	464	2,091	1,662	596	2,697	2,501	1,312	5,360	5,386	2,372
<b>Number released</b>												
1998	136	113	20	643	197	40	2,076	900	253	2,855	1,210	313
1999	209	570	194	295	163	61	1,430	994	466	1,934	1,727	721
2000	221	532	148	499	229	72	2,325	1,431	502	3,045	2,192	722
2001	119	602	138	422	302	52	1,673	1,141	420	2,214	2,045	610
2002	241	659	213	488	207	57	2,084	1,473	488	2,813	2,339	758
2003	214	629	193	239	235	64	1,382	1,392	595	1,835	2,256	852
2004	283	576	143	1074	501	116	5,154	2,962	707	6,511	4,039	966
2005	464	1105	265	715	439	67	4,240	2,661	598	5,419	4,205	930
2006	499	1234	239	583	304	54	4,496	2,048	498	5,578	3,586	791
2007	436	666	142	1181	726	109	4,253	1,981	448	5,870	3,373	699
2008	507	948	170	1547	874	116	4,827	2,307	622	6,881	4,129	908
2009	378	630	148	957	743	104	2,925	1,963	549	4,260	3,336	801
2010	339	367	104	1743	604	107	6751	3141	802	8,833	4,112	1,013
2011	481	1,038	298	1,380	1,289	301	4,242	3,351	1,092	6,102	5,678	1,691
2012	449	1,046	443	1,391	1,371	334	2,960	2,502	871	4,800	4,919	1,648
2013	367	996	456	874	619	137	3,553	2,292	794	4,794	3,907	1,387
2014	345	768	204	830	649	112	2,406	1,823	553	3,581	3,240	869
2015	486	1,140	440	1,280	745	215	1,876	1,170	512	3,642	3,055	1,167
2016	522	1,040	528	1,424	1,009	409	2,081	1,468	983	4,027	3,517	1,920
2017	504	1,096	434	1,546	1,134	433	2,336	2,179	1,189	4,386	4,409	2,056
<b>Percentage (%) released</b>												
1998	26	15	18	17	23	18	36	44	45	28	33	35
1999	59	66	74	23	26	30	39	45	53	36	47	54
2000	57	69	72	20	28	30	40	46	56	35	47	54
2001	58	62	68	24	29	26	39	45	58	35	45	54
2002	64	65	71	24	27	33	47	54	63	41	52	61
2003	76	77	80	27	28	34	48	58	69	45	56	66
2004	55	69	59	32	32	41	46	48	58	43	47	56
2005	85	76	81	36	37	40	53	54	61	51	55	63
2006	88	82	89	41	39	49	49	57	65	50	61	69
2007	77	72	88	40	38	47	54	58	63	52	54	63
2008	71	69	79	46	39	40	54	57	61	53	54	60
2009	76	74	86	44	38	47	59	63	68	56	57	67
2010	77	78	89	47	43	50	60	63	73	57	60	71
2011	75	73	82	53	46	52	62	64	70	61	60	68
2012	75	75	87	56	50	60	66	67	74	63	62	73
2013	84	83	94	53	54	60	68	73	79	66	71	81
2014	89	87	95	64	59	61	80	80	85	77	76	83
2015	89	92	95	70	63	74	76	83	89	75	80	88
2016	85	88	92	71	66	71	82	86	89	78	79	85
2017	88	90	94	74	68	73	87	87	91	82	82	87

Notes: 1998 Pre national byelaw.

1999 National byelaw requiring compulsory catch and release before 16 June introduced on 15 April.

2000 First full year of national catch and release byelaw.

Analysis based on representative sample of catch return data; totals differ from the declared catches (Table 10).

Rod catch data since 2015 have, in part, been derived from a new on-line catch reporting system. Concerns have been raised about the completeness of the resulting data. Declared catches are reported in this table, however, adjusted values have been used for assessment purposes (see Table 19).

Data for 2017 are provisional.

**Table 17. Provisional declared number and percentage of small (<3.6kg) and large (>3.6kg) salmon caught by net fisheries in England & Wales, 2017.**

EA Region/NRW	Small salmon (1SW)		Large salmon (MSW)		Total
	(<3.6 kg)	%	(>3.6 kg)	%	
North East	3,383	37	5,687	63	9,070
South West	159	67	78	33	237
Midlands	1	5	21	95	22
North West	87	21	323	79	410
Wales	107	41	157	59	264
<b>Total</b>	<b>3,737</b>	<b>37</b>	<b>6,266</b>	<b>63</b>	<b>10,003</b>

Note: Weight split based primarily on retained fish, so total differs from that provided in Table 10.

**Table 18. Provisional declared number and percentage of 1SW (grilse) and MSW salmon caught by selected rod fisheries (including fish caught and released), 2017.**

EA Region / NRW	River	No. 1SW	%	No. MSW	%
NE	Coquet	207	61	135	39
	Tyne	922	28	2407	72
	Wear	409	46	471	54
Southern	Itchen	109	69	50	31
	Test	77	62	47	38
SW	Hants Avon	53	38	86	62
	Frome	43	54	36	46
	Exe	127	79	33	21
	Teign	35	78	10	22
	Dart	14	56	11	44
	Tavy	27	56	21	44
	Tamar	211	61	136	39
	Lynher	92	75	31	25
	Fowey	121	72	47	28
	Camel	45	52	41	48
	Taw	100	42	137	58
Midlands	Torridge	30	43	39	57
	Lyn	27	66	14	34
	Severn	73	22	254	78
NW	Ribble	333	47	372	53
	Lune	209	46	248	54
	Kent	90	62	55	38
	Leven	20	57	15	43
	Irt	34	76	11	24
	Ehen	124	62	76	38
	Derwent	133	40	202	60
	Eden	182	29	437	71
	Border Esk	135	36	235	64
Wales	Wye	202	25	597	75
	Usk	241	32	512	68
	Ogmore	12	67	6	33
	Tywi	133	40	201	60
	Tawe	22	46	26	54
	Taf	28	70	12	30
	E & W Cleddau	28	62	17	38
	Teifi	102	44	128	56
	Dyfi	36	54	31	46
	Mawddach	21	36	38	64
	Ogwen	45	61	29	39
Conwy	87	59	60	41	
Dee	122	30	287	70	
<b>E&amp;W Total</b>		<b>5,061</b>	<b>40</b>	<b>7,601</b>	<b>60</b>

Note: Data only included for fish for which weight data provided on catch return and do not include all rivers; these data therefore differ from the total reported catch (Table 10).

**Table 19. Estimated number of 1SW and MSW salmon (corrected for under-reporting) and the percentage composition of MSW salmon caught by rods (including fish caught and released), 1992-2017.**

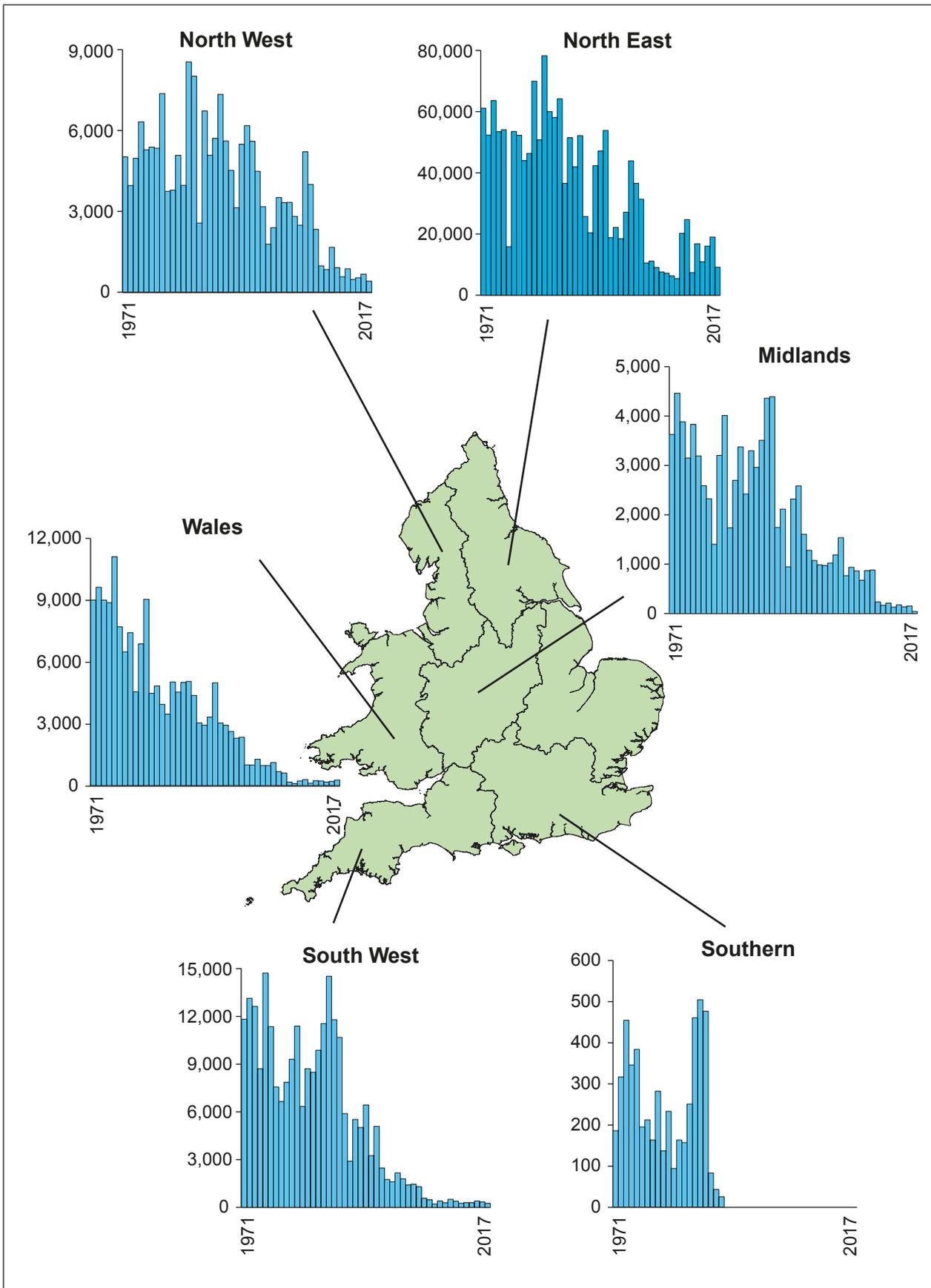
Year	Environment Agency Region										NRW		E&W	
	NE		Southern		SW		Midlands		NW		Wales		Total	
	1SW	MSW	1SW	MSW	1SW	MSW	1SW	MSW	1SW	MSW	1SW	MSW	1SW	MSW
1992	1,085	723	235	29	3,186	476	112	175	4,029	945	2,282	1,074	10,927	3,422
1993	966	729	465	82	3,216	706	145	192	5,245	999	4,788	1,197	14,825	3,905
1994	1,173	660	277	156	4,172	1,043	217	339	7,162	1,680	5,609	2,291	18,611	6,169
1995	1,270	1,082	218	65	1,914	860	71	402	5,380	1,102	2,769	1,491	11,622	5,002
1996	1,246	1,405	262	97	1,674	1,116	90	603	4,620	1,228	3,431	2,287	11,322	6,736
1997	1,325	1,084	120	30	1,932	483	54	266	3,780	667	2,382	1,021	9,593	3,551
1998	2,226	909	378	24	2,543	501	66	131	5,975	699	3,548	843	14,736	3,107
1999	1,586	1,351	206	72	1,386	683	70	132	3,589	955	2,278	1,175	9,115	4,368
2000	2,188	1,618	292	56	2,270	441	200	139	6,507	807	3,196	816	14,653	3,877
2001	2,628	1,478	344	61	1,275	261	90	210	3,936	694	3,638	1,149	11,911	3,853
2002	2,924	1,440	520	64	1,452	459	92	123	5,233	852	2,550	1,093	12,771	4,031
2003	2,353	1,505	151	74	947	446	117	249	3,121	780	1,766	1,129	8,455	4,183
2004	5,222	2,245	528	81	2,633	446	123	228	9,790	1,234	5,927	1,386	24,223	5,620
2005	5,481	2,088	306	132	1,404	494	151	322	7,804	1,487	3,588	1,261	18,734	5,784
2006	4,637	1,715	256	76	1,388	595	145	247	5,810	1,639	3,593	1,198	15,829	5,470
2007	3,798	1,431	382	84	1,615	656	171	136	6,725	1,029	4,110	1,267	16,801	4,603
2008	4,651	1,547	633	78	2,245	710	106	217	7,724	1,147	5,387	1,347	20,746	5,046
2009	3,686	1,346	157	95	1,326	477	74	157	4,686	1,346	2,323	1,163	12,252	4,584
2010	6,119	2,623	498	88	2,486	335	106	153	7,194	1,687	5,027	1,103	21,430	5,989
2011	4,422	4,788	420	183	1,882	760	105	293	4,564	2,775	3,066	2,126	14,460	10,925
2012	3,528	3,584	273	128	1,219	1,005	68	206	2,877	2,193	2,198	3,016	10,162	10,132
2013	3,978	3,138	140	158	778	416	76	289	2,790	1,103	1,828	1,719	9,590	6,822
2014	2,153	2,200	256	100	463	339	48	161	1,738	901	953	1,197	5,610	4,897
2015	2,074	1,919	326	287	1,232	933	136	502	1,323	1,641	1,414	2,171	6,505	7,453
2016	2,285	3,602	263	223	881	674	78	363	1,614	1,805	1,439	2,702	6,560	9,369
2017	2,118	4,209	239	126	1,219	833	95	325	1,764	2,213	1,505	2,581	6,940	10,287
Mean (2012-2016)	2,804	2,888	251	179	915	673	81	304	2,068	1,528	1,566	2,161	7,686	7,734
% change:														
2017 on 2016	-7	+17	-9	-44	+38	+24	+22	-10	+9	+23	+5	-4	+6	+10
2017 on 5-year mean	-24	+46	-5	-30	+33	+24	+17	+7	-15	+45	-4	+19	-10	+33

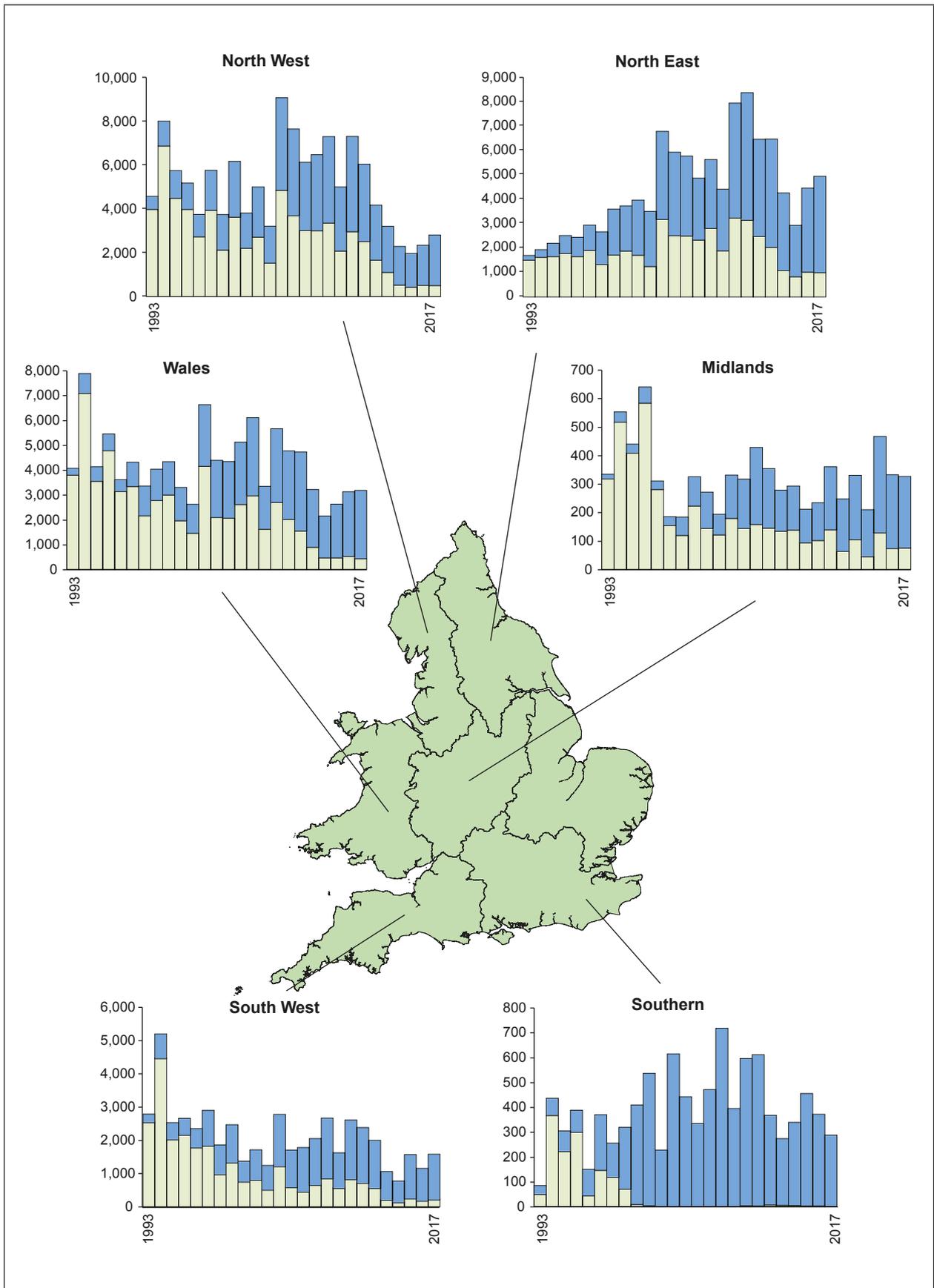
<b>Percentage MSW</b>														
Year	Environment Agency Region										NRW		E&W	
	NE		Southern		SW		Midlands		NW		Wales		Total	
	1SW	MSW	1SW	MSW	1SW	MSW	1SW	MSW	1SW	MSW	1SW	MSW	1SW	MSW
1992	40		11		13		61		19		32		24	
1993	43		15		18		57		16		20		21	
1994	36		36		20		61		19		29		25	
1995	46		23		31		85		17		35		30	
1996	53		27		40		87		21		40		37	
1997	45		20		20		83		15		30		27	
1998	29		6		16		66		10		19		17	
1999	46		26		33		65		21		34		32	
2000	43		16		16		41		11		20		21	
2001	36		15		17		70		15		24		24	
2002	33		11		24		57		14		30		24	
2003	39		33		32		68		20		39		33	
2004	30		13		14		65		11		19		19	
2005	28		30		26		68		16		26		24	
2006	27		23		30		63		22		25		26	
2007	27		18		29		44		13		24		22	
2008	25		11		24		67		13		20		20	
2009	27		38		26		68		22		33		27	
2010	30		15		12		59		19		18		22	
2011	52		30		29		74		38		41		43	
2012	50		32		45		75		43		58		50	
2013	44		53		35		79		28		48		42	
2014	51		28		42		77		34		56		47	
2015	48		47		43		79		55		61		53	
2016	61		46		43		82		53		65		59	
2017	67		35		41		77		56		63		60	
Mean (2012-2016)	51		42		42		79		42		58		50	

Note: Data for 2017 are provisional.

Rod catch data since 2015 have, in part, been derived from a new on-line catch reporting system. Concerns have been raised about the completeness of the resulting data. Correction factors have therefore been applied to the catches reported in this table to provide the best estimate of the total catch in each former region. The methodology applied to correct for under-reporting is outlined in the background report.



**Figure 6. Declared number of salmon caught by nets and fixed engines, 1971-2017. (Note: y-axes not to same scale.)**



**Figure 7. Declared number of salmon caught by rods and the number of salmon released, 1993-2017. The histograms display the total declared catch, with the blue shaded area denoting fish caught and released. (Note: y-axes not to same scale.)**

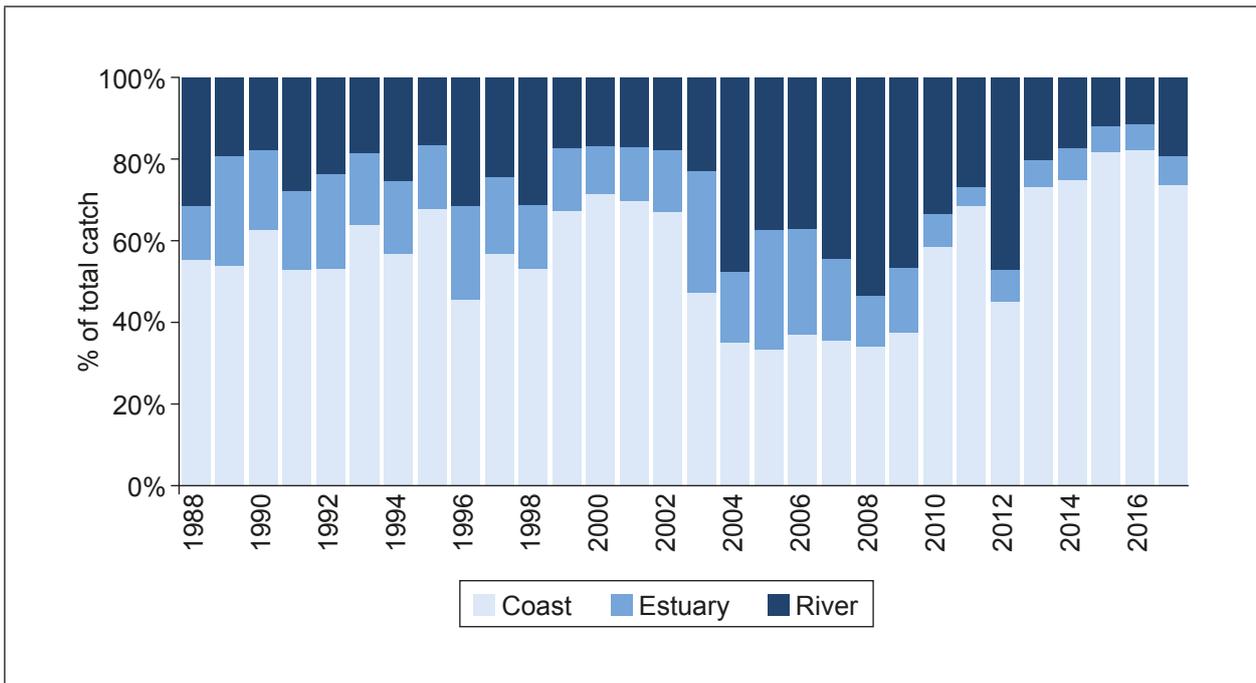


Figure 8. Percentage (by weight) of the declared total catch of salmon (caught and retained only) taken in coastal, estuarine and riverine fisheries, 1988-2017.

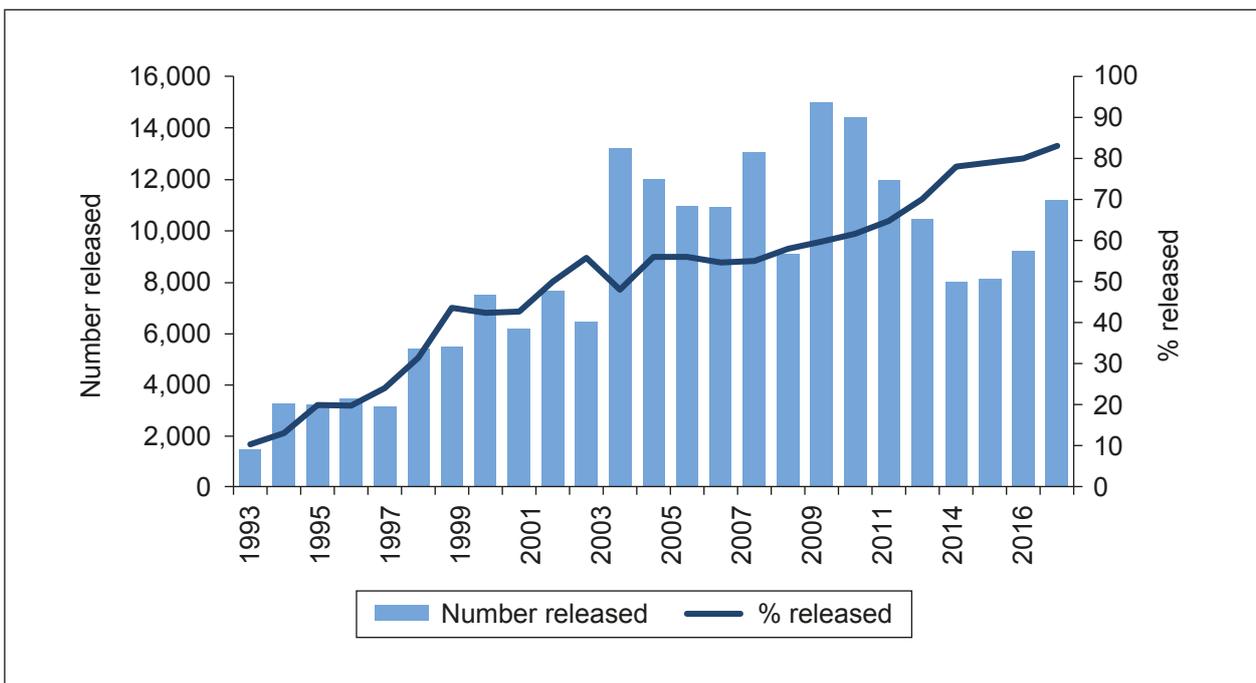
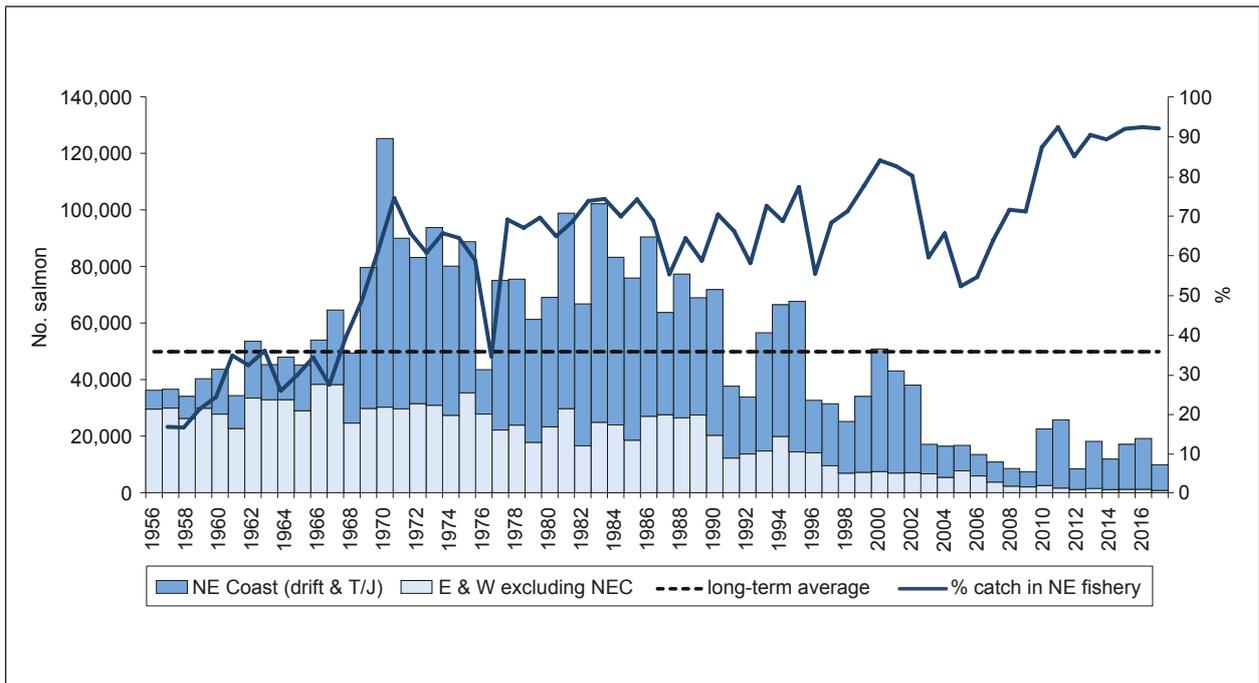
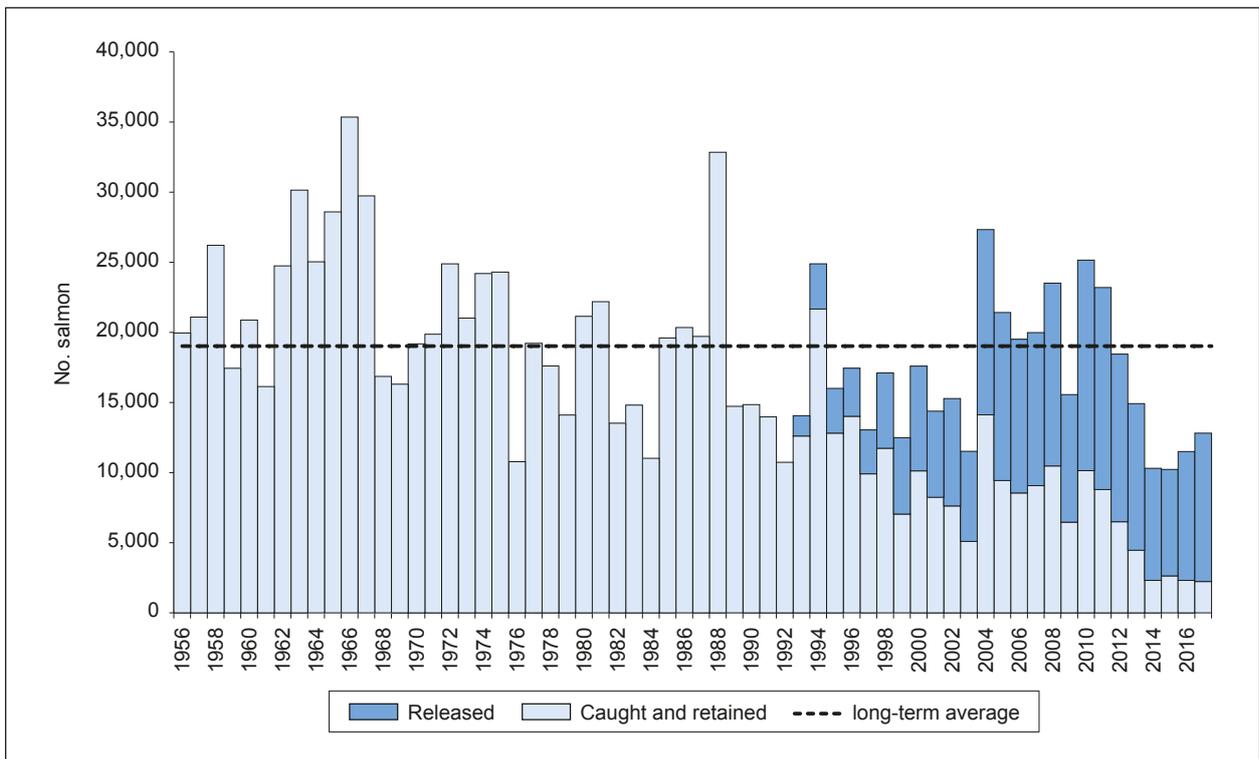


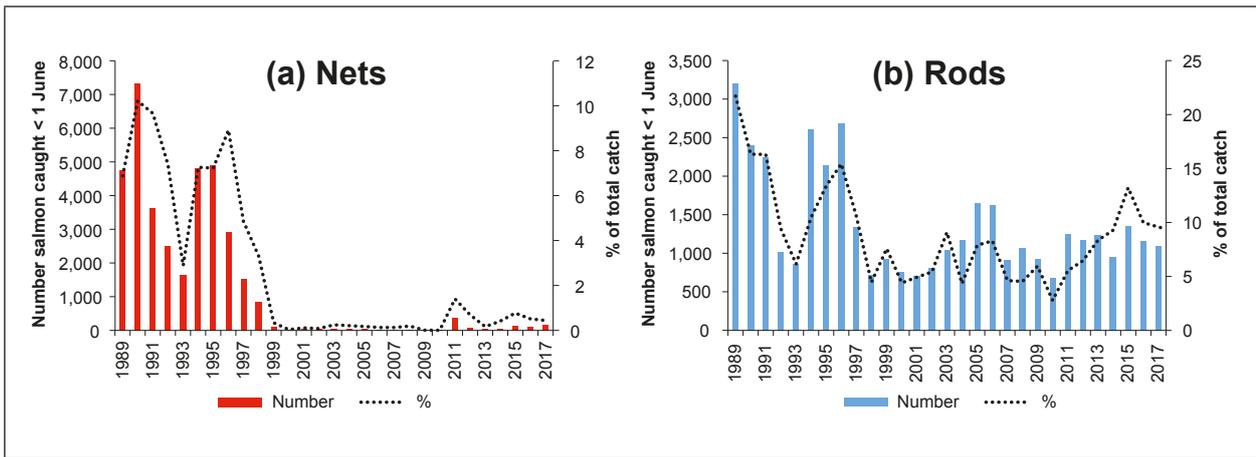
Figure 9. The number and percentage of the declared salmon catch released by anglers, 1993-2017.



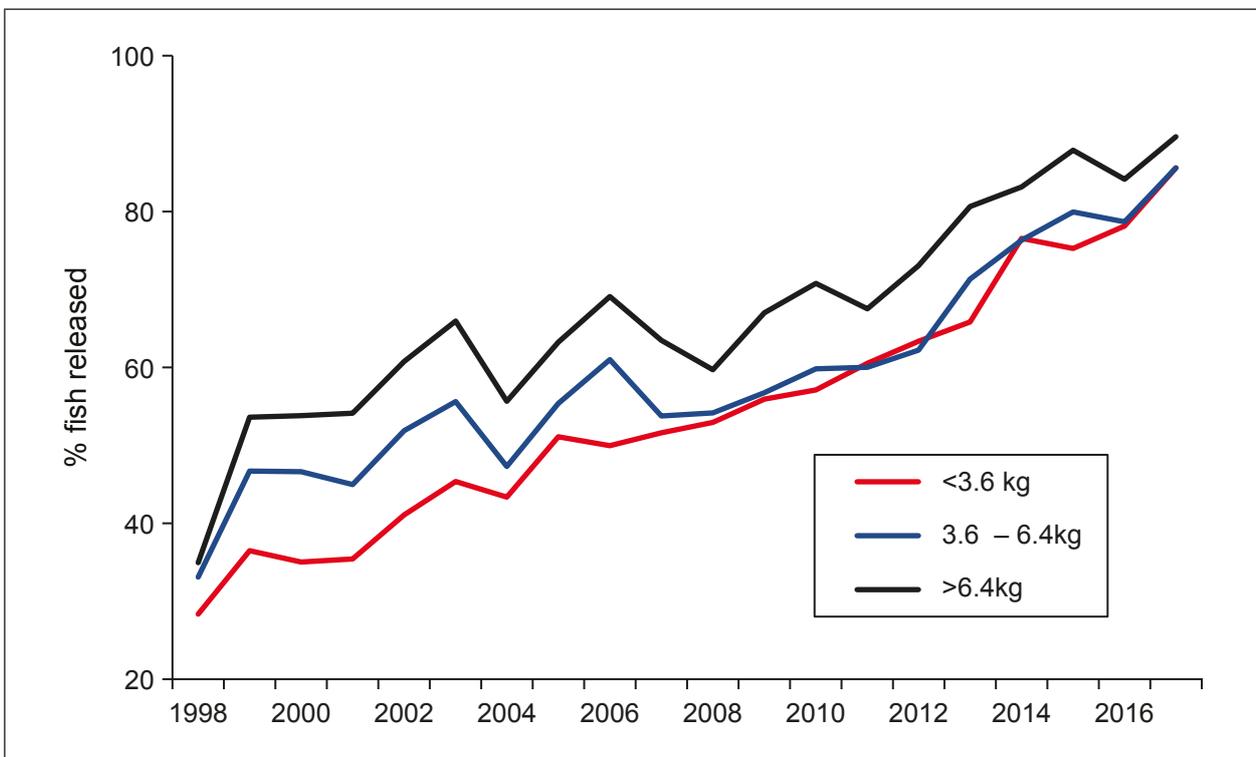
**Figure 10. Declared number of salmon caught by nets and fixed engines in England & Wales and the percentage of the catch taken in the north east coast fishery, 1956-2017.**



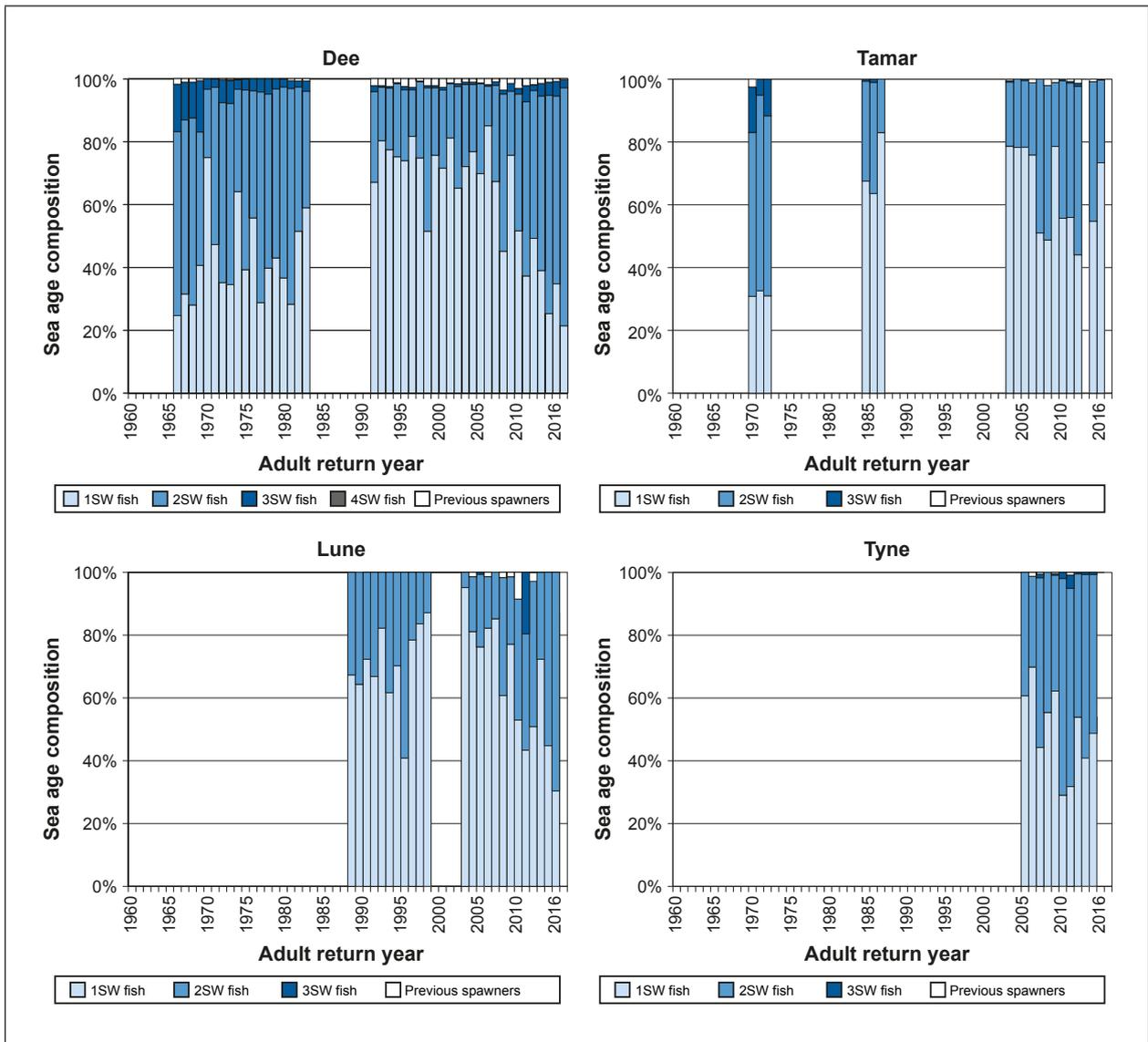
**Figure 11. Declared number of salmon caught by rods in England & Wales, 1956-2017.**



**Figure 12. Declared number and percentage of salmon caught by (a) nets and (b) rods before 1 June, 1989-2017.**



**Figure 13. Percentage of rod caught fish released by anglers by weight category, 1998-2017.**



**Figure 14. Variation in the proportions of 1SW and older salmon returning to the Rivers Dee, Tamar, Lune and Tyne over available time series.**

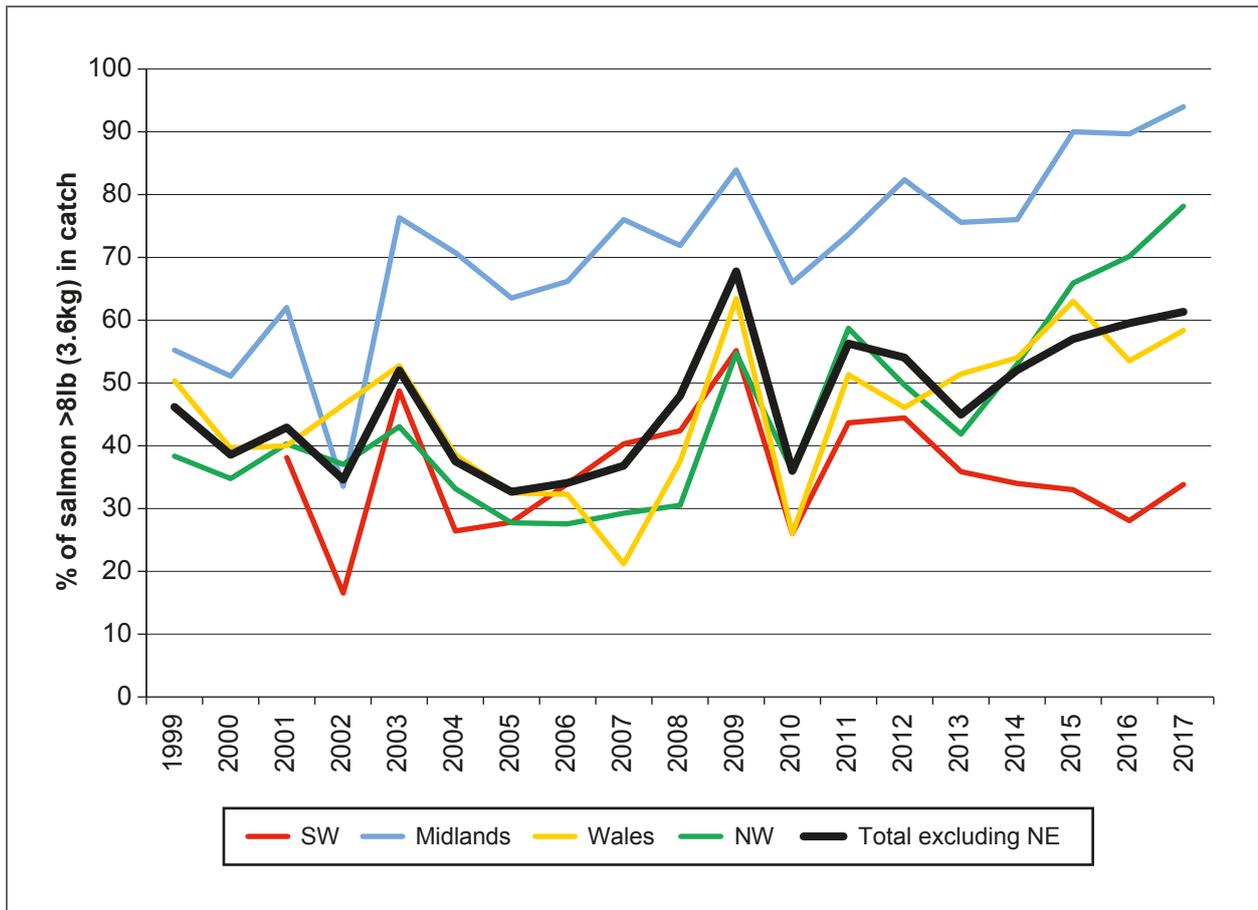


Figure 15. Estimated percentage (%) of salmon >8lb (3.6 kg) caught in net and fixed engine fisheries (excluding NE Region), 1999-2017.

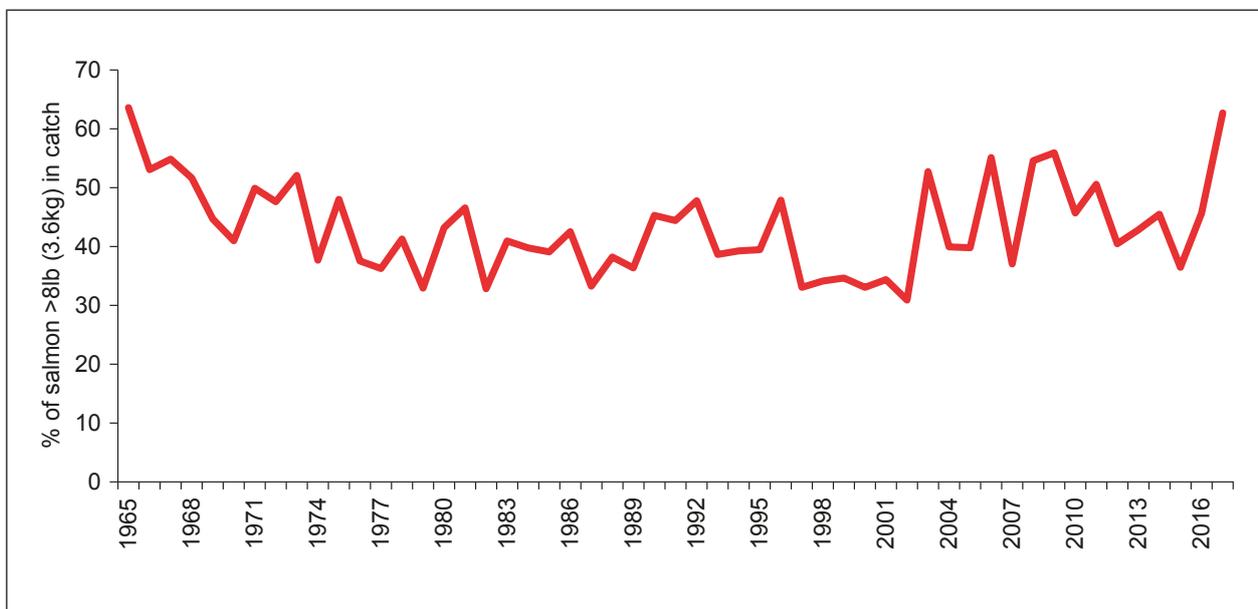
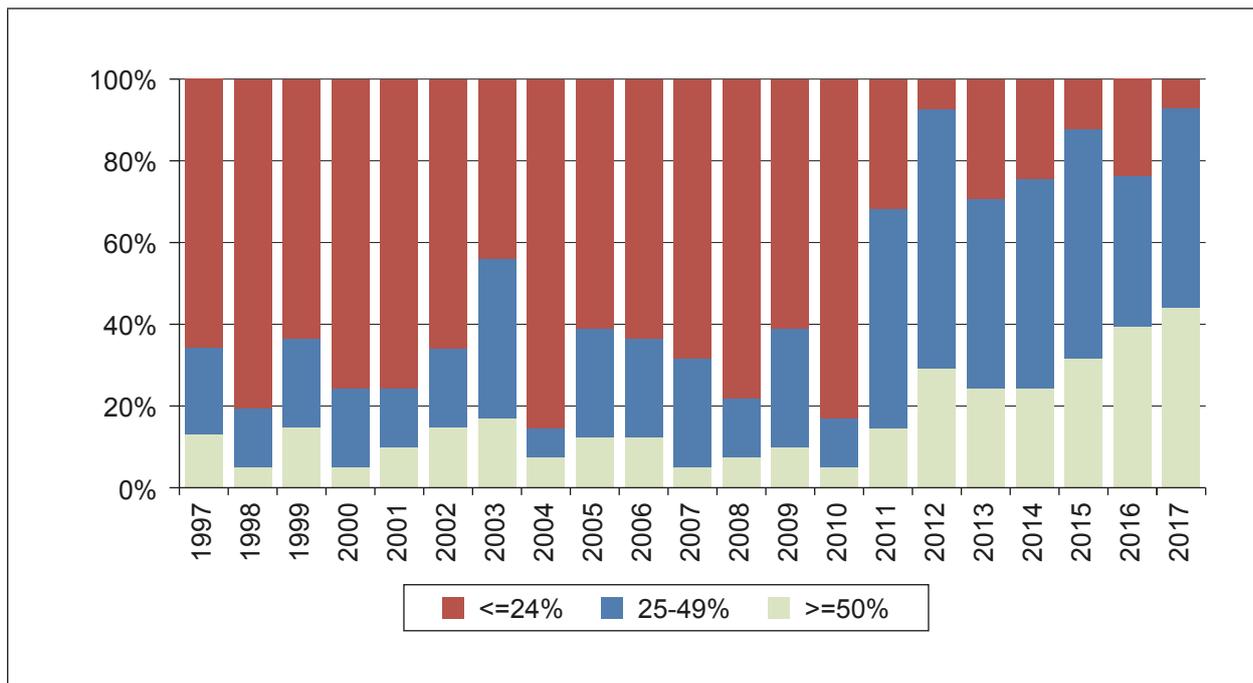
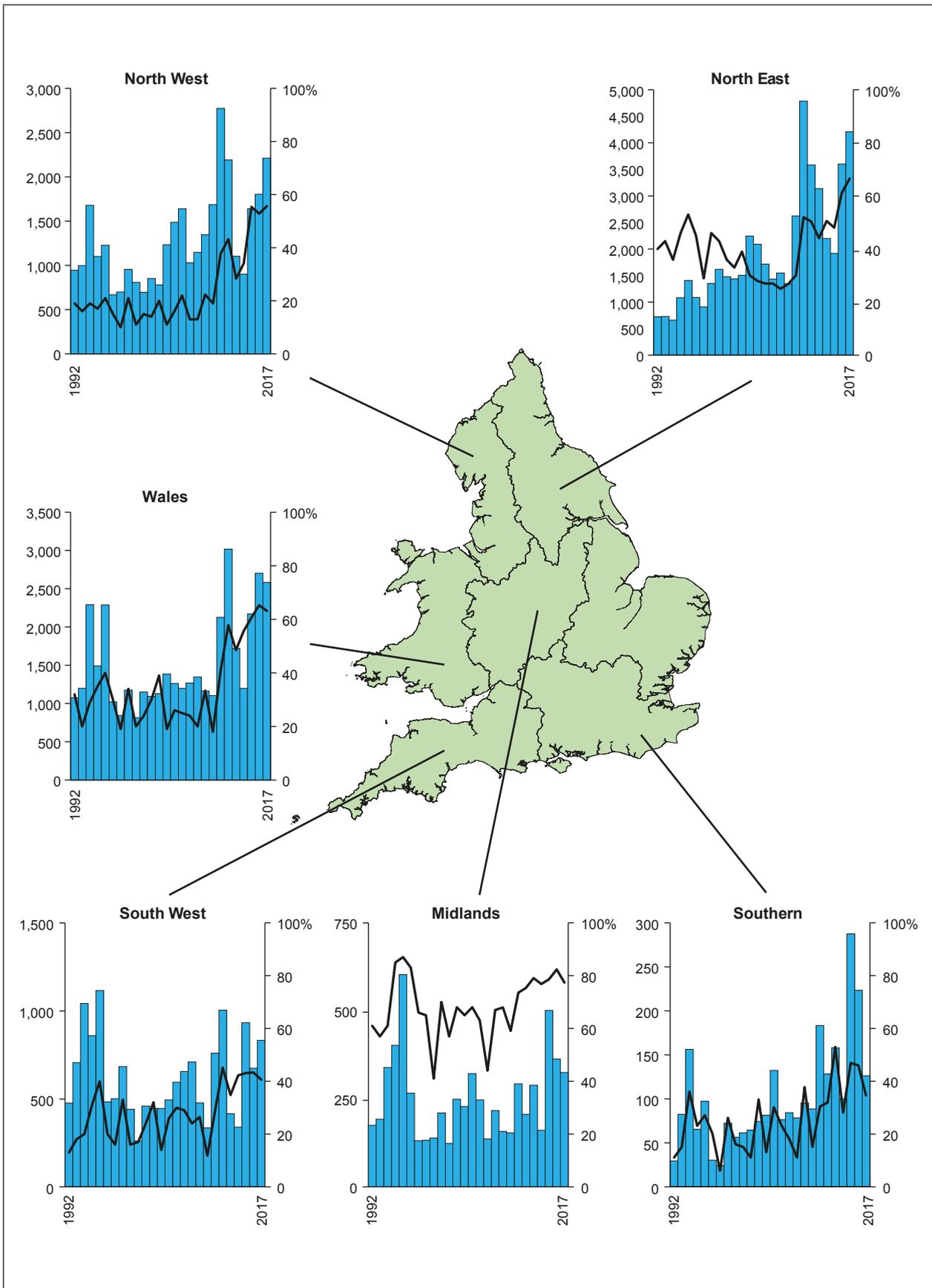


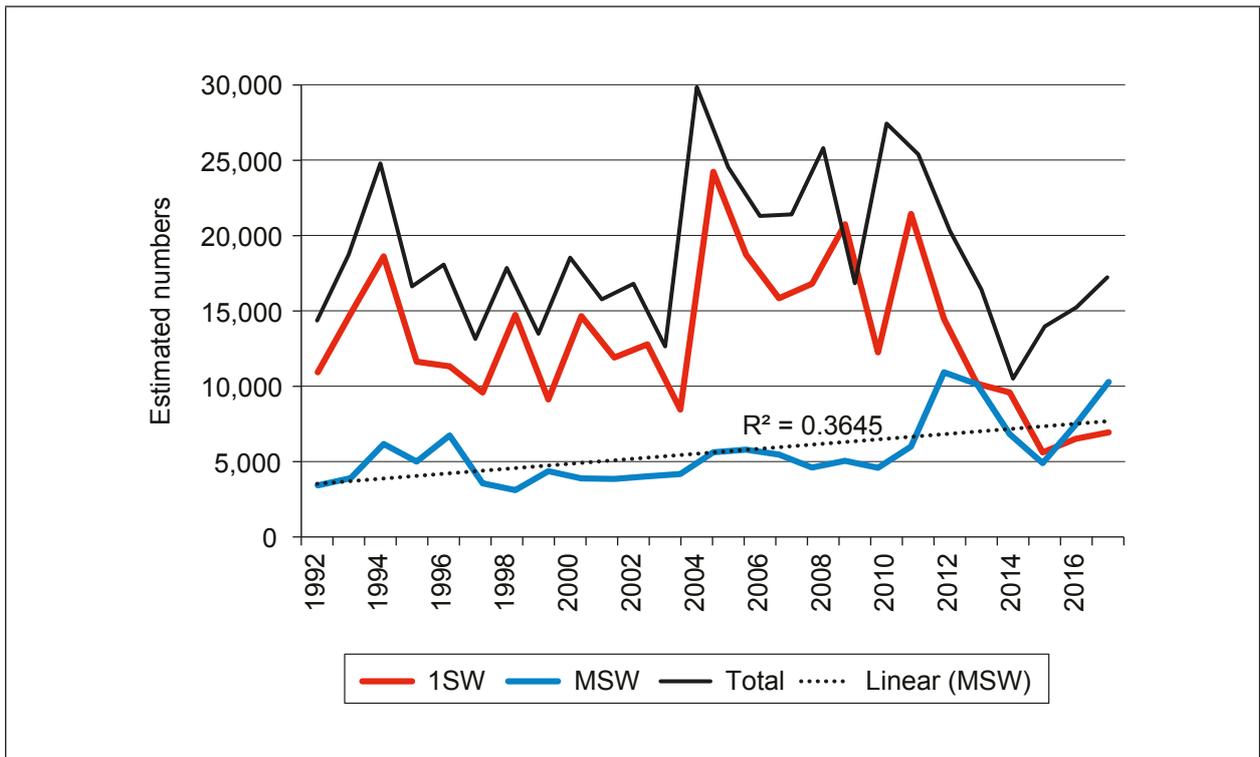
Figure 16. Estimated percentage (%) of salmon >8lb (3.6 kg) caught in the north east coast net fishery (as declared by netmen), 1965-2017.



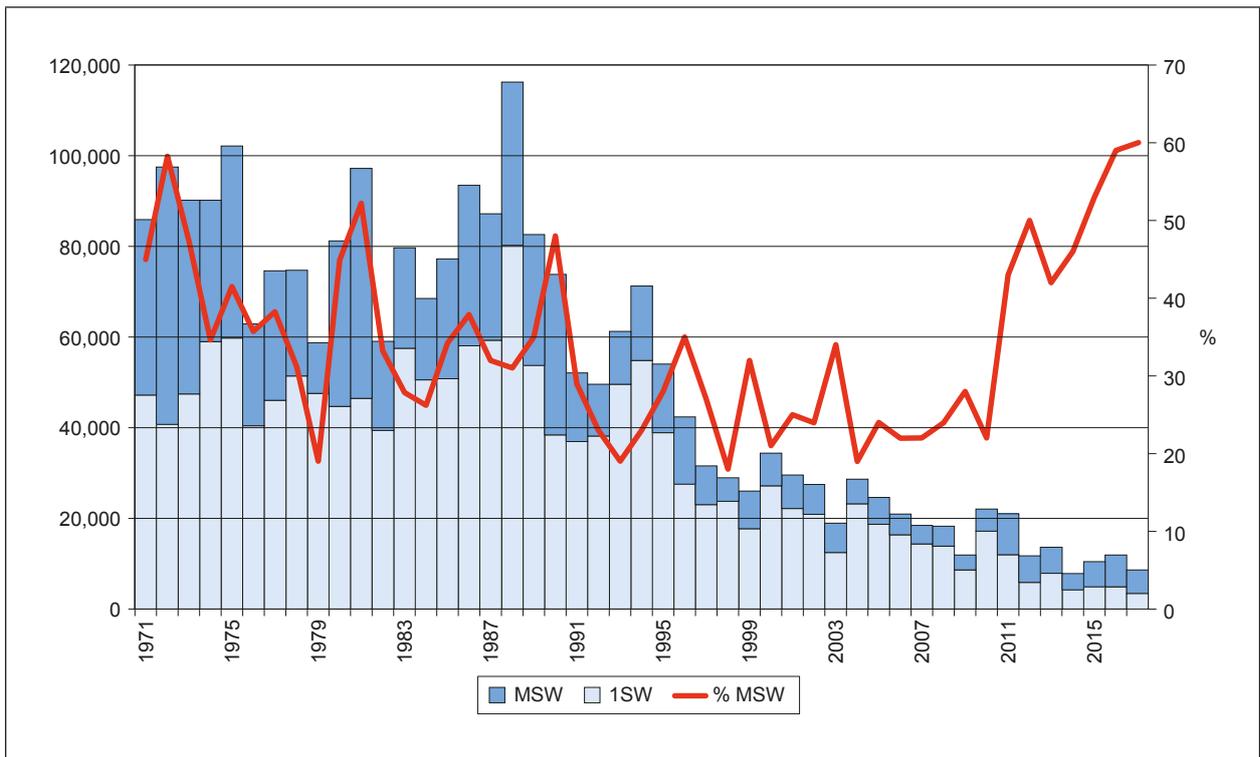
**Figure 17. Estimated percentage of selected principal salmon rivers with  $\geq 50\%$ , 25-49% and  $\leq 24\%$  of MSW salmon in the declared rod catch, 1997-2017.**



**Figure 18. Estimated number (histogram) and percentage (solid line) of MSW salmon caught by rods, 1992 to 2017.**



**Figure 19. Estimated total number (corrected for under-reporting) of 1SW and MSW salmon caught by rod fisheries in England and Wales (including fish caught and released), 1992-2017.**



**Figure 20. Estimated total catch of 1SW and MSW salmon in England and Wales (fish caught and killed only), 1971-2017, as used in the ICES PFA assessment.**

## 5. CATCH PER UNIT EFFORT (CPUE)

Since catch levels are influenced strongly by the level of fishing effort, catch per unit effort (CPUE) data are commonly used as well as the declared catch in order to help evaluate the status of stocks. However, the relationship between CPUE and abundance can be influenced by confounding factors in both rod and net fisheries. It should also be remembered that net and rod fisheries operate sequentially (the net fisheries exploit the returning fish first), and over different time periods (fishing seasons). Rod fisheries are active over a longer period and typically extend into the early autumn after net fisheries have ceased to fish. Thus, changes in patterns of run-timing may also impact on CPUE values in the different fisheries.

- **Nets** – Regional CPUE data for net fisheries for the period since 1997 are presented in Table 20. These data are based on the number of tides fished by netsmen, except in the North East Region where the number of days fished is used. In order to provide comparable time series, the data only include fishing gears that have operated in a consistent manner over the full period. Plots of the standardised CPUE Z-scores for the various regions and for net fisheries overall (expressed as a 2-year moving average) are provided in Figure 21.
- **Rods** – Regional CPUE data for rod fisheries for the period since 1997 (expressed as the number of salmon caught per 100 days fished) are presented in Table 21. Plots of the standardised CPUE Z-scores for the various regional rod fisheries and the overall rod CPUE for England and Wales are provided in Figure 22 for the same period. Individual CPUE data for all the major salmon rivers in England and Wales are reported in the annual catch statistics reports (e.g. Environment Agency, 2017). The trends in rod CPUE for the different regions show a reasonable degree of coherence and available evidence from selected rivers where we have estimates of returning stock size, as well as CPUE, suggests rod CPUE values provide a reasonable indicator of stock abundance (Figure 23).

### Overview of CPUE in 2017

The overall catch per unit effort (CPUE) for nets and fixed engines in 2017 decreased on that in 2016, and was 19% below the previous 5-year mean (2012-2016). CPUE in 2017 was above the 5-year average in Wales, but below the 5-year mean elsewhere (Table 20). Normalised CPUE values (Z-scores) for the various former regions and an overall average (Figure 21) indicate that CPUE, and by inference abundance, peaked during the period 2000-02, then declined steadily until 2009 (which had the lowest CPUE of the time series), before increasing again between 2010 and 2011. Since that time overall CPUE has oscillated; in 2017 it was below the long-term average of the time series. An earlier analysis of net CPUE and river flow suggests above average flows in July (when a high proportion of the net catch typically occurs) tend to result in reduced CPUE values.

Rod CPUE in 2017 increased on 2016 in the South West, North West and Wales. For all regions, except Southern, rod CPUE was equal to or above the 5-year average (Table 21). In the North East Region, rod CPUE in 2017 was slightly above (2%) the 5-year average. Normalised CPUE values (Z-scores) for rod fisheries (Figure 22) indicate a largely positive trend between 1997 and 2012, and by inference increasing abundance (Figure 23). However, overall CPUE decreased from 2013 to 2015 followed by an increase thereafter. Overall CPUE in 2017 was slightly above the long-term average of the time series.

**Table 20. Mean catch per unit effort (CPUE) for salmon net fisheries, 1997-2017.**

Year	Environment Agency Region					NRW Wales	England & Wales total
	NE Drift nets (June-August)	NE	SW	Midlands	NW		
1997	6.48	4.40	0.70	0.23	0.63	0.07	1.23
1998	5.92	3.81	1.25	0.24	0.46	0.08	1.17
1999	8.06	4.88	0.79	0.31	0.52	0.20	1.35
2000	13.06	8.11	1.01	0.33	1.05	0.18	2.19
2001	10.34	6.83	0.71	0.33	0.71	0.16	1.77
2002	8.55	5.59	1.03	0.53	0.90	0.23	1.66
2003	7.13	4.82	1.24	0.60	0.62	0.11	1.43
2004	8.17	5.88	1.17	0.36	0.69	0.11	1.65
2005	7.23	4.13	0.60	0.60	1.28	0.09	1.35
2006	5.60	3.20	0.66	0.51	0.82	0.09	1.04
2007	7.24	4.17	0.33	0.51	0.75	0.05	1.14
2008	5.41	3.59	0.63	0.64	0.34	0.06	0.96
2009	4.76	3.08	0.53	0.64	0.51	0.04	0.89
2010	17.03	8.56	0.99	0.26	0.47	0.09	2.08
2011	19.25	9.93	0.63	0.14	0.34	0.10	2.25
2012	6.80	5.35	0.69		0.31	0.21	1.36
2013	11.06	8.22	0.54		0.39	0.08	1.89
2014	10.30	6.12	0.43		0.31	0.07	1.42
2015	12.93	7.22	0.64		0.39	0.08	1.71
2016	10.95	9.98	0.78		0.38	0.10	2.34
2017	7.58	5.64	0.58		0.26	0.15	1.41
Mean (2012-2016)	10.41	7.38	0.62		0.35	0.11	1.75
No. fisheries	2	4	3	1	6	6	19
% change (2017 on 5-year mean)	-27	-24	-5		-26	+39	-19

Notes: Fisheries were selected on the basis that they were fished consistently during the period. Data are expressed as catch per licence-tide, except for the North East, for which data are recorded as catch per licence-day.

From 2012, the fishery operating in the Severn (Midlands Region) has been limited by a catch limit (cap); the Midlands data have therefore been removed from the combined E&W total for the whole time series.

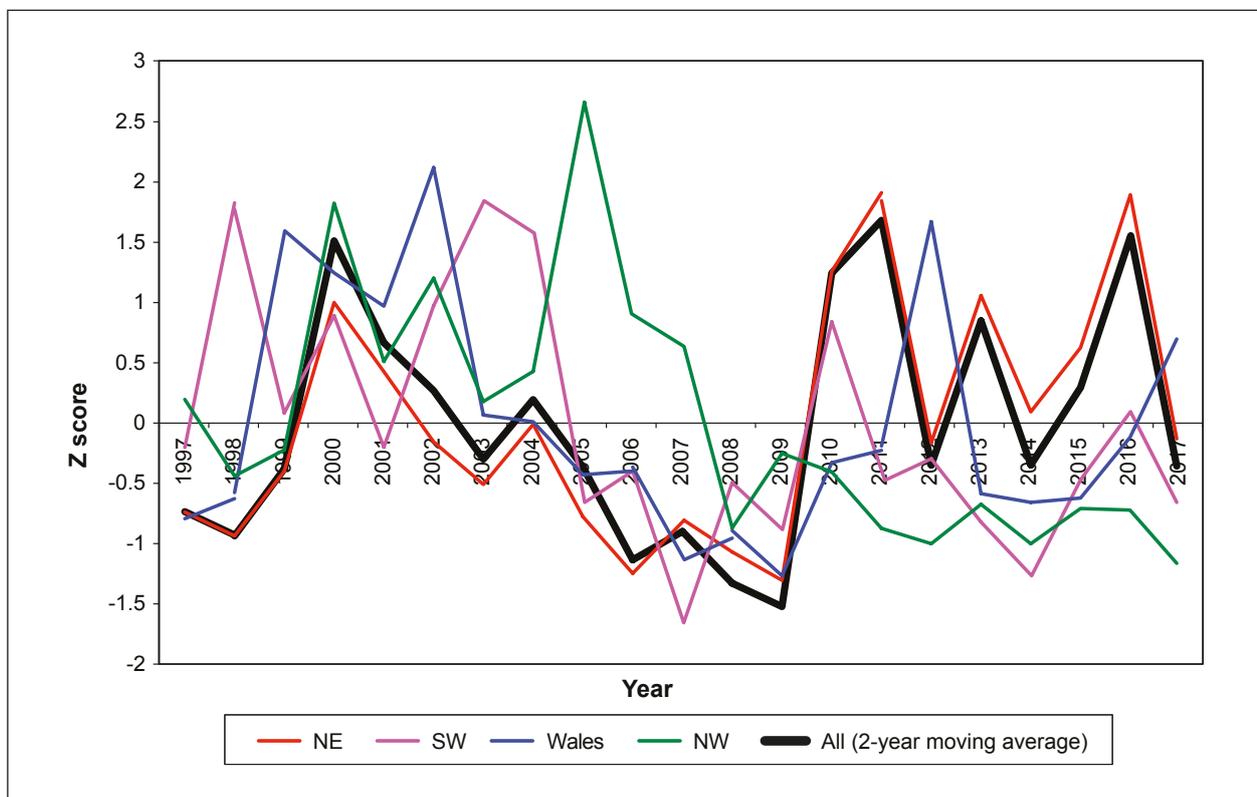
CPUE estimates in recent years include small numbers of fish that were subsequently released.

Data for 2017 are provisional.

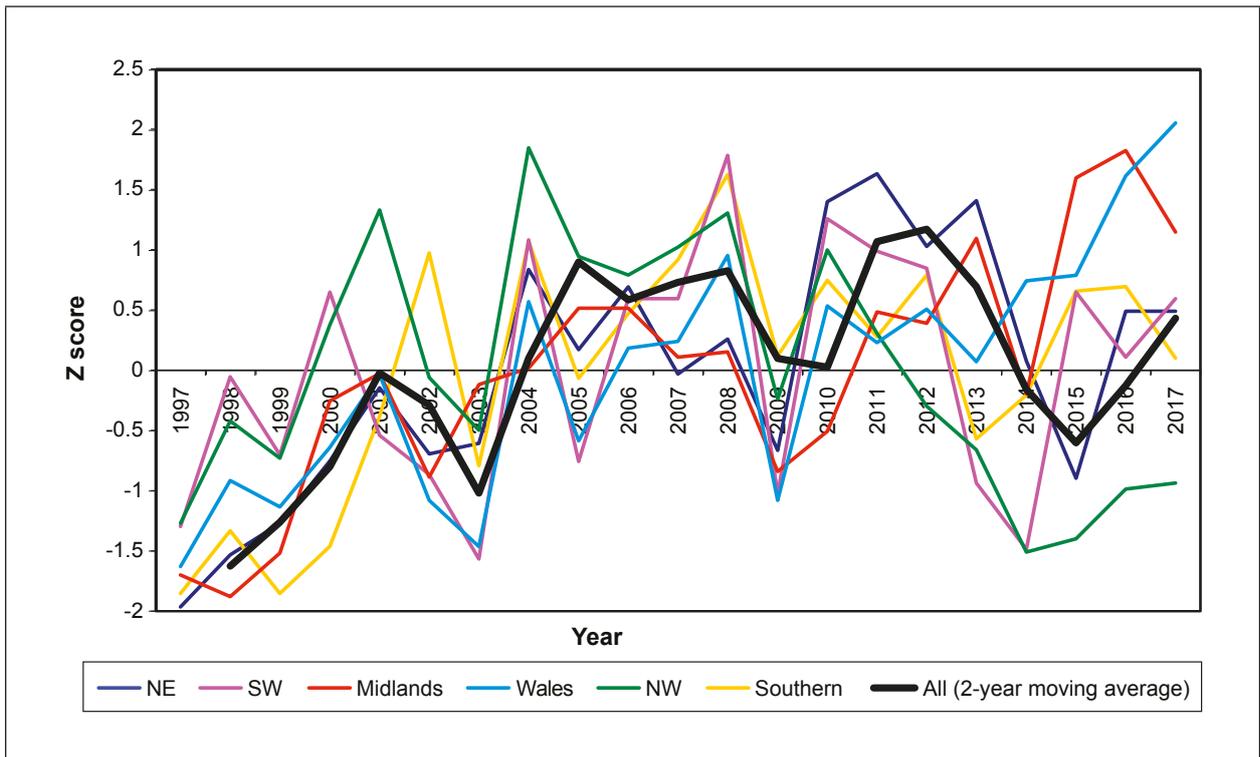
**Table 21. Mean catch per unit effort (CPUE) for salmon rod fisheries in each Region, 1997-2017.**

Year	Environment Agency Region						NRW Wales	England & Wales
	NE	Thames	Southern	SW	Midlands	NW		
1997	5.0	0.6	3.1	5.2	1.7	5.3	2.6	4.0
1998	6.5	0.0	5.9	7.5	1.3	8.6	3.9	6.0
1999	7.4	0.3	3.1	6.3	2.1	7.4	3.5	5.5
2000	9.2	0.0	5.2	8.8	4.9	11.7	4.4	7.9
2001	11.3	0.0	11.0	6.6	5.4	15.4	5.5	8.7
2002	9.4	0.0	18.3	6.0	3.5	10.0	3.6	6.8
2003	9.7	0.0	8.8	4.7	5.2	8.3	2.9	5.7
2004	14.7	0.0	18.8	9.6	5.5	17.4	6.6	11.4
2005	12.4	0.0	12.7	6.2	6.6	13.9	4.5	9.0
2006	14.2	0.0	15.6	8.7	6.6	13.3	5.9	10.1
2007	11.7	0.0	18.0	8.7	5.7	14.2	6.0	9.6
2008	12.7	0.0	21.8	10.9	5.8	15.3	7.3	10.5
2009	9.5	0.0	13.7	5.7	3.6	9.3	3.6	6.6
2010	16.7	2.8	17.1	9.9	4.3	14.1	6.5	10.2
2011	17.5	0.0	14.5	9.4	6.5	11.4	6.0	10.9
2012	15.4	0.0	17.3	9.2	6.3	9.1	6.5	10.6
2013	16.7	0.0	10.0	5.9	7.9	7.7	5.7	8.9
2014	12.1	0.0	11.9	4.8	5.0	6.9	4.4	7.1
2015	8.7	0.0	16.6	8.8	9.0	7.0	4.8	7.1
2016	13.5	0.0	16.8	7.8	9.5	8.5	6.4	9.1
2017	13.5	0.0	13.6	8.7	8.0	9.3	6.6	9.4
Mean (2012-2016)	13.3	0.0	14.5	7.3	7.5	7.8	5.6	8.6
% change:								
2017 on 2016	0		-19	+12	-16	+9	+3	+4
2017 on 5-yr mean	+2		-6	+19	+6	+19	+19	+10

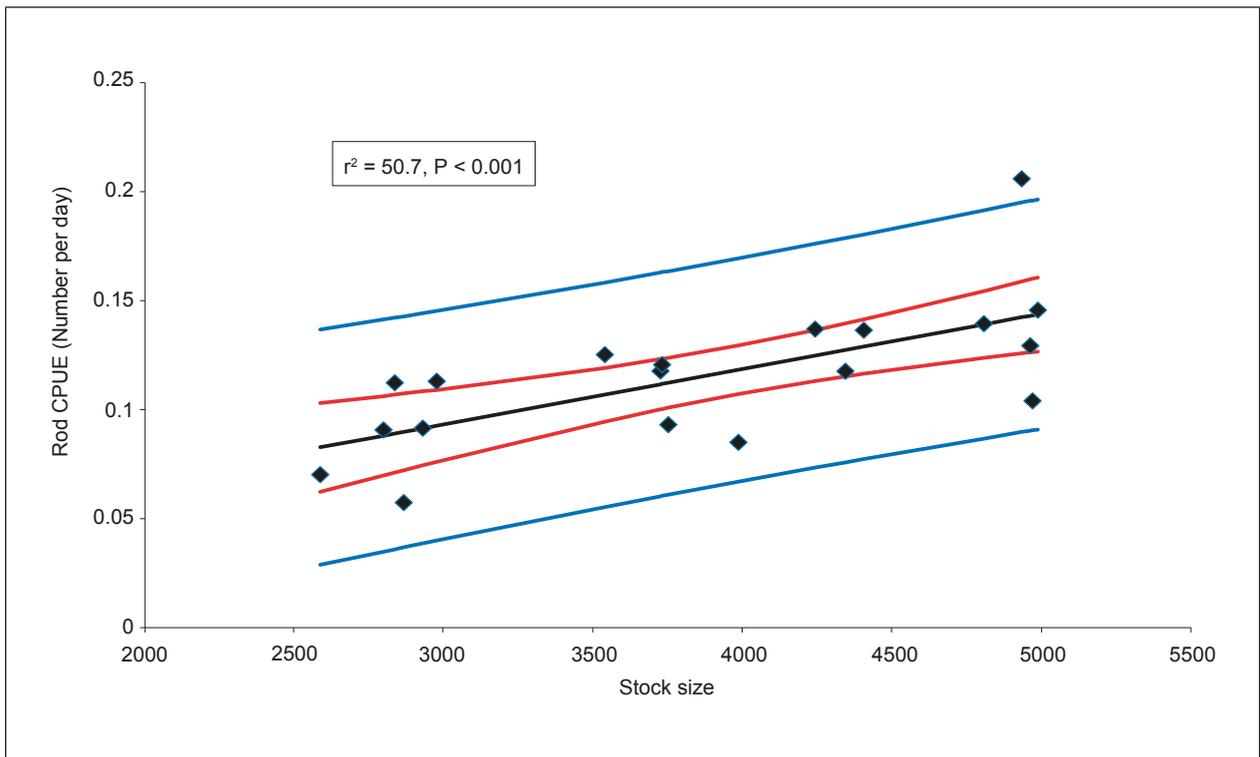
Notes: Based only on catch returns for which effort data have been reported.  
 CPUE is expressed as number of salmon (including released fish) caught per 100 days fished.  
 Data for 2017 are provisional.



**Figure 21. Normalised catch per unit effort (CPUE) (z-score) for salmon net fisheries, 1997-2017.**



**Figure 22. Normalised catch per unit effort (CPUE) (z-score) for salmon rod fisheries, 1997-2017. Note: the bold black line for all fisheries has been smoothed using a 2-year moving average.**



**Figure 23. The relationship between mean rod CPUE and mean stock size for the Rivers Frome, Tamar, Fowey, Dee and Lune, 1997-2016. Note: the red lines are 95% confidence intervals and the blue lines 95% prediction intervals.**

## 6. EXPLOITATION RATES

Care is required in trying to draw general conclusions about current stock status from catches alone. The actual relationship between catch and stock abundance depends upon exploitation rates (i.e. the proportion of the salmon population taken in the catch – both retained fish and those released), although it is important to remember that fishing effort and catchability (the proportion of the stock taken per unit of fishing effort) can be influenced by factors such as river flow, angler activity and changes in run timing. Exploitation rates can be estimated where there is a fishery-independent measure of the salmon run, such as that obtained from fish counters and traps (Table 23 and Figure 28), and these data can then be compared against the catch (both total catch and retained fish) to estimate exploitation rates (Table 22 and Figure 24). These show varying trends, but the 'true' exploitation rates (i.e. fish retained) show a marked decline over the available time series, due largely to the increasing use of catch-and-release.

### Overview of exploitation rates in 2017

There was considerable variability in the exploitation rates in rod fisheries in 2017. In some rivers, exploitation rates were higher than those in 2016 and above the average of the previous five years, while in other rivers the opposite applied. While total exploitation rates remain quite high on some rivers, the 'true' exploitation rates (i.e. fish retained) show a marked decline over the available time series in almost all rivers. This is largely attributable to catch and release, which has increased from 10% to over 80% over the past 2 to 3 decades, with mandatory catch and release now applying on some rivers. The exploitation rates for the net fisheries, where estimates have been possible, have either been reduced to zero or been greatly reduced, largely reflecting a major reduction in effort.

### Assessment of national trend in exploitation

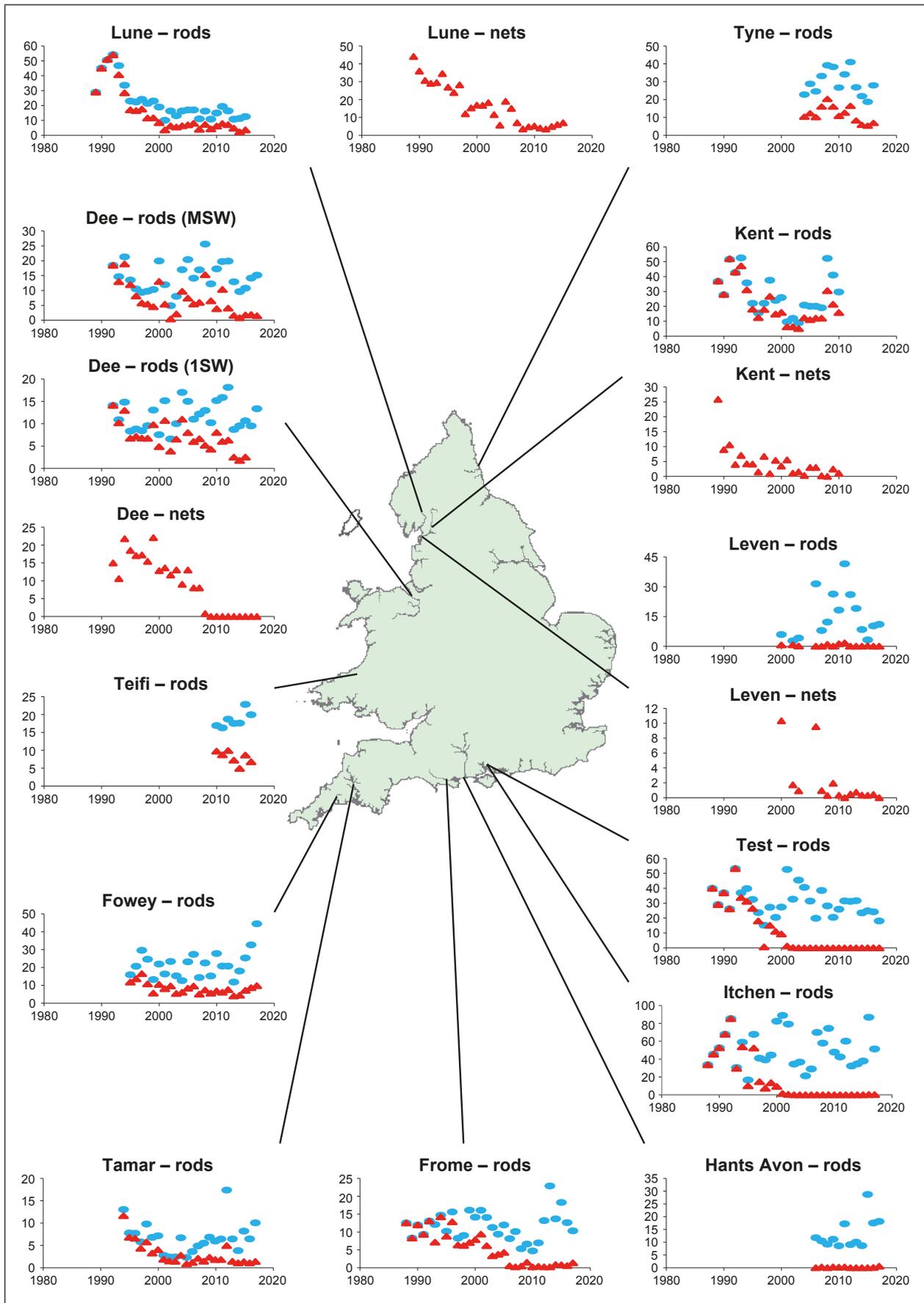
Estimates of aggregated national exploitation rates, split by sea-age class, are required for use in the ICES annual assessment of stock status to estimate numbers of returning fish. The procedures used in deriving these estimates are described in the background report. The overall trends in national exploitation rate derived from this process are provided in Figure 25. These indicate that exploitation rates have fallen from about 50% for 1SW fish and 35-40% for MSW fish at the start of the period to 12% and 6%, respectively, currently, due to the measures taken to control both legal and illegal fisheries. The decline in exploitation rates occurred particularly in the 1990s, but has levelled out more recently.

**Table 22. Estimated exploitation rates (%) for selected rod and net fisheries, 1988-2017.**

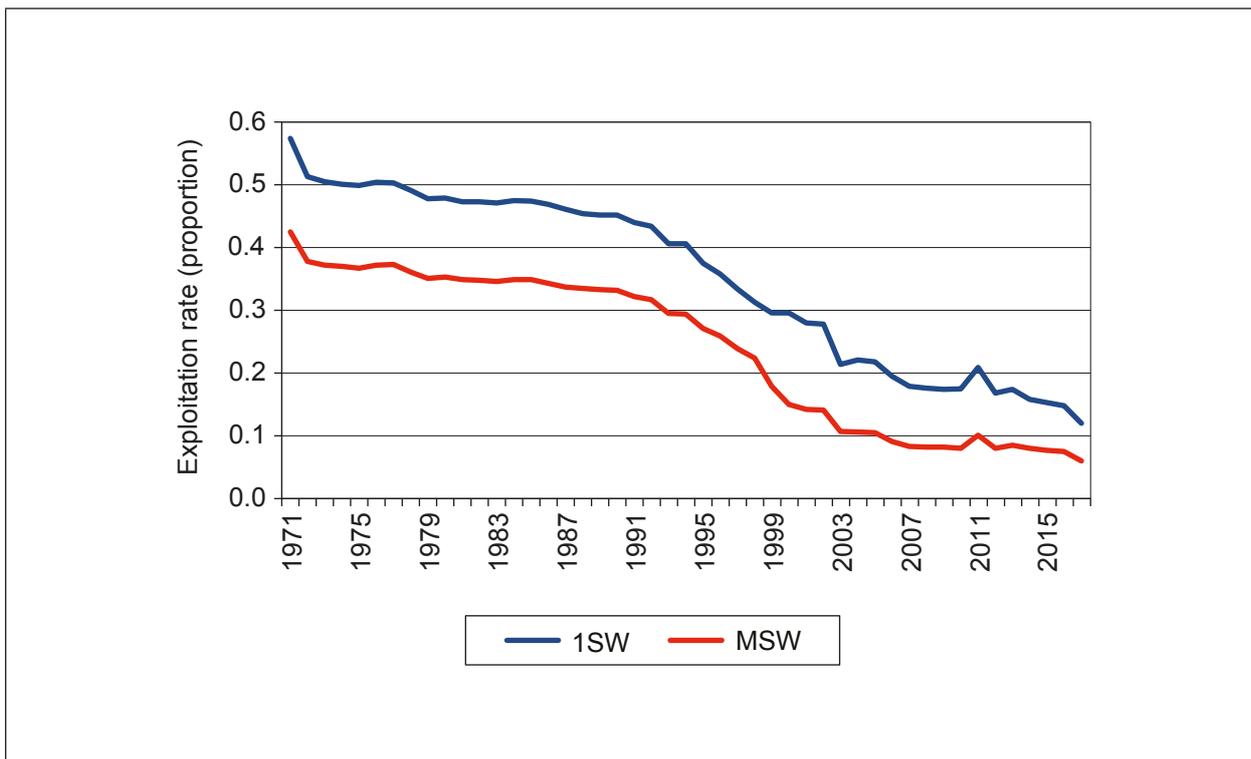
Year	Rod Fisheries												Net Fisheries											
	Region/NRW			NE			Southern			SW			NW			Wales			Wales					
	River	W	Ret.	W	Ret.	W	Ret.	W	Ret.	W	Ret.	W	Ret.	W	Ret.	W	Ret.	W	Ret.	W	Ret.			
1988	Wild/Hatchery	All	40	Ret.	34	34	Ret.	12	12	Ret.	12	12	Ret.	37	37	Ret.	29	29	Ret.	26	26	Ret.	44	44
1989		All	29	Ret.	45	45	Ret.	8	8	Ret.	8	8	Ret.	28	28	Ret.	45	45	Ret.	9	9	Ret.	36	36
1990		All	37	Ret.	53	53	Ret.	12	12	Ret.	12	12	Ret.	52	52	Ret.	51	51	Ret.	11	11	Ret.	31	31
1991		All	26	Ret.	68	68	Ret.	9	9	Ret.	9	9	Ret.	43	43	Ret.	54	54	Ret.	4	4	Ret.	29	29
1992		All	53	Ret.	85	85	Ret.	13	13	Ret.	13	13	Ret.	53	53	Ret.	47	47	Ret.	14	14	Ret.	18	18
1993		All	37	Ret.	30	30	Ret.	7	7	Ret.	7	7	Ret.	47	47	Ret.	34	34	Ret.	10	10	Ret.	15	15
1994		All	40	Ret.	59	54	Ret.	14	14	Ret.	14	14	Ret.	36	31	Ret.	29	29	Ret.	4	4	Ret.	35	35
1995		All	32	Ret.	17	10	Ret.	9	9	Ret.	9	9	Ret.	22	18	Ret.	23	17	Ret.	8	8	Ret.	27	18
1996		All	24	Ret.	68	52	Ret.	13	13	Ret.	13	13	Ret.	15	12	Ret.	22	17	Ret.	7	7	Ret.	24	17
1997		All	15	Ret.	41	15	Ret.	6	6	Ret.	6	6	Ret.	30	16	Ret.	24	18	Ret.	6	6	Ret.	28	17
1998		All	27	Ret.	39	7	Ret.	6	10	Ret.	6	10	Ret.	25	11	Ret.	21	12	Ret.	7	7	Ret.	12	15
1999		All	20	Ret.	44	14	Ret.	7	7	Ret.	7	7	Ret.	37	27	Ret.	23	12	Ret.	10	10	Ret.	15	22
2000		All	27	Ret.	9	82	Ret.	8	8	Ret.	8	8	Ret.	26	16	Ret.	19	8	Ret.	5	5	Ret.	15	22
2001		All	53	Ret.	1	89	Ret.	9	9	Ret.	9	9	Ret.	10	6	Ret.	10	4	Ret.	15	11	Ret.	17	14
2002		All	33	Ret.	0	79	Ret.	6	6	Ret.	6	6	Ret.	12	6	Ret.	16	6	Ret.	4	4	Ret.	12	12
2003		All	46	Ret.	0	34	Ret.	3	3	Ret.	3	3	Ret.	9	5	Ret.	0.1	13	Ret.	7	8	Ret.	12	13
2004		All	23	Ret.	10	41	Ret.	4	4	Ret.	4	4	Ret.	21	12	Ret.	16	6	Ret.	17	11	Ret.	6	9
2005		All	29	Ret.	12	31	Ret.	4	4	Ret.	4	4	Ret.	8	20	Ret.	17	7	Ret.	15	8	Ret.	19	13
2006		All	25	Ret.	10	20	Ret.	0.3	0.3	Ret.	0.3	0.3	Ret.	20	12	Ret.	0	17	Ret.	6	14	Ret.	15	8
2007		All	33	Ret.	16	39	Ret.	0	0	Ret.	0	0	Ret.	19	12	Ret.	0	11	Ret.	12	7	Ret.	17	8
2008		All	39	Ret.	20	28	Ret.	0	0	Ret.	0	0	Ret.	52	31	Ret.	1.0	16	Ret.	7	13	Ret.	15	0.8
2009		All	38	Ret.	16	20	Ret.	0	0	Ret.	0	0	Ret.	41	21	Ret.	26	0	Ret.	4	10	Ret.	7	0
2010		All	27	Ret.	11	26	Ret.	0	0	Ret.	0	0	Ret.	7	31	Ret.	18	1.3	Ret.	15	8	Ret.	4	0
2011		All	34	Ret.	13	32	Ret.	0.2	0.2	Ret.	0.2	0.2	Ret.	6	16	Ret.	4.2	1.7	Ret.	19	8	Ret.	10	0
2012		All	41	Ret.	16	31	Ret.	0	0	Ret.	0	0	Ret.	8	n/a	Ret.	26	0	Ret.	18	6	Ret.	4	0
2013		All	27	Ret.	8	32	Ret.	0	0	Ret.	0	0	Ret.	4	n/a	Ret.	19	0	Ret.	3	13	Ret.	2	0
2014		All	22	Ret.	6	23	Ret.	0	0	Ret.	0	0	Ret.	4	n/a	Ret.	8	0	Ret.	11	2	Ret.	18	0
2015		All	19	Ret.	5	25	Ret.	0	0	Ret.	0	0	Ret.	7	n/a	Ret.	3	0	Ret.	11	3	Ret.	11	0
2016		All	28	Ret.	7	24	Ret.	0	0	Ret.	0	0	Ret.	9	n/a	Ret.	10	0	Ret.	14	2	Ret.	20	0
2017		All	18	Ret.	0	51	Ret.	1	10	Ret.	1	10	Ret.	10	n/a	Ret.	11	0	Ret.	13	1	Ret.	15	0
Mean (2012-2016)		All	27	Ret.	9	27	Ret.	0.3	0.3	Ret.	0.3	0.3	Ret.	6	6	Ret.	13	0	Ret.	11	3	Ret.	13	0
% change		All	-25	Ret.	-41	-41	Ret.	-19	-19	Ret.	-19	-19	Ret.	+8	+8	Ret.	+8	+8	Ret.	+40	-10	Ret.	+7	-21
2017 on 2016		All	-33	Ret.	+2	+2	Ret.	-37	-37	Ret.	-37	-37	Ret.	+52	+52	Ret.	-18	-18	Ret.	+18	-59	Ret.	+13	-27
2017 on 5-yr mean		All		Ret.			Ret.			Ret.			Ret.			Ret.			Ret.			Ret.		

Notes: It is unclear to what extent total rod exploitation rate ('All') has been affected by catch and release and the repeat capture of fish; no correction factor has been applied. The entire catch from net fisheries is assumed killed.

Data for 2017 are provisional.  
 (i) Data based on Game & Wildlife Conservation Trust counter at East Stoke, and supplied courtesy of GWCT.  
 (ii) Data derived from mark recapture investigation.  
 (iii) Type values are provisional; work is ongoing with Newcastle University to further refine FSEs.



**Figure 24. Estimated exploitation rates (%) for selected rod and net fisheries in England & Wales, 1988-2017. For rod fisheries, the figures display exploitation rates for all fish caught – i.e. including fish released (blue dots) and fish killed (red triangles). Note that estimates for the Dee rods have been split by sea-age class (1SW and MSW), all other estimates are combined for all ages. Data for net fisheries are for retained fish only.**



**Figure 25. Estimated national exploitation rates for 1SW and MSW salmon caught in England and Wales (fish caught and killed only), including estimated non-reported catch, 1971-2017, as used in the ICES PFA assessment.**

# REPORT ON STATUS OF STOCKS IN 2017

## 7. STOCK MONITORING

The Environment Agency and Natural Resources Wales monitor both stocks and fishery performance in most rivers supporting salmon stocks in England and Wales. This includes operating counters, undertaking surveys of juvenile fish and collecting fishery statistics. These data provide the basis for assessing stock status and informing management decisions. In addition to protecting the abundance of stocks, managers need to maintain the diversity of stocks in terms of their biological characteristics. Measures of stock diversity potentially encompass a wide range of biological characteristics, but those of greatest significance for the management of stocks are the population structure within the river, the river-age of the emigrating smolts and the run-timing and sea-age composition of the returning adult stock. Such data tend to be derived from a small number of 'indicator' rivers. Further details on the various monitoring programmes are provided in the background report.

### Juvenile surveys (salmon fry and parr)

A programme of juvenile salmonid monitoring is carried out to identify spatial variation in juvenile populations and temporal trends in their abundance. The habitat at all sites is assessed such that the abundance of the juvenile salmon population at any site can be compared with standard reference conditions. A classification scheme is also applied such that the proportion of sites falling into different salmon abundance classes (Classes A to F) provides a measure of the health of the juvenile salmon populations for each river. Figure 26 presents the proportion of sites in each catchment that fall into the top three categories (Classes A to C) over the period 2012 to 2017. Thus, for catchments shaded red, less than 25% of sites fall within this category, while for those shaded green more than 75% of sites are at or above average. Overall, the majority (68%) of sites surveyed over the period were in the lowest two classes (Classes E or F). The proportion of sites surveyed that fell within Classes A to C varied between regions from 4% to 30%. Work is continuing to revise and update the procedures for collecting and interpreting juvenile data.

Figure 27 presents annual estimates of the overall percentage of sites within principal salmon rivers falling within classes A to C viewed over the available time series (2005 – 2017). It should be noted that the same sites are not sampled every year and so are strictly not directly comparable. Nonetheless, these data provide the best general indication of overall changes in juvenile recruitment throughout England and Wales over the period. The data show considerable variability in the percentage of sites falling within classes A-C with a notable decline from over 50% in 2009 to below 30% in 2010. The value for 2016 was the lowest in the time series (23%), highlighting the poor juvenile recruitment that was observed throughout England and Wales in that year (Section 10). There was an improvement in the percentage of sites falling within classes A to C in 2017 (32%), although this remained among the lowest in the time series.

### Upstream counts of adult salmon

Electronic fish counters or traps are operated on several catchments to provide estimates of the upstream run of adult salmon and sea trout. Where it is possible to separate the species, the counts are adjusted to provide estimates of the numbers of returning salmon. For some rivers (e.g. River Tyne and River Teifi) the time-consuming validation procedures mean data may not be available for the latest year. A number of such monitoring facilities have also ceased to

operate in recent years as a result of changes in operating procedures, counter / trap damage or due to budgetary restrictions. Available time series, including those that have been recently discontinued, are presented in Table 23 and Figure 28.

Around half the available returning stock estimates and counts for 2017 were above the levels recorded in 2016 and the recent 5-year averages. However, on two rivers (Dee and Taff) the 2017 values were the lowest in the time series. In the majority of rivers, particularly those on the west coast of England and in Wales (Figure 28), there is evidence of a marked decline in the numbers of returning salmon over the last decade. However, on some other rivers, notably some of those on the south coast of England, the numbers of returns indicate an increasing trend.

### **Tagging investigations**

Tagging studies have often been employed to monitor stocks and to evaluate the outcome of different management initiatives, although tagging effort has fallen in recent years. In 2017, around 2,400 wild salmon smolts were microtagged and released in England and Wales to assess levels of marine survival; all these fish were also adipose fin-clipped. A further 9,900 hatchery parr and smolts and 11,000 wild parr were marked with adipose fin clips; all the wild parr were also fitted with PIT tags. In addition, about 700 adult salmon were tagged for the assessment of returning stocks. Details of the tagged and marked salmon released each year around the whole North Atlantic are compiled annually by ICES. Details of the fish tagged in England and Wales in 2017 are provided in Table 24.

### **Marine survival**

Evidence from monitored rivers around the North Atlantic indicates that the survival of salmon during the marine phase of their life-cycle has declined in recent decades. Time series of marine survival estimates, measured as percentage return rates, are shown in Table 25 for the River Corrib (Ireland), River Bush (Northern Ireland) and River North Esk (Scotland) (data from ICES, 2018). Shorter time series for the Rivers Dee (Wales), Tamar and Frome (Table 25 and Figure 29) indicate similar low levels of marine survival in recent years. It was not possible to monitor adult returns on the Tamar in 2014, or to undertake any smolt tagging, so there are therefore gaps in this time series. However, this programme resumed in 2015.

For the Rivers Tamar and Frome, the return rate of 1SW fish (from the 2016 smolt cohort) was lower than the previous year, but remained within the range of observed values (back to 2002). For the River Dee, however, the return rate of 1SW was the lowest in the time series. The survival estimate for 2SW salmon on the Frome in 2017 (from the 2015 smolt cohort) was the highest recorded and that for the Dee was the highest for over 10 years, while that for Tamar was below average.

Analysis of data for the River Dee has previously indicated a clear correlation between survival rates of particular smolt cohorts and the condition of the adult salmon returning to the river derived from these cohorts. This suggests a direct link between the ability of salmon to feed and grow at sea and their subsequent survival.

**Table 23. Validated counts and run estimates of salmon smolts and adults in selected monitored rivers, 1986-2017.**

Region/NRW:	Smolts										Adults																								
	Southern					NE					Thames					Southern					SW					NW					Wales				
	Test (a)	Frome (a)	Tyne (b)	RSE1 (b)	Run estimate	Tees (a)	T (a)	RSE1 (a)	Test	Itchen	Hants Avon	Frome (a)	Tamar (a)	Fowey (a)	Lune	RSE1 (a)	Leven	Caldey	Dee	RSE2	T (a)	C	RSE1 (a)	Kent	RSE1 (a)	Teifi	RSE1 (a)	Taff	C						
1986																																			
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Mean (2012-2016)																																			

Key to methods:  
 T = adult trap.  
 C = adult salmon count.  
 RSE1 = returning stock estimate (validated count + catch below counter).  
 RSE2 = returning stock estimate (mark-recapture estimate).

Notes: Data for 2017 are provisional.  
 (a) Index of run only - based on adult trap in barrage. Trap not operated after 2010; new counter now in place but provides combined salmon & sea trout count.  
 (b) Data adjusted for multiple entry (re-entry rate of 6.6% in 2002). Data relate to spawning year, i.e. 12 month period from March to February. Trap no longer operative from 2014.  
 (c) Due to counter malfunction, estimates for 2011-12 based on relationship between rod catch and RSE for the period 1990-2010.  
 (d) Slight underestimate due to counter malfunction during May/June.  
 (e) Estimates informed by return rate of PIT tagged fish in addition to adult counter.  
 (f) Due to significant resistivity counter downtime, estimates based on a correlation between rod exploitation rate and validated counter estimates (from 2006 - 2012).  
 (g) Counter damaged by high flows at end of year and some degree of 'leakage' reported due to some fish by-passing counter.  
 (h) Counter damaged in late 2015 and inoperable for extended periods since this time.

**Table 24. ICES Compilation of microtag, fin clip and external tag releases**

Marking season: 2017 Country: UK (England and Wales)	Totals				
	Origin	Microtag	Primary Tag or Mark External Mark	Other internal (a) Adipose Clip	Total
	Hatchery juvenile		9,852		9,852
	Wild juvenile	2,383	10,965		13,348
	Adult	692			692
	Total fish marked	2,383	20,817	0	23,892

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	Floy tag	149	Green 2001 - 2525	None	Nov - Dec 2017	Tyne & tributaries
Natural Resources Wales	Various	Smolt	W	Dee (Worthenbury)	CWT	46	01/42/34	Adipose	May 2017	Dee - Worthenbury
Natural Resources Wales	Various	Smolt	W	Dee (Ceiriog)	CWT	221	01/42/38	Adipose	May 2017	Dee - Ceiriog
Natural Resources Wales	Various	Adult	W	Dee	Floy tag	543	Various (blue and blue/green)	None	March-Oct 2017	Dee - Chester
Natural Resources Wales	0+	Parr	H	Dee	Adipose clip	3,124		None	Oct 2017	Dee - Tryweryn
Natural Resources Wales	1+ & 2+	Smolt	H	Taff	Adipose clip	6,728		None	May-June 2017	Taff - Radyr
EA South West	Various	Smolt	W	Tamar	CWT	2,116	01/42/95	Adipose	April-May 2017	Tamar
Cefas	Various	Parr	W	Itchen	Adipose clip	178	Codes start: DC00xxxxxx	PIT tag	July 2017	Itchen
Cefas/NRW	Various	Parr	W	Dee (Ceiriog)	Adipose clip	279	Codes start: DC00xxxxxx	PIT tag	Sept 2017	Dee - Ceiriog
GWCT/Cefas	0+ & 1+	Parr	W	Frome	Adipose clip	10,508	Codes start: 3DD.003* (hexadecimal) or 989.0010* (decimal)	PIT tag	Aug-Sept 2017	Frome

Notes: (a) Includes PIT and radio/acoustic tags.

**Table 25. Estimated survival of wild smolts (%) to return to homewaters (prior to coastal fisheries) for index rivers in the UK and Ireland (from ICES, 2018 and Environment Agency/Natural Resources Wales/Cefas/GWCT data) for 1984 to 2016 smolt years.**

Smolt migration year	Ireland		UK (N. Ireland)		UK (Scotland)		UK (England and Wales)							
	River Corrib		River Bush		River North Esk		Dee		Tamar		Frome			
	1SW	2SW	1SW	1SW	1SW	MSW	1SW	MSW	95% CL	MSW	95% CL	1SW	MSW	
1984	26.2	2.0	19.8		6.0	4.0								
1985	18.9	1.8	19.3		13.6	5.4								
1986			20.0	31.3										
1987	16.6	0.7	26.9	35.1	10.4	3.9								
1988	14.6	0.7	22.9	36.2										
1989	6.7	0.7	7.1	25.0	6.6	4.2								
1990	5.0	0.6	16.0	34.7	6.0	3.1								
1991	7.3	1.3	21.7	27.8	7.6	3.1								
1992	7.3		15.9	29.0	10.9	6.5								
1993	10.8	0.1	23.9		14.5	6.1	6.3	2.5	2.2					
1994	9.8	1.4	26.9	27.1	10.9	3.6	1.3	1.2	1.3					
1995	8.4	0.1	14.6		8.4	3.8	2.7	1.8	0.7					
1996	6.3	1.2	18.3	31.0	5.9	2.7	4.8	2.1	1.3					
1997	12.7	0.8	15.6	19.8	7.2	4.2	6.2	2.9	1.9					
1998	5.5	1.1	12.4	13.4	2.6	1.4	2.3	2.4	3.6					
1999	6.4	0.9	14.9	16.5	6.8	3.8	5.0	3.7	11.8					
2000	9.4		22.5	10.1	6.0	2.8	2.0	1.1	0.8					
2001	7.2	1.1	16.6	12.4	4.7	2.9	4.3	5.1						
2002	6.0	0.5	12.3	11.3	2.2	2.0	2.9	1.4	0.9	2.1	1.4	3.6	0.7	5.6
2003	8.3	2.1	19.4	6.8			2.6	1.7	0.4	2.0	1.8	6.1	0.4	4.8
2004	6.3	0.8	12.8	6.8			4.5	1.1	1.0	2.3	1.5	6.0	0.5	5.3
2005			8.1	5.9	6.7	2.8	5.1	1.6	0.5	1.6	1.2	6.4	0.4	1.2
2006	3.6	0.7	12.9	14.0	3.3	3.4	4.3	1.2	1.5	0.9	3.8	3.8	0.9	5.1
2007	1.3	1.6	8.4	8.3	5.0	4.0	1.3	1.1	0.9	0.7	3.3	7.6	0.7	2.5
2008	1.7	1.0	8.2	4.0	6.4	5.3	2.5	2.0	1.3	1.5	0.9	1.6	1.5	2.0
2009	6.0	1.0	8.9	5.9	9.0	8.7	4.8	2.1	1.1	1.0	0.9	8.2	2.1	3.1
2010	2.9	1.2	7.5	4.0			1.9	1.9	0.7	1.3	1.9	3.4	1.5	7.7
2011	2.4	0	10.8	2.7					0.3	0.5	1.6	1.1	0.3	8.6
2012	1.5	0	9.4	11.7	4.8	4.9	4.8	4.9		1.4	1.9	2.5	1.2	1.7
2013	2.2	0.3	4.5	4.6	1.9	1.7			1.4	1.3	4.7		2.6	3.1
2014	2.9	0.5	8.0	2.9					0.5	1.1			0.5	1.5
2015	5.5	0.6	7.8	6.7	0.5	1.0	0.5	1.0	1.8	1.6	2.3	4.2	1.9	2.7
2016	6.9		7.5	3.8	0.3	0.6	0.3	0.6		1.6	2.6	3.5	2.6	5.9
Mean (2011-15)	2.9	0.3	8.1	5.7	2.4	2.4	2.4	2.6	1.0	2.6	3.0	2.6	1.0	4.4
Mean (2006-15)	3.0	0.2	8.6	6.5	5.9	5.4	2.8	4.0	1.0	4.0	3.2	4.0	1.0	2.8

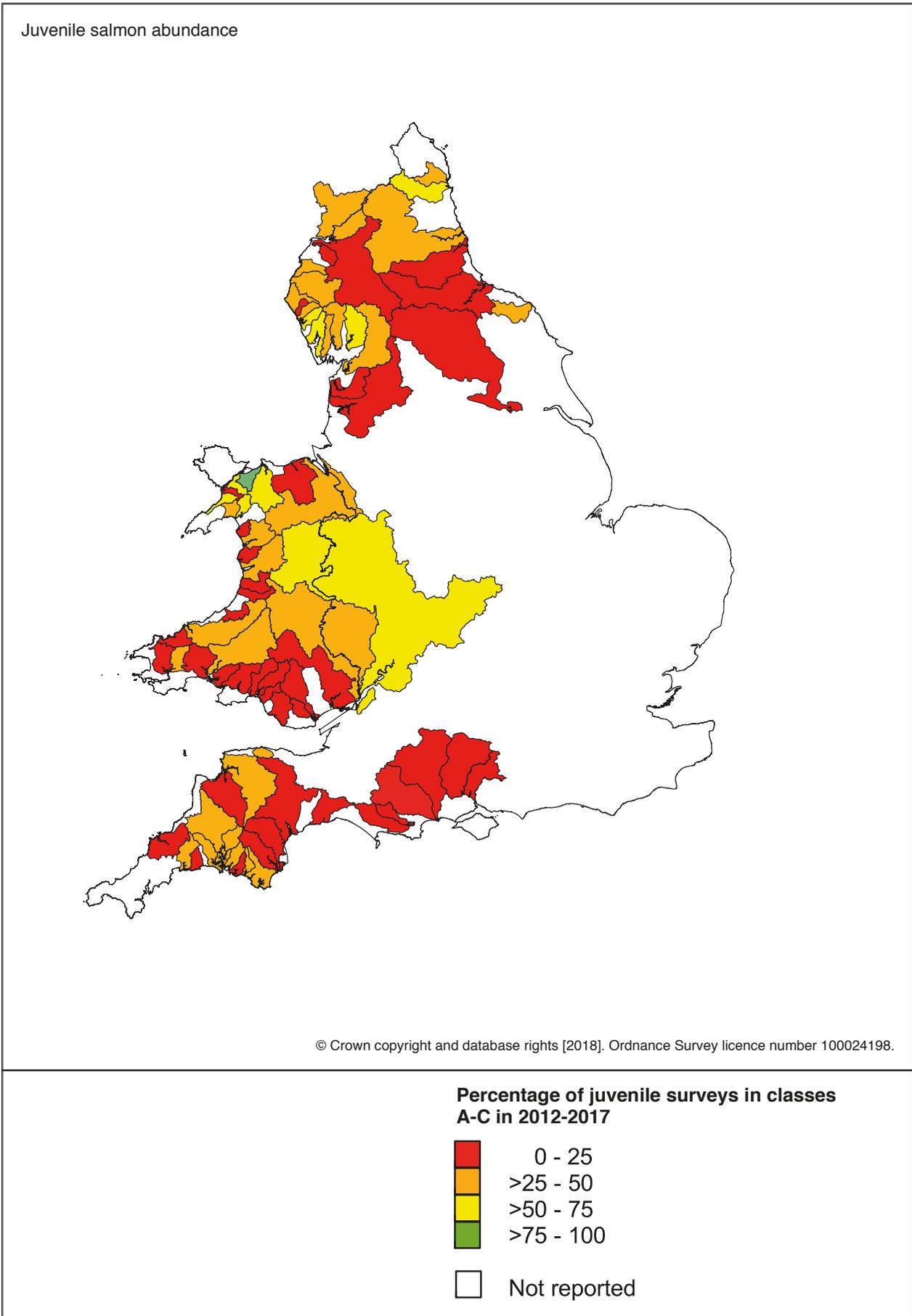
Key: <sup>(a)</sup> Based on microtagging, corrected for tagging mortality.

<sup>(b)</sup> Based on tagging with Carlin tags, not corrected for tagging mortality

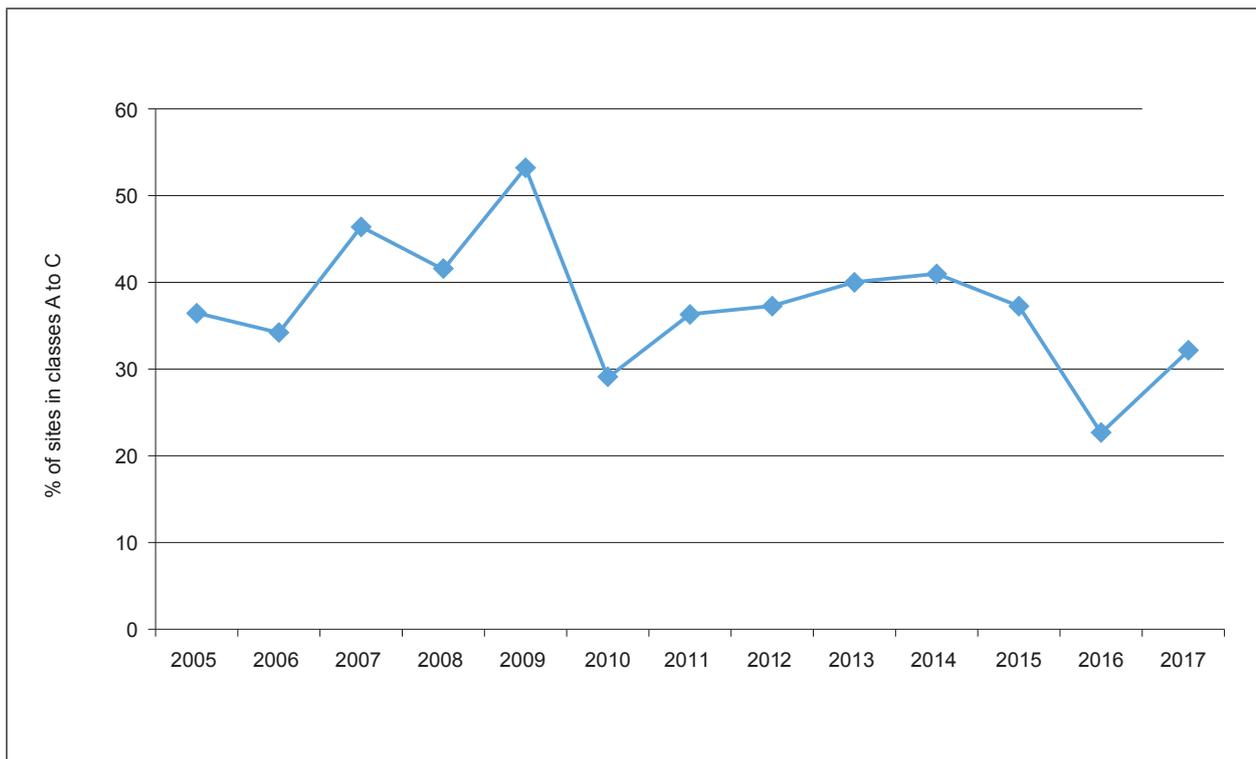
<sup>(c)</sup> Based on microtagging with a 90% tag retention rate, not corrected for tagging mortality.

<sup>(d)</sup> Data based on Game & Wildlife Conservation Trust monitoring facilities at East Stoke, and supplied courtesy of GWCT.

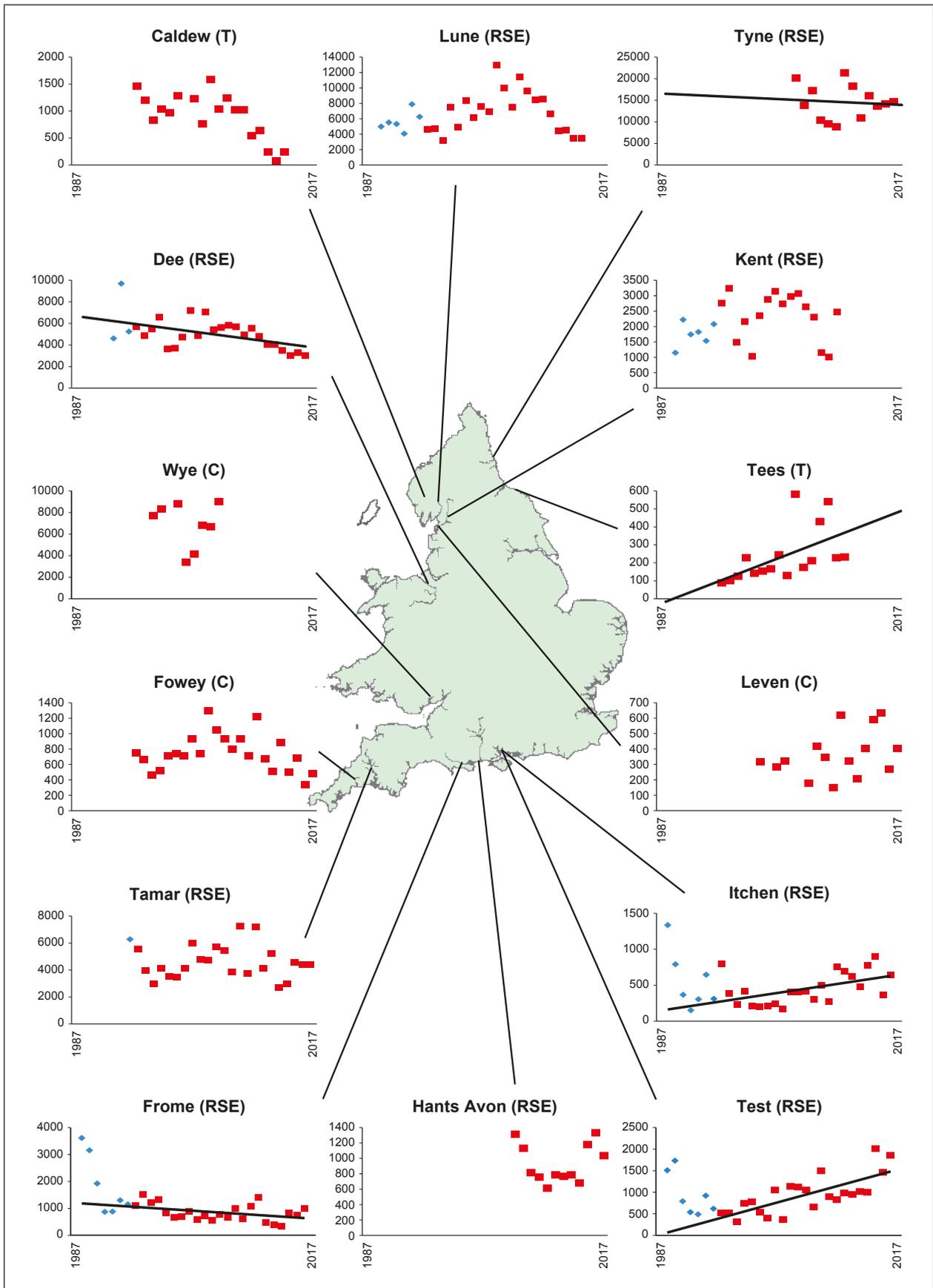
Notes: Data for 2016 smolt migration year are provisional.



**Figure 26. Juvenile salmon abundance indices for each catchment, presented as percentage of surveys in classes A-C only, 2012-2017.**



**Figure 27. Overall percentage of juvenile survey sites in England and Wales in classes A to C, 2005–2017. Data include all surveys conducted in a single year from principal salmon rivers only. (Note: data updated from previous reports.)**



**Figure 28.** Counts from electronic counters (C) and monitoring traps (T), and returning stock estimates (RSE) (based on trapping and tagging, or validated counts plus catch below counter) for selected salmon stocks in England and Wales, 1988-2017. Regression lines are indicative only and based on data from 1995 on (red squares); earlier data for some rivers indicated as blue diamonds. Note that y-axes scales differ.

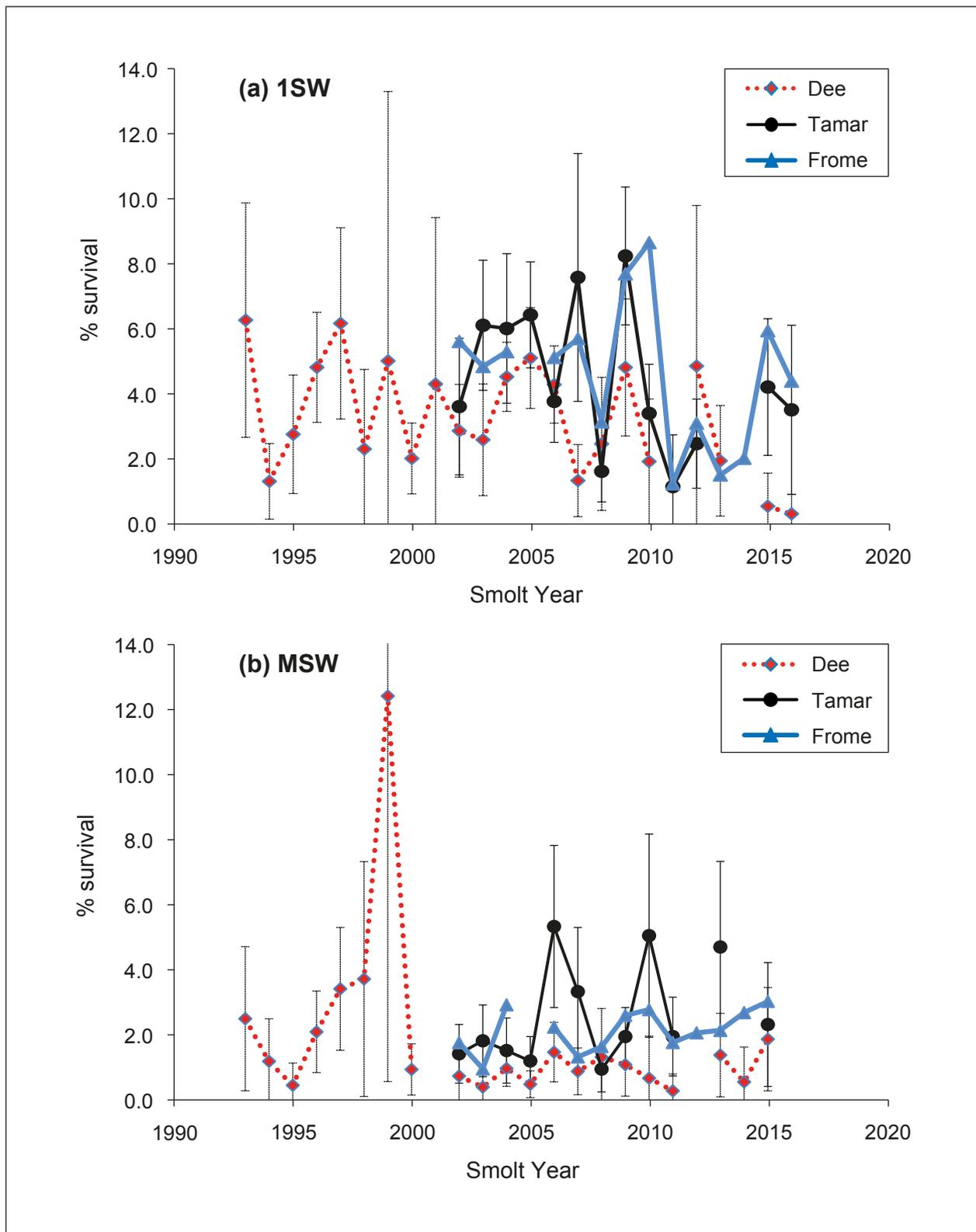


Figure 29. Estimated survival ( $\pm$  95 CLs where available) of wild smolts (%) to return to homewaters (prior to coastal fisheries) for (a) 1SW and (b) MSW salmon for the Rivers Dee, Tamar and Frome.

## 8. ASSESSMENT OF STOCK STATUS

The status of individual river stocks in England and Wales is evaluated annually against stock conservation limits (CLs) and management targets (MTs) in line with the requirements of ICES and NASCO. A national assessment of the status of the salmon resource in England and Wales is also undertaken annually, using the Pre-fishery Abundance (PFA) and National Conservation Limit Models (Potter *et al.*, 2004), and reported to ICES to assist with the development of management advice for the distant water fisheries. Full details of these assessment approaches are provided in the background report.

### Status of river stocks in 2017

Egg deposition estimates for 2017 have been calculated for each of the 64 main salmon rivers in England and Wales and values, expressed as the proportion of the CL attained, are provided in Table 26 and illustrated in Figure 30.

Thirty two rivers (50%) were provisionally assessed as meeting their CL in 2017 (Table 27), an increase on 2016 (22 rivers). This represents the highest level of CL attainment since 2012 (Figure 31). Seventeen rivers (27%) were below 50% of their CL in 2017, compared with 22 rivers in 2016. River-to-river variation in the proportion of the CL attained in 2017 (Figure 30) indicates that rivers where spawning escapement was below the CL were widely distributed throughout England and Wales.

In 2017, additional egg deposition resulting from fish that were caught and released is estimated at about 22 million eggs (assuming 80% survival to spawning, 50% females and an average of 5,000 eggs per female). This represents about 7% of the total estimated egg deposition in England and Wales in 2017.

### Compliance with the management objective

The 'management objective' for salmon stocks in England and Wales is that they should meet or exceed their CLs in at least four years out of five. Compliance with this objective takes trends in egg deposition into account, and has been calculated for all 64 principal river stocks in England and Wales for 2017 and forecast for 2022 (Table 26 and Figure 32).

The latest compliance assessment indicates that none of the principal rivers across England and Wales were classified as 'not at risk' in 2017 – having a high probability ( $p > 95\%$ ) of achieving the management objective. The same has applied in each year since 2014 and is forecast to continue to apply in 2022. In 2017, 19 rivers (30%) were classified as 'at risk' - having a low probability ( $p < 5\%$ ) of achieving the management objective; this represent an improvement on 2016 (25 rivers). Twelve rivers (19%) are forecast to be 'at risk' in 2022, consistent with the progressive reduction in the number of rivers classified as 'at risk' over the time series. Thirty eight rivers in England and Wales in 2017 (59%) are classified as 'probably at risk' ( $5\% < p < 50\%$  of achieving the management objective); this rises to 64% in 2022. Only 7 rivers (11%) are classified as 'probably not at risk' ( $50\% \leq p < 95\%$ ) in 2017, compared with 5 rivers in 2016. The compliance figures are summarised, separately, for rivers in England and Wales below:

## Rivers in England

Stock status category	Probability of meeting the management objective	2017		2022	
		Number of rivers	%	Number of rivers	%
<b>Not at risk</b>	>95%	0	0	0	0
<b>Probably not at risk</b>	50–95%	6	14	9	21
<b>Probably at risk</b>	5–50%	27	64	29	69
<b>At risk</b>	<5%	9	21	4	10

## Rivers in Wales

Stock status category	Probability of meeting the management objective	2017		2022	
		Number of rivers	%	Number of rivers	%
<b>Not at risk</b>	>95%	0	0	0	0
<b>Probably not at risk</b>	50–95%	1	5	2	9
<b>Probably at risk</b>	5–50%	11	50	12	55
<b>At risk</b>	<5%	10	45	8	36

For rivers in England (Figure 33a) there has been a general decrease in the proportion of rivers regarded as 'at risk' over the past 14 years, and this is forecast to continue. However, while the percentage of rivers classified as 'not at risk' was relatively stable, at about 20%, over the early part of the time series, none have been assessed as 'not at risk' in the last four years, and this is projected to continue in 2022. There was a small increase in the number of rivers classified as 'probably not at risk' in 2017 compared with 2016, and the majority of rivers (64%) continue to fall in the 'probably at risk' category as in the previous three years. The 2017 assessment suggests that the majority (79%) of English rivers will fall in the 'probably at risk' and 'at risk' categories in 2022.

For Wales (Figure 33b), a higher proportion of rivers have fallen in the 'at risk' category over the time series and very few rivers have been classed as 'not at risk'. In 2017, all the rivers except one are classified as either 'at risk' (45%) or 'probably at risk' (50%). The projected trend suggests that 91% of rivers will fall in the same two categories in 2021, but with the majority classed as 'probably at risk'.

The latest assessment thus indicates that the majority of salmon stocks in England and Wales remain in a depleted state.

## Assessment of pre-fishery abundance (PFA) for England and Wales

Each year, ICES makes an assessment of the status of the salmon stocks in the Northeast Atlantic (NEAC) area as a basis for advising managers and providing catch advice for the distant water fisheries. A key part of this assessment is the estimation of the pre-fishery abundance (PFA) of all NEAC stocks, which is defined as the number of fish alive in the sea on January 1 in their first sea winter. This is split between maturing (potential 1SW) and non-maturing (potential

MSW) fish. The PFA estimates for the period since 1971 provide our best interpretation of what the available catch and effort data tell us about changes in the status of the total national stock of salmon over the past four to five decades.

The estimated PFA of salmon from England and Wales has declined by around 45% from the early 1970s to the present time (Figure 34). Over much of the period, the decrease has tended to be somewhat greater for the non-maturing (i.e. potential MSW) component of the PFA than the maturing 1SW (i.e. potential grilse) component. However, there has been a marked reduction in the PFA of 1SW salmon in the last seven years, and the decline in PFA between the start and the end of the time series is now greater for 1SW fish (~60%) than for MSW salmon (~40%). It should be noted that these trends mask conflicting changes in individual river stocks. Many rivers have experienced more serious declines but these are obscured by the very substantial improvements and recovery in others. The results also suggest that there was a marked decline in PFA around 1990, which is consistent with the general perception of a decrease in the marine survival for many stocks around the North Atlantic at about this time. [NB the model cannot provide an estimate of PFA of potential MSW fish for the most recent year, as this relies on an assessment of the returns to homewaters of these fish, which will not occur until the subsequent year].

The estimated numbers of salmon returning to rivers in England and Wales (prior to exploitation in homewater fisheries) are also derived from the ICES national assessment. These estimates show a similar downward trend to the PFA (Figure 35), although the decrease is less marked due to the reduction in net exploitation in distant water fisheries. Thus, numbers of returning fish are estimated to have declined by about 40% between the early 1970s and the present time. As with the PFA, the decline in returning MSW fish has tended to be greater than that of the 1SW (grilse) returns over much of the time period. However, a higher proportion of MSW fish has been observed in recent years and the percentage reduction in returning fish between the start and the end of the times series is now substantially greater for 1SW fish.

The difference between the estimated numbers of returning fish and those surviving to spawn has reduced progressively over the time series and the total spawning escapement has remained reasonably consistent over the period (Figure 35). This reflects the marked reduction in levels of exploitation in homewater net and rod fisheries, including the increasing use of catch and release. The recent upturn in MSW returns means that MSW spawner numbers are now similar to those at the start of the time period. This will be expected to have a disproportionate effect on egg deposition, given the substantially higher fecundity of these larger fish.

**Table 26. Conservation Limits (CL) and the percentage of the CL attained for the principal salmon rivers in England and Wales, 2008-2017. Current compliance against the management objective and predicted compliance in 2022 are shown in the right hand columns (see Background report for details).**

EA Region/NRW River	Accessible wetted area (ha)	CL eggs/100m <sup>2</sup>	CL eggs (x10 <sup>6</sup> )	Mgmt Target eggs (x10 <sup>6</sup> )	2017 egg deposition (x10 <sup>6</sup> )	Percentage of Conservation Limit attained (%) <sup>(a)</sup>											Current compliance <sup>(a)</sup> 2017	Predicted compliance <sup>(a)</sup> in 2022
						2008	2009	2010	2011	2012	2013	2014	2015	2016	2017			
<b>NE</b>																		
Coquet	144	218	3.14	5.84	5.97	337	185	370	325	366	228	134	93	160	190	PaR	PaR	
Tyne [c]	542	208	11.25	22.77	45.33	218	214	519	518	277	436	408	434	541	403	PNaR	PNaR	
Wear	232	250	5.80	11.38	17.99	236	181	383	460	321	526	351	196	228	310	PNaR	PNaR	
Tees	620	240	14.90	17.05	3.20	55	14	14	21	50	23	4	8	13	21	AR	PaR	
Essex-Yorks	86	236	2.02	2.62	3.51	133	44	120	105	89	100	84	73	100	174	PaR	PNaR	
<b>Southern</b>																		
Test	138	246	3.40	4.24	4.35	100	62	56	66	64	68	68	137	99	128	PaR	PNaR	
Itchen	69	234	1.63	2.01	1.40	83	35	103	96	82	67	109	125	45	86	PaR	PaR	
<b>SW</b>																		
Avon-Hants	369	175	6.48	7.31	4.05	44	48	31	50	43	61	37	59	85	63	PaR	PaR	
Stour	142	149	2.12	2.18	0.29	10	10	7	11	9	13	8	13	18	14	AR	AR	
Piddle	18	177	0.31	0.39	0.23	87	55	96	129	50	33	27	66	63	74	PaR	PaR	
Frome	88	171	1.50	2.22	2.26	161	102	179	239	93	57	52	133	128	151	PaR	PaR	
Axe	83	175	1.45	1.73	0.23	74	51	25	58	77	26	16	37	37	16	AR	AR	
Exe	282	253	7.14	13.47	7.60	305	192	221	341	279	70	48	130	86	106	PaR	PaR	
Teign	98	251	2.47	3.91	2.34	304	96	133	175	207	123	100	121	72	95	PaR	PaR	
Dart	137	218	2.98	4.00	1.29	107	53	96	93	143	37	18	23	52	43	AR	PaR	
Avon-Devon	35	202	0.70	0.92	0.42	120	57	151	122	127	50	69	63	64	60	PaR	PaR	
Erme	20	180	0.37	0.51	0.64	63	47	87	86	66	76	13	19	31	176	PaR	PaR	
Yealm	11	212	0.24	0.28	0.03	48	56	80	64	57	49	29	25	24	12	AR	AR	
Plym	29	188	0.55	0.67	0.17	71	15	54	91	43	24	35	32	7	30	AR	PaR	
Tavy	68	201	1.37	1.84	1.96	102	68	152	84	102	64	45	130	37	143	PaR	PaR	
Tamar	293	395	11.56	14.80	12.51	186	104	139	104	126	74	77	111	84	108	PaR	PaR	
Lynher	29	233	0.68	1.13	2.08	131	149	266	104	162	150	75	277	172	306	PNaR	PNaR	
Fowey	42	207	0.86	1.42	0.99	266	206	345	196	153	261	139	235	100	115	PaR	PaR	
Camel	56	176	0.98	1.96	0.99	301	170	462	241	142	158	88	88	112	101	PaR	PaR	
Taw	274	211	5.78	9.35	14.12	221	158	134	287	199	52	109	253	139	244	PNaR	PNaR	
Torridge	198	207	4.10	5.08	4.14	128	58	80	68	131	58	49	91	83	101	PaR	PaR	
Lyn	27	359	0.97	1.74	2.50	305	90	227	291	166	85	103	95	60	257	PaR	PaR	
<b>Midlands</b>																		
Severn	898	143	12.85	19.09	22.80	120	88	88	161	113	156	99	270	196	177	PNaR	PNaR	
<b>NW</b>																		
Ribble	351	202	7.10	10.57	12.34	276	202	240	210	189	120	124	111	111	174	PaR	PaR	
Wyre	67	73	0.49	0.59	0.15	91	46	31	44	37	14	16	23	2	31	AR	PaR	
Lune	423	237	10.01	13.87	13.21	213	210	190	190	132	112	94	111	112	132	PaR	PaR	

Kent	68	223	1.52	2.62	1.73	136	148	326	275	160	138	70	55	105	113	PaR
Leven	46	182	0.83	1.19	1.04	95	42	175	109	58	119	170	186	62	125	PaR
Crake	16	194	0.32	0.44	0.19	28	57	104	152	119	91	45	29	13	60	PaR
Duddon (& Lickle)	26	121	0.31	0.77	1.70	783	357	427	540	343	316	177	230	342	548	PNaR
Esk	20	181	0.37	0.58	0.98	249	78	64	176	112	156	147	98	180	266	PNaR
Irt	35	198	0.69	1.03	0.60	158	81	192	192	143	164	42	44	63	87	PaR
Ehen	41	230	0.94	1.98	1.70	335	216	513	371	220	279	162	75	116	181	PaR
Calder	13	261	0.33	0.52	0.14	158	79	204	174	124	91	34	22	16	42	AR
Derwent	213	185	3.93	6.99	6.37	309	211	306	271	152	144	82	58	90	162	PaR
Eden	688	200	13.75	17.29	12.83	148	139	128	115	105	65	52	99	114	93	PaR
Esk-Border <sup>(d)</sup>	306	255	7.79	11.15	6.32	164	113	196	191	125	67	68	71	84	81	AR
<b>Wales</b>																
Wye	1,721	224	38.57	49.26	36.98	59	35	25	50	79	79	43	95	132	96	PNaR
Usk	407	248	10.11	15.05	23.79	211	97	99	137	222	122	97	160	228	235	PNaR
Taff & Ely	146	219	3.19	3.45	0.55	15	14	25	34	25	30	15	43	26	17	PaR
Ogmore	61	180	1.10	1.36	0.28	74	48	110	52	47	17	36	32	27	25	AR
Tawe	88	211	1.85	2.35	0.54	98	58	114	55	34	37	24	26	28	29	AR
Tywi	500	226	11.30	15.31	13.21	146	85	178	120	78	84	41	52	82	117	PaR
Taf	90	189	1.70	2.67	0.90	115	68	268	122	78	58	53	85	31	53	PaR
E&W Cleddau	87	179	1.55	1.80	0.75	89	69	61	44	55	37	35	45	24	48	AR
Teifi	326	265	8.65	12.60	6.16	151	81	235	155	116	90	80	70	65	71	PaR
Rheidol	31	222	0.68	0.87	0.04	124	31	37	62	46	66	35	24	30	6	AR
Nevern	19	259	0.48	0.59	0.55	88	33	91	57	60	81	89	127	72	114	PaR
Dyfi	179	235	4.21	5.59	2.36	123	56	93	125	70	24	16	29	50	56	PaR
Dysinni	31	216	0.68	0.73	0.07	13	13	11	0	30	18	6	17	24	11	PaR
Mawddach	57	242	1.37	2.02	2.29	148	99	236	199	199	73	75	106	144	167	PaR
Dwyrdd	9	201	0.19	0.34	0.35	357	72	52	116	44	56	74	83	48	186	PaR
Glaslyn	25	191	0.48	0.63	0.40	146	106	78	122	107	193	104	147	68	84	PaR
Dwyrfawr	33	258	0.86	1.02	0.03	53	15	79	43	27	19	30	15	38	4	AR
Selont	21	226	0.48	0.79	0.20	219	99	214	127	158	49	21	15	37	41	AR
Ogwen	24	362	0.87	1.65	2.29	365	216	347	244	231	112	39	135	101	265	PaR
Conwy	63	185	1.17	1.90	2.54	212	153	331	200	164	107	76	100	134	217	PaR
Clwyd	84	237	1.99	3.43	0.91	212	104	233	175	138	33	15	14	17	46	AR
Dee	617	248	15.30	16.83	11.15	93	106	80	85	87	79	80	68	66	73	AR
<b>E &amp; W Total</b>			<b>262.75</b>	<b>369.71</b>	<b>329.04</b>											

Key to compliance assessments: **PNaR** Probably not at risk **PaR** Probably at risk **AR** At risk

Key: <sup>(a)</sup> Estimates include eggs contributed by rod-released fish.

<sup>(b)</sup> Basis for current and predicted compliance explained in Background Report (see text for details).

<sup>(c)</sup> Provisional salmon counts now used on the Tyne to estimate egg deposition.

<sup>(d)</sup> Prior to 1 April 2005, Border Esk egg deposition estimates were based only on English rod catch and likely to be underestimates.

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

On some rivers, catch returns from fishery owners (rather than declared catches) or data from counters/traps have been used to derive estimates of egg deposition where these are considered to provide the most complete record of the returning stock.

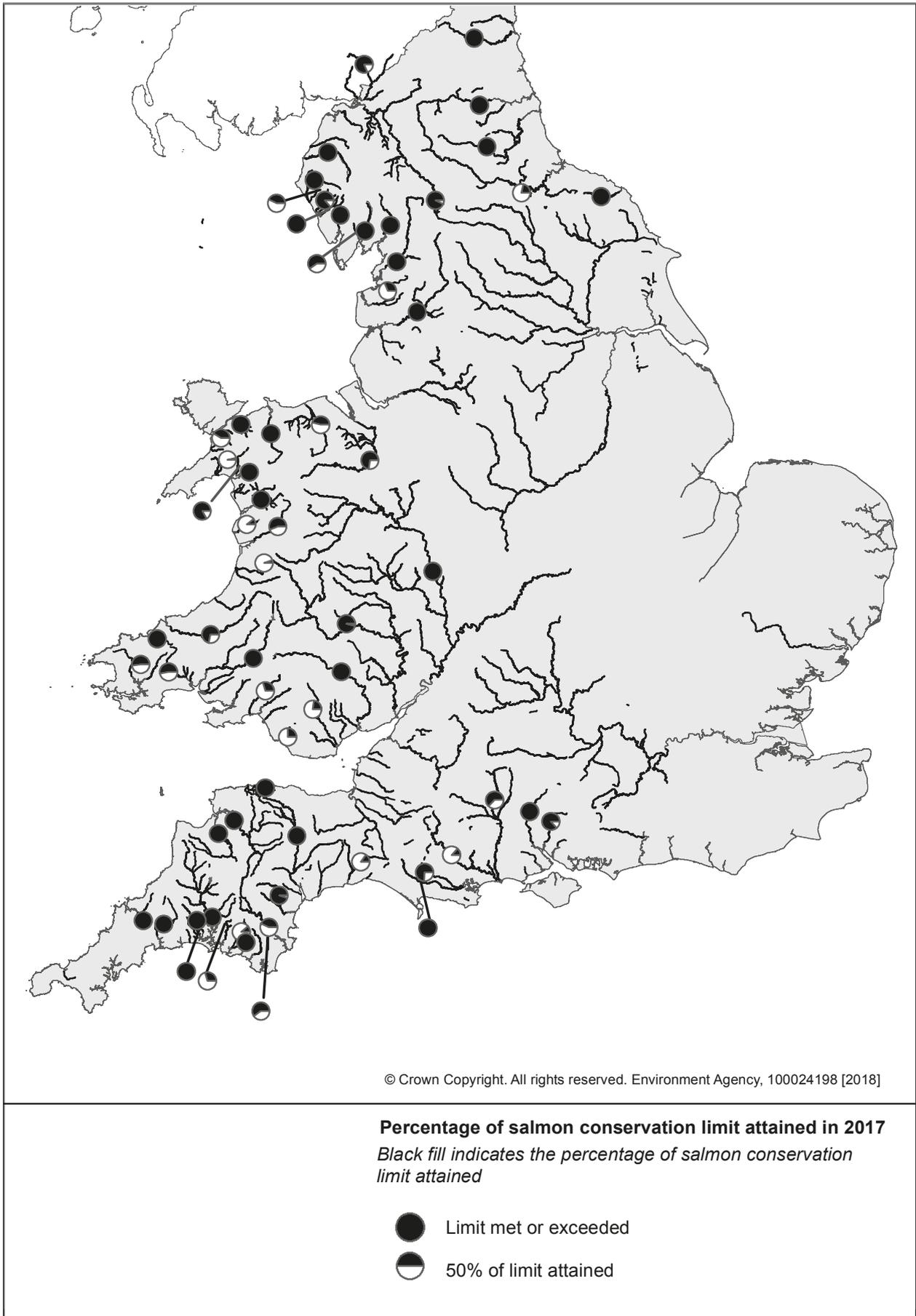
For rivers where assessments are based on declared rod catch data, adjustments have been made since 2015 to account for reduced levels of reporting (see text for details). Data for 2017 are provisional.

**Table 27. Number and percentage of salmon river stocks above their Conservation Limit (CL), between 50% and 100% of the CL, and less than 50% of the CL, 1993-2017.**

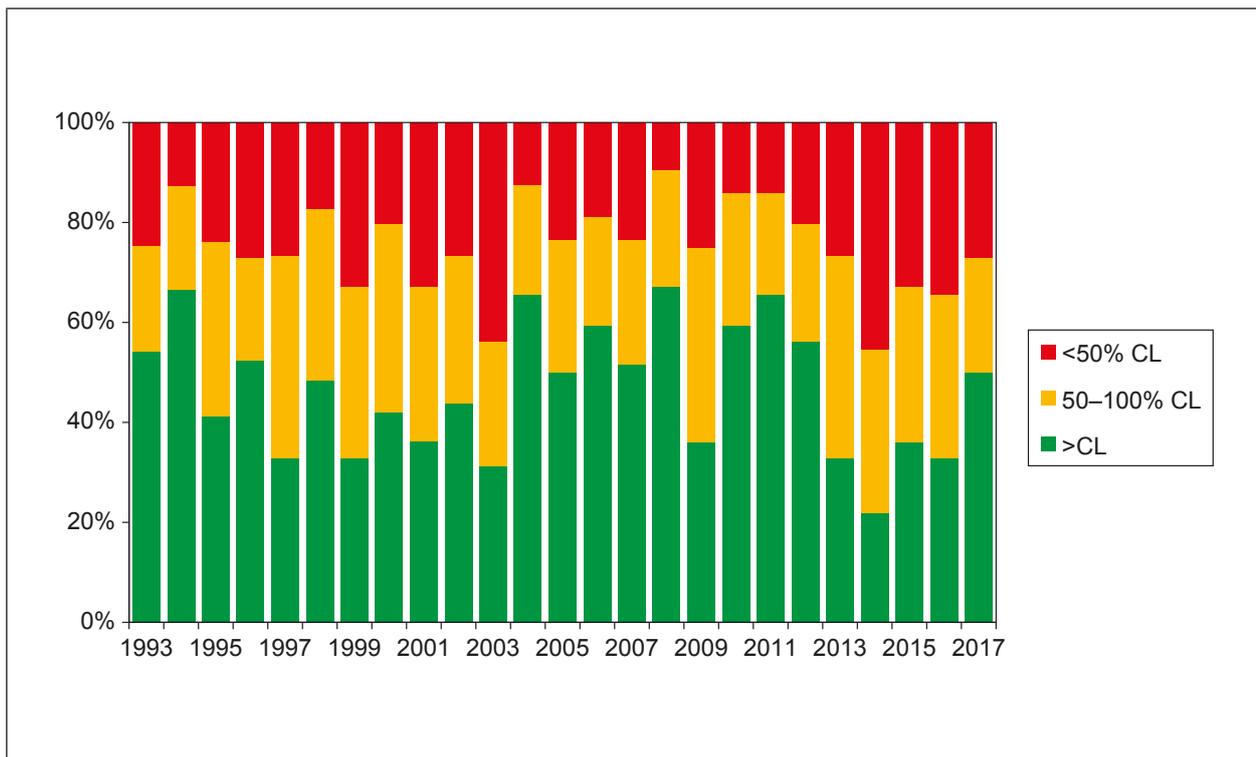
Year	>CL		50-100% CL		<50% CL	
	No.	%	No.	%	No.	%
1993	33	54	13	21	15	25
1994	42	67	13	21	8	13
1995	26	41	22	35	15	24
1996	33	52	13	21	17	27
1997	21	33	26	41	17	27
1998	31	48	22	34	11	17
1999	21	33	22	34	21	33
2000	27	42	24	38	13	20
2001 <sup>[a]</sup>	21	36	18	31	19	33
2002	28	44	19	30	17	27
2003	20	31	16	25	28	44
2004	42	66	14	22	8	13
2005	32	50	17	27	15	23
2006	38	59	14	22	12	19
2007	33	52	16	25	15	23
2008	43	67	15	23	6	9
2009	23	36	25	39	16	25
2010	38	59	17	27	9	14
2011	41	64	14	22	9	14
2012	36	56	15	23	13	20
2013	21	33	26	41	17	27
2014	14	22	21	33	29	45
2015	23	36	20	31	21	33
2016	22	34	20	31	22	34
2017	32	50	15	23	17	27
Average % 1993-2017		47		29		25

Key: <sup>[a]</sup> No CL possible for 6 rivers due to impact of foot and mouth disease.

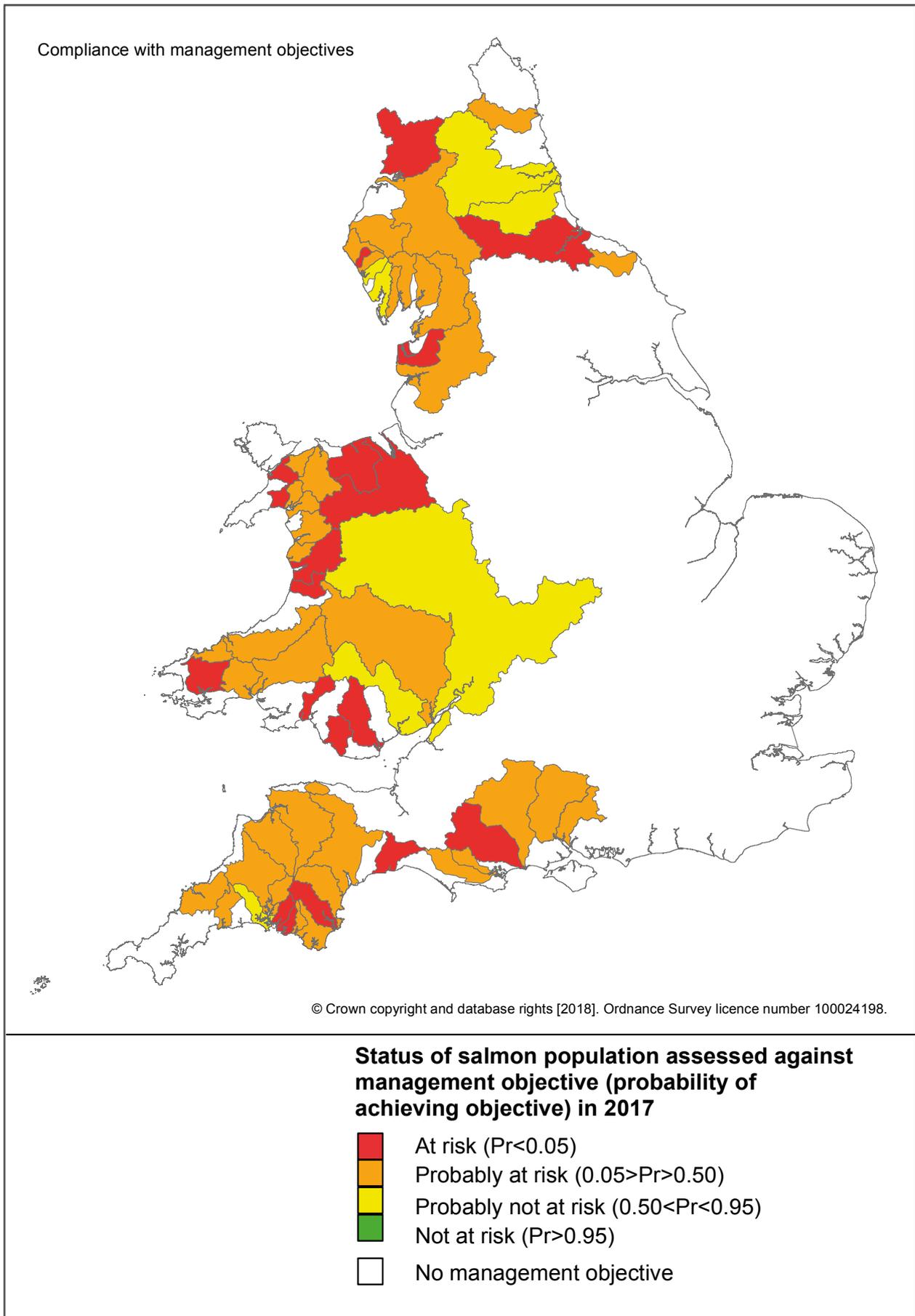
Notes: Data for 2017 are provisional.



**Figure 30. Pie charts for individual rivers for which Conservation Limits (CLs) have been set showing the % of the CLs attained in 2017.**



**Figure 31. Percentage of salmon river stocks exceeding their Conservation Limit (CL), between 50% and 100% of the CL, and less than 50% of the CL, 1993-2017.**



**Figure 32. Status of river catchments in 2017 assessed against the management objective (i.e. that the CL is met or exceeded in at least 4 years out of 5).**



**Figure 33. Percentage of principal salmon rivers in each risk category, assessed against the management objective, for 2004-2017, and as projected for 2022 for rivers in (a) England and (b) Wales.**

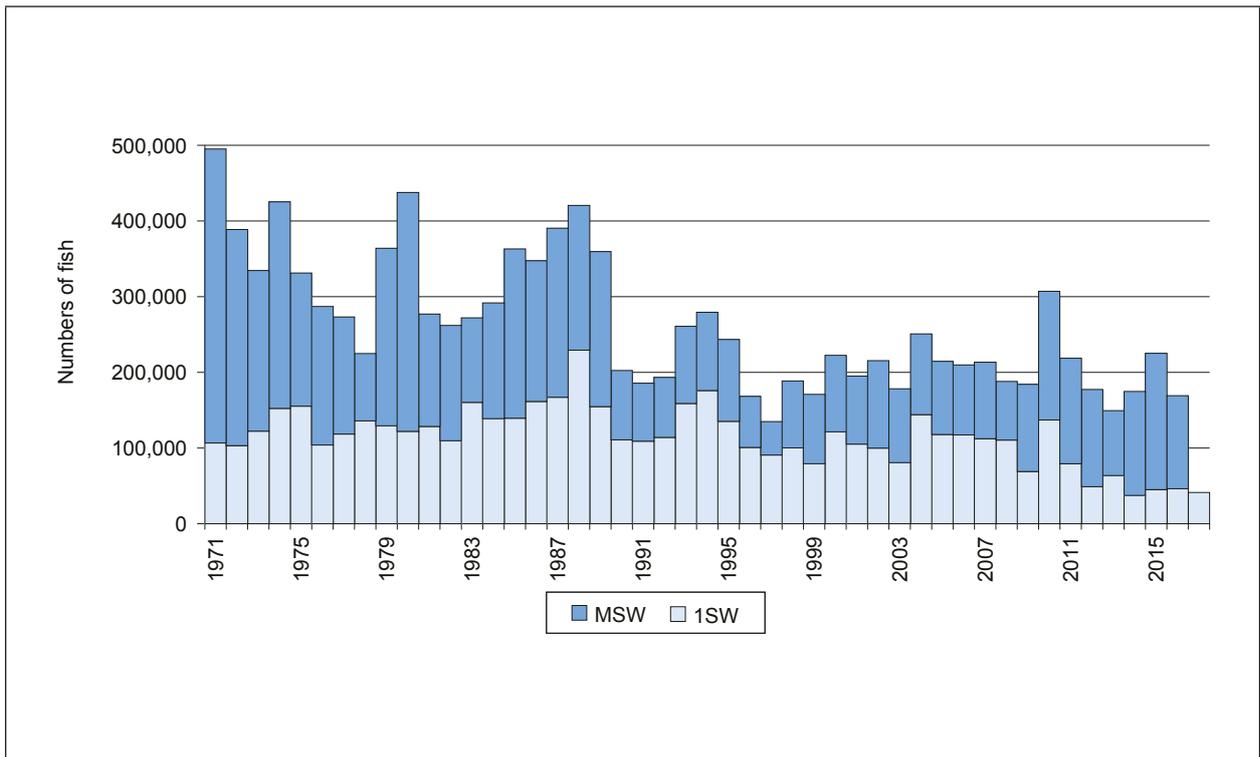


Figure 34. Estimated Pre Fishery Abundance (PFA) of salmon from UK (England & Wales), 1971-2017, as derived from the ICES-NEAC PFA model, 2017.

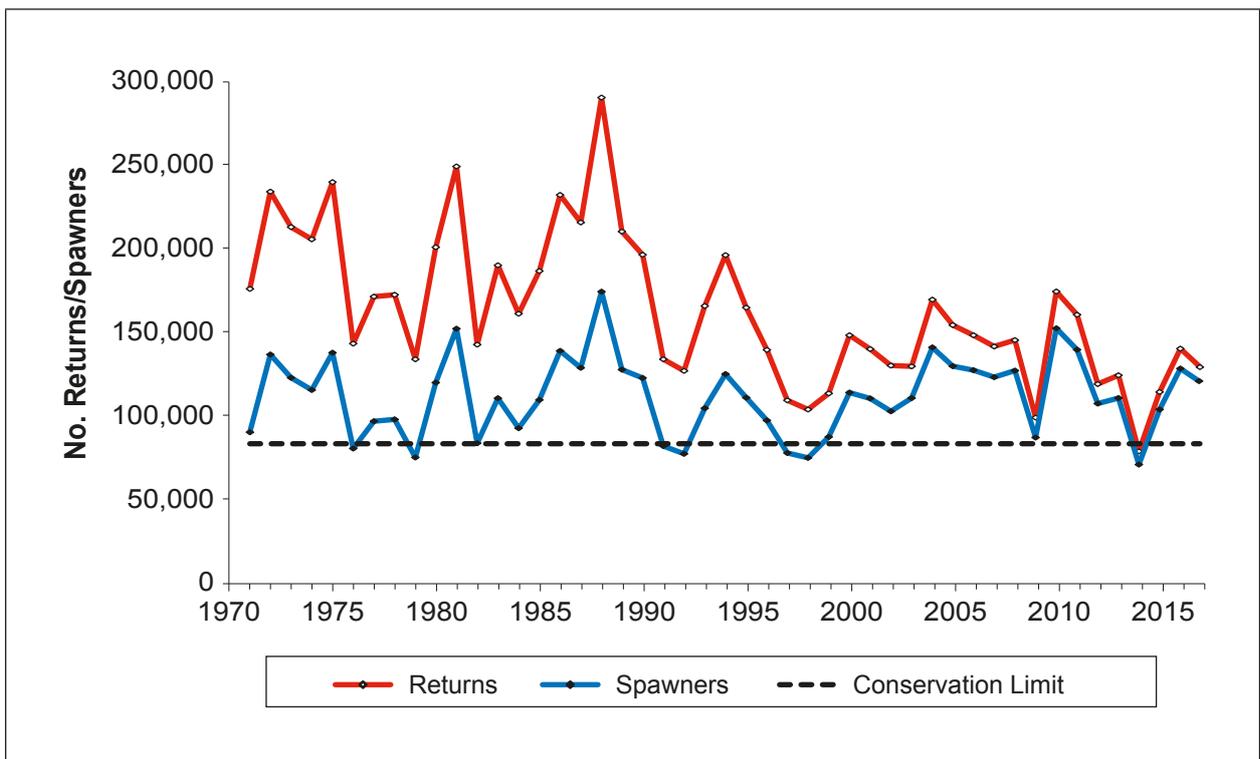


Figure 35. Estimated numbers of returning and spawning salmon for UK (England & Wales), 1971-2017, as derived from the ICES-NEAC PFA model, 2017, together with the national conservation limit (derived from the sum of river-specific CLs).

## **9. FACTORS AFFECTING STOCKS, FISHERIES AND CATCHES**

### **9.1 Management measures**

Viewed against historical data, current stock estimates and catches provide ongoing cause for concern and the conservation of salmon remains a priority. As a result, the Environment Agency and Natural Resources Wales have developed a range of new measures to protect salmon stocks in England and Wales. This followed an initial consultation to better understand how further regulation of salmon fishing might help to safeguard stocks. The measures include proposals for closure of many net fisheries (or for requirements to release salmon where a fishery is authorised to continue to operate for sea trout) and for requirements to achieve very high levels of catch-and-release in rod fisheries (including mandatory catch-and-release on rivers with the lowest stock status in England and for all rivers in Wales). Some restrictions have also been proposed on the number, size and type of hooks that can be used when fishing. These proposals have been subject to public consultation and new measures will be implemented through appropriate legislative provisions. Final proposals (post-consultation) will be subject to approval by the regulatory bodies and government; the aim is to introduce the measures in 2019.

In England, reducing the catch of salmon by rods and nets is only one part of the Environment Agency's larger programme – the Salmon Five Point Approach, which has been jointly developed by the Environment Agency, Defra, its agencies and partner organisations. This sets out actions to address the key pressures that affect the different life stages of salmon. The priorities are:

- Improving marine survival;
- Further reducing exploitation by nets and rods;
- Removing barriers to migration and enhancing habitat;
- Safeguarding sufficient flows; and
- Maximising spawning success by improving water quality.

Progress on actions to address these priorities, and similar activities in Wales, are summarised in the England and Wales Annual Progress Reports to NASCO, available at: [http://www.nasco.int/implementation\\_plans\\_cycle2.html](http://www.nasco.int/implementation_plans_cycle2.html)

A number of measures aimed at better management of this valuable resource have also been implemented or strengthened in England and Wales in recent years. The following provides a brief overview:

- The number of licences issued for nets and fixed engines in all parts of England and Wales 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 has decreased by 76% since 1971.

- The national spring salmon measures introduced in 1999 have reduced the proportion of the net catch taken before June from a 5-year average of 6.7% in the mid-1990's to 0.3%, on average, from 1999; these latter fish are all required to be released. These measures were renewed for another ten years in December 2008 and are proposed to continue.
- Several net fisheries are being (or have been) phased out because they exploit migratory salmonids returning to more than one river (i.e. mixed stock fisheries). Arrangements have also been made to reduce netting effort in some fisheries by either compensating netsmen not to fish for a particular period (buy-offs), or through voluntary agreement to return salmon alive. Catch limits have also been imposed on some net and fixed engine fisheries. Further restrictions, if approved, will be introduced in 2019.
- In Ireland, action by the Government and fisheries authorities in 2007 imposed new restrictions on their fisheries and ended legal coastal drift netting for salmon. This change is estimated to have resulted in up to 5,000 more grilse returning to homewaters, particularly to rivers in the south and west of England and Wales.
- The national spring salmon measures have also affected rod fisheries. The proportion of the rod catch taken before June fell from a mean of 10.9% over the period 1994–1998 to an average of 6.4% for the period since 1999, and these fish are 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 are ongoing efforts to promote catch and release. As a consequence, the proportion of salmon released by anglers has increased steadily from 10% in 1993 to at or above 60% in the last eight years (83%, provisionally, in 2017, the highest in the time series). Tracking studies suggest that, if handled appropriately, the majority (~85%) of released salmon go on to spawn successfully.

## **9.2 Other factors**

Other, non-regulatory, factors may also contribute to changes in stocks and catches, for example, the condition of returning fish, weather conditions, water quality, extreme flow events and the market prices of wild and farmed fish. Further information on these factors is provided in the background report. The following provides brief details of factors pertinent to 2017:

### **The effect of river flows on angler effort and catches**

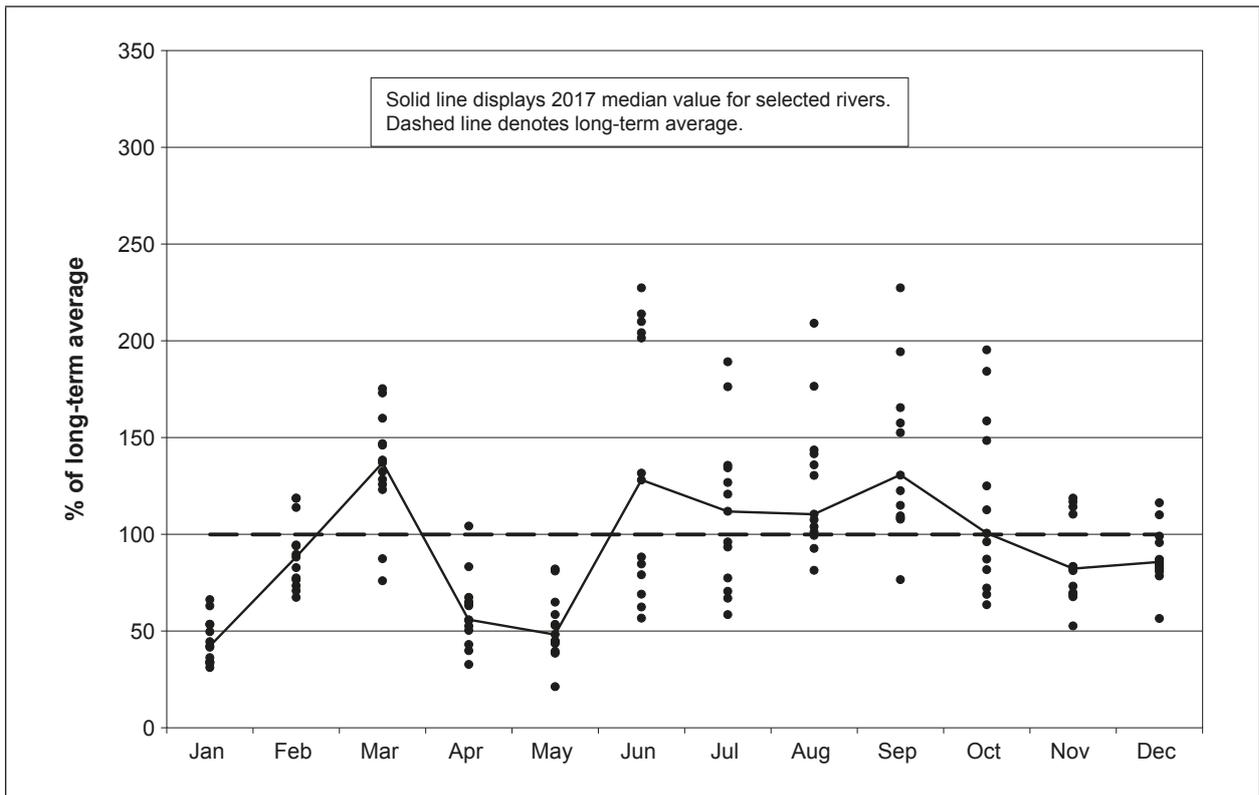
For rod fisheries, river flow is a key factor affecting angler effort. In 2017, river flows were above the long-term average in March, below average in April and May due to a dry spring, and slightly above or close to the long-term average over the summer and early autumn (Figure 36). However, river flows were typically less variable than in many recent years when periods of the year have experienced particularly wet and dry periods. As such, conditions for angling are likely to have been reasonably favourable in 2017, particularly during the summer and early autumn which is commonly an important period for many rod fisheries. This, in turn, may have affected angler fishing effort.

Monthly rod catch data for the majority of the rivers featured in Figure 36, expressed in the same format as the flow data, as a percentage of the long-term average, are presented in Figure 37. This excludes the River Cynon, which has no catch of salmon, and includes the catch for the whole River Tyne rather than just the South Tyne tributary. The long-term average for the rod data has only been extended back as far as 1999, which is when the national measures were introduced imposing compulsory catch and release in the early part of the season. Fishing patterns are likely to have been different prior to this time. The monthly rod catch data have also been restricted to the period February to October, since for most rivers fishing seasons do not extend outside this period.

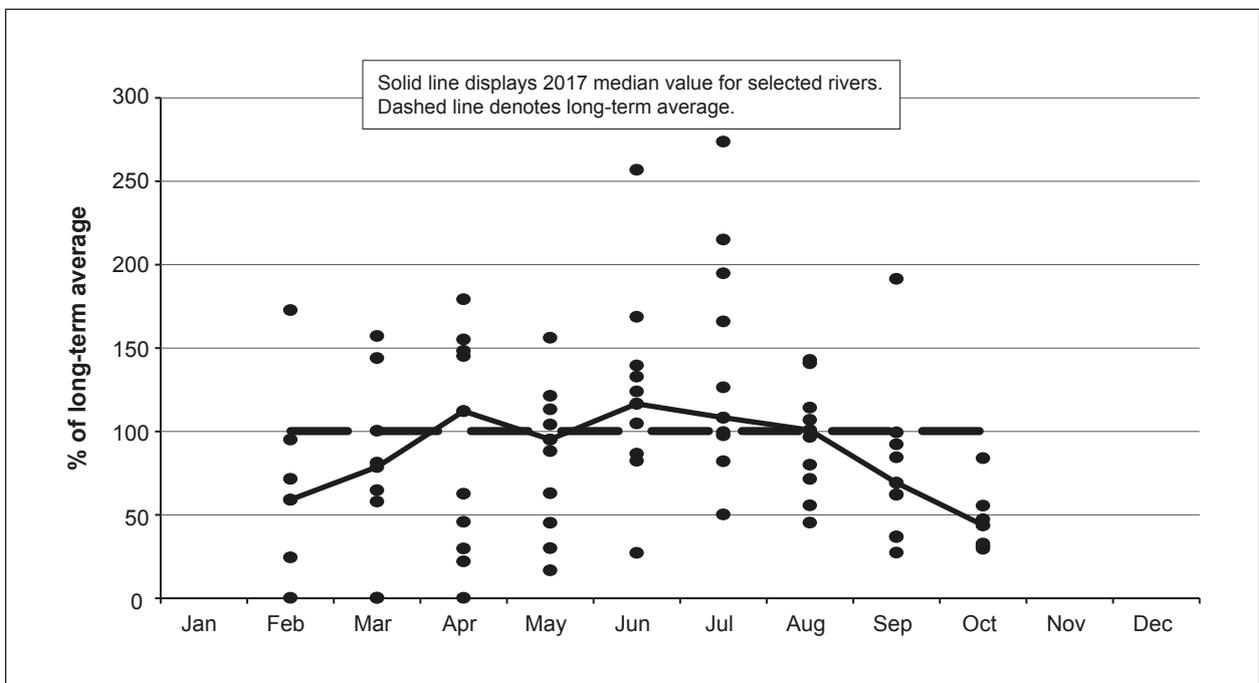
Median monthly rod catches in 2017 were below the long-term average in February and March, close to the long-term average for much of the spring and summer (April to August inclusive), but then well below average at the end of the fishing season in September and October. The particularly low catches in February and March need to be treated with caution since there is relatively little fishing at this time of year, catches are typically very small and fishing is restricted to only some rivers. The above average catches in spring and summer, probably reflect, in part at least, the improved returns of MSW salmon, many of which return earlier in the year. The low abundance of 1SW salmon (Figure 19) is likely to have been the main factor affecting the relatively poor late season catches. It is important to remember that differing proportions of 1SW and MSW fish in the runs and the timing of the return migrations of these fish will also have an impact on catch rates, in addition to river flows.

### **First sale price of salmon**

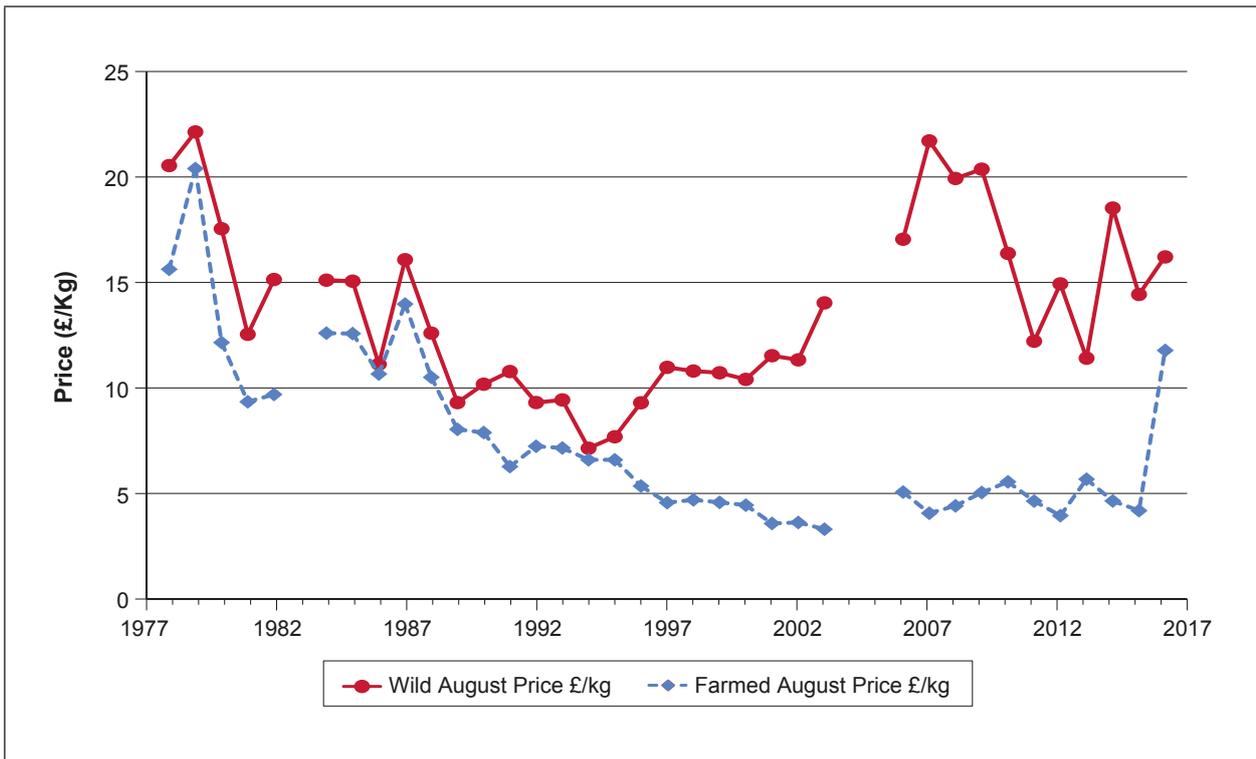
The first sale price of salmon has potential implications for fishing effort and the economic viability of those net fisheries that target these fish. The average monthly price of wild salmon varies seasonally, reflecting both availability and the size of fish. Figure 38 provides an indication of trends in the first sale price of both wild and farmed salmon since 1978. The data are provided for a single month, August; data for 2017 are not available. Further discussion on these price changes is provided in the background report.



**Figure 36. Monthly mean river flows (cubic metres per second) in 2017 for 12 rivers (South Tyne, Itchen, Avon, Exe, Taw, Severn, Wye, Cynon, Teifi, Dee, Lune and Eden) in England & Wales, expressed as a percentage of the long-term average on each river for the same month. (Data supplied courtesy of the National River Flow Archive at the 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.**



**Figure 37. Monthly rod catches in 2017 for 11 rivers (Tyne, Itchen, Avon, Exe, Taw, Severn, Wye, Teifi, Dee, Lune and Eden) in England & Wales, expressed as a percentage of the long-term average on each river for the same month. The long-term average is derived from data for the period since 1999.**



**Figure 38.** The average price of farmed salmon and wild Scottish salmon sold in August at Billingsgate, London, 1978 to 2016.

## 10. EXISTING AND EMERGING THREATS TO SALMON POPULATIONS

Further information on the various factors impacting on salmon stocks in England and Wales, and progress with actions to protect and enhance these stocks, is reported in the NASCO Implementation Plan and in the annual progress reports to NASCO. These reports are available at: [http://www.nasco.int/implementation\\_plans\\_cycle2.html](http://www.nasco.int/implementation_plans_cycle2.html). Some additional information is also available in the background report. The following provides brief details on three issues:

### Red Vent Syndrome and other diseases

The occurrence of salmon returning to rivers in England and Wales with swollen and/or bleeding vents has been noted since 2004. The condition, referred to as Red Vent Syndrome (RVS), has continued to be observed since this time, and has been subject to ongoing monitoring. Monitoring programmes on salmon 'index' rivers provide the most consistent measure of the incidence of RVS. Since 2007, this consistency has been improved through the introduction of a system whereby symptoms have been classified according to their apparent severity (with samplers referring to a set of standard photographs and descriptions to assist their judgement). Available time series of RVS incidence in returning fish are presented in Table 28 for the Rivers Tyne, Tamar, Dee, Lune and Caldew (a tributary of the River Eden). However, no sampling has been possible at one of these sites in the last four years and sampling effort has been substantially reduced at two others. The relatively high reported incidence of RVS for the River Lune in 2017 is understood to include a greater proportion of fish than usual exhibiting mild symptoms of the disease.

Fish affected by RVS show a degree of recovery in freshwater and appear to be able to spawn successfully.

In response to increased reports of fungal (*Saprolegnia*) infections in salmon (and sea trout), the Environment Agency and Natural Resources Wales continue to monitor disease problems in all the major salmon rivers across England and Wales. Over the last decade, there have been increased reports of fish infected with *Saprolegnia*. In some rivers, resulting mortalities have been above those considered usual from this disease. At a national level, relatively few instances of *Saprolegnia* were reported in 2017, although the number of reports of the disease were higher for some rivers than in 2016. In most cases, the reports received were within expected 'natural' levels, although higher and more persistent levels of *Saprolegnia* have been recorded in recent years in rivers in the south-west of England. The Environment Agency has part funded a collaborative project with Cardiff University to further improve the understanding of *Saprolegnia* and to help identify potential drivers for infection that could explain recent observations.

### Poor juvenile recruitment in 2016

The densities of juvenile salmon, and 0+ salmon fry in particular, were very low in English and Welsh rivers in 2016 and well below long-term averages. Abnormal conditions associated with severe storms and abnormally high winter temperatures, as well as low numbers of spawners, particularly in rivers where 1SW fish normally comprise the main component of the run, are believed to have contributed to this. A more detailed appraisal of this issue was included in last year's assessment report. It is noteworthy, however, that the smolt run estimate for the River Frome in 2017 (Table 23), where almost all smolts migrate at one year old, was the lowest in the time series. This is consistent with the poor recruitment in 2016. For rivers where the majority of smolts migrate as two-year-olds, smolt output may well be below average in 2018.

## Pink Salmon

There have been occasional reports of pink salmon captures in England and Wales in previous years. Most recent reports have occurred in odd years (e.g. 2007, 2009 and 2015) consistent with the fish originating from established populations of pink salmon in northern parts of the Russian Federation and northern Norway. Pink salmon have a strict two-year life-cycle and thus have distinct populations breeding in even and odd years. It is principally only odd year populations that have established in these areas.

In 2017, there were widespread reports of pink salmon captures across North Atlantic countries (ICES, 2018). Relatively large numbers of pink salmon (perhaps around 200) were taken in the English north east coast fishery and there were also reports of fish being captured in a number of river systems across the country. In Scotland, pink salmon were observed spawning in some rivers and eggs are known to have hatched successfully. It is, as yet, unclear whether the marked increase in pink salmon numbers in 2017 represented a one-off occurrence, due to particularly favourable conditions for a particular cohort of fish, or whether this might mark the start of a wider range expansion by the species.

A small sample of frozen pink salmon (9 fish) arising from captures in rivers in the north-east and south-west of England were subject to post-mortem examination. Although the freezing of samples limited comprehensive assessment of parasites, a number of common metazoan species were recovered. All samples were found to be negative for the viruses Infectious Haematopoietic Necrosis (IHN), Viral Haemorrhagic Septicaemia (VHS), Infectious Salmon Anaemia virus (ISA) and Infectious Pancreatic Necrosis (IPN).

**Table 28. Percentage of returning salmon showing signs of Red Vent Syndrome in monitored rivers in England and Wales, 2004–2017.**

River	Tyne #	Tamar	Dee	Lune	Caldew #
Region/NRW	NE	SW	N. Wales	NW	NW
Sample source	Upper river broodstock	Lower river trap	Lower river trap	Lower river trap	Sub-catchment trap
% incidence of RVS in returning fish					
2004			0.4		
2005			3.2	0	
2006			9.2	1.4	
2007	1.4	60.2	29.9	23.1	5.3 <sup>[a]</sup>
2008	0.8	45.3	20.9	24.7	0.3 <sup>[a]</sup>
2009	3.4	41.5	28.2	21.2	10.2
2010	5.3	57.1	23.7	18.8	5.1
2011	3.8	45.6	10.9	16.3	6.4
2012	5.2	26.1	13.2	0 <sup>[a]</sup>	6.1
2013	10.1	44.5 #	20.5	41.6	0.8 <sup>[a]</sup>
2014	7.5	n/a	25.3	9.5 #	n/a
2015	10.3	35.5 #	24.4	13.6 #	n/a
2016	3.5	24.6 #	21.7	19.0 #	n/a
2017	4.9	17.7 #	22.5	60.2 #	n/a

Note: Except where indicated (#), these estimates are based on fish sampled over a common (June–October) period and have been weighted according to monthly run totals. Three of the traps (not the Caldew) are located at or close to head-of-tide. The relatively high reported incidence of RVS for the River Lune in 2017 is understood to include a greater proportion of fish than usual exhibiting mild symptoms of the disease.

<sup>[a]</sup> Considered minimum values.

## 11. REFERENCES

- Environment Agency, 2017. Salmonid and freshwater fisheries statistics for England and Wales, 2016, 42 pp. <https://www.gov.uk/government/collections/salmonid-and-freshwater-fisheries-statistics>
- ICES. 2018. Report of the Working Group on North Atlantic Salmon. ICES CM 2018/ACOM:21, 386pp.
- Potter, E.C.E., Crozier, W.W., Schön, P-J., Nicholson, M.D., Prévost, E., Erkinaro, J., Gudbergsson, G., Karlsson, L., Hansen, L.P., Maclean, J.C., Ó Maoiléidigh, N. and Prusov S. 2004. Estimating and forecasting pre-fishery abundance of Atlantic salmon (*Salmo salar* L.) in the north-east Atlantic for the management of mixed stock fisheries. ICES Journal of Marine Science 61: 1359-1369.

# **ANNEX 1. NASCO's request for scientific advice from ICES in 2018**

## **1. With respect to Atlantic salmon in the North Atlantic area:**

- 1.1 provide an overview of salmon catches and landings by country, including unreported catches and catch and release, and production of farmed and ranched Atlantic salmon in 2017<sup>1</sup>;
- 1.2 report on significant new or emerging threats to, or opportunities for, salmon conservation and management<sup>2</sup>;
- 1.3 provide a review of examples of successes and failures in wild salmon restoration and rehabilitation and develop a classification of activities which could be recommended under various conditions or threats to the persistence of populations<sup>3</sup>;
- 1.4 provide a compilation of tag releases by country in 2017; and
- 1.5 identify relevant data deficiencies, monitoring needs and research requirements.

## **2. With respect to Atlantic salmon in the North-East Atlantic Commission area:**

- 2.1 describe the key events of the 2017 fisheries<sup>4</sup>;
- 2.2 review and report on the development of age-specific stock conservation limits including updating the time series of the number of river stocks with established CL's by jurisdiction;
- 2.3 describe the status of the stocks including updating the time series of trends in the number of river stocks meeting CL's by jurisdiction;
- 2.4 provide catch options or alternative management advice for the 2018/19-2020/21 fishing seasons, with an assessment of risks relative to the objective of exceeding stock conservation limits, or pre-defined NASCO Management Objectives, and advise on the implications of these options for stock rebuilding<sup>5</sup>; and
- 2.5 update the Framework of Indicators used to identify any significant change in the previously provided multi-annual management advice.

## **3. With respect to Atlantic salmon in the North American Commission area:**

- 3.1 describe the key events of the 2017 fisheries (including the fishery at St Pierre and Miquelon)<sup>4</sup>;
- 3.2 update age-specific stock conservation limits based on new information as available including updating the time series of the number of river stocks with established CL's by jurisdiction;
- 3.3 describe the status of the stocks including updating the time series of trends in the number of river stocks meeting CL's by jurisdiction;
- 3.4 provide catch options or alternative management advice for 2018-2021 with an assessment of risks relative to the objective of exceeding stock conservation limits, or pre-defined NASCO Management Objectives, and advise on the implications of these options for stock rebuilding<sup>5</sup>; and
- 3.5 update the Framework of Indicators used to identify any significant change in the previously provided multi-annual management advice.

**4. With respect to Atlantic salmon in the West Greenland Commission area:**

- 4.1 describe the key events of the 2017 fisheries<sup>4</sup>;
- 4.2 describe the status of the stocks<sup>6</sup>;
- 4.3 provide catch options or alternative management advice for 2018-2020 with an assessment of risk relative to the objective of exceeding stock conservation limits, or pre-defined NASCO Management Objectives, and advise on the implications of these options for stock rebuilding<sup>5</sup>; and
- 4.4 update the Framework of Indicators used to identify any significant change in the previously provided multi-annual management advice.

**Notes:**

1. *With regard to question 1.1, for the estimates of unreported catch the information provided should, where possible, indicate the location of the unreported catch in the following categories: in-river; estuarine; and coastal. Numbers of salmon caught and released in recreational fisheries should be provided.*
2. *With regard to question 1.2, ICES is requested to include reports on any significant advances in understanding of the biology of Atlantic salmon that is pertinent to NASCO, including information on any new research into the migration and distribution of salmon at sea and the potential implications of climate change for salmon management.*
3. *With respect to question 1.3, NASCO is aware that the WGERAAS final report is being prepared and will be submitted to ICES in 2017.*
4. *In the responses to questions 2.1, 3.1 and 4. 1, ICES is asked to provide details of catch, gear, effort, composition and origin of the catch and rates of exploitation. For homewater fisheries, the information provided should indicate the location of the catch in the following categories: in-river; estuarine; and coastal. Information on any other sources of fishing mortality for salmon is also requested. For 4.1 ICES should review the results of the recent phone surveys and advise on the appropriateness for incorporating resulting estimates of unreported catch into the assessment process.*
5. *In response to questions 2.4, 3.4 and 4.3, provide a detailed explanation and critical examination of any changes to the models used to provide catch advice and report on any developments in relation to incorporating environmental variables in these models.*
6. *In response to question 4.2, 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 2.3 and 3.3.*

## ANNEX 2. Net Limitation Orders applying to salmon net fisheries in England & Wales.

EA Region / NRW	Area	Net Limitation Order	End date	Welsh rivers in Wales 'all areas' NLO	NLO licence provision	
					Type	Number
Anglian	Coastal	Anglian Coast 2015	2022		Drift net & non-drift net	0
North East	Coastal	North East Coast 2012	2022		T and J nets	0
					Drift net - Northumbria and Yorkshire	0
North West	North	River Lune Estuary 2009	2019		Drift	7
	North	River Lune Estuary 2009	2019		Haaf	12
	North	River Ribble Estuary 2006	2017		Drift (hang or whammel) nets	2
	North	River Kent Estuary 2013	2023		Lave net	6
	North	River Leven Estuary 2013	2023		Lave net	2
	North	Solway Firth 2007	2017		Heave or Haaf net	105
Southern	Solent & S Downs	Southern Region 2008	2018		Seine	1
South West	Cornwall	River Camel 2013	2018		Draft, seine, drift or hang net	6
	South Wessex	Christchurch Harbour 2012 (Hants Avon & Stour)	2022		Draft or seine net	0
	South Wessex	Poole Harbour 2012 (Piddle & Frome)	2017		Seine net	1
	Devon	River Dart 2015	2025		Draft or seine net	0
	Devon	Exe Estuary 2011	2021		Draft nets	3
	Cornwall	River Fowey 2007	2017		Draft or seine net	1
	Cornwall	River Lynher 2014	2024		Draft or seine net	0
	Cornwall	River Tamar 2014	2024		Draft or seine net	0
	Cornwall	River Tavy 2014	2024		Draft or seine net	0
	Cornwall	Rivers Taw and Torridge 2012	2022		Draft or seine net	1
	Devon	River Teign 2015	2020		Draft or seine net	3
Midlands		River Severn 2014	2019		Draft or seine net	0
		River Severn 2014	2019		Lave net	15
Wales	All areas	Wales 2009	2017	Nevern	Draft or seine net	1
				Taf	Coracle net	1
				Taf	Wade net	1
				Dyfi	Draft or seine net	3
				Dysynni	Draft or seine net	1
				Glaslyn & Dwyrdd	Draft or seine net	0
				Mawddach	Draft or seine net	3
				Conwy	Draft or seine net	3
				Cleddau	Compass nets	6
				Teifi	Coracle net	12
				Teifi	Draft or seine net	3
				Tywi	Draft or seine net	3
				Tywi	Coracle net	8
				Wales	North	River Dee 2015
Trammel nets	0					

Notes: Table does not include historical installation fisheries which operate under Certificates of Privilege or the private lave net fishery on the River Wye.

Some fisheries are also subject to seasonal catch limits - see Table 2 for details.

## ANNEX 3. Byelaws applying to salmon rod fisheries in England and Wales.

EA Region / NRW	River	Salmon Season (inclusive dates)	*Method Restrictions	*Bag limits/Catch and Release etc.	Effective from (date); expires (date)
NE	Aln	1.2 -31.10			
	Coquet	1.2 -31.10			
	Tyne	1.2 -31.10			
	Wear	1.2 -31.10			
	Tees	1.2 -31.10			
	Esk (Yorks.)	6.4 -31.10			
	Ouse (Yorks.)	6.4 -31.10			
Anglian	Region	1.3 -28.9			
Thames	Thames	1.4 -30.9		2 salmon bag limit a day	
SW	Avon (Hants.)	1.2 -31.8	Artificial fly only before 15/5		
	Piddle	1.3 -31.8	Artificial fly only before 15/5		
	Frome	1.3 -31.8	Artificial fly only before 15/5		
	Axe	15.3 -31.10	No shrimp, prawn, worm or maggot. Fly only after 31/7 below Axbridge		
	Exe	14.2 -30.9 (trial extension to 14.10)	No worm or maggot	Fly only and mandatory catch and release during trial extension period.	
	Teign	1.2 -30.9	No worm or maggot before 1/6		
	Dart	1.2 -30.9	No worm or maggot. No shrimp/prawn etc. below Staverton Bridge.		
	Avon (Devon)	15.4 -30.11	No worm or maggot		
	Plym	1.4 -15.12	No worm, maggot, shrimp or prawn after 31/8		
	Tavy	1.3 -14.10	No worm, maggot, shrimp or prawn after 31/8		
	Tamar	1.3 -14.10	No worm, maggot, shrimp or prawn after 31/8		
	Lynher	1.3 -14.10	No worm, maggot, shrimp or prawn after 31/8		
	Fowey	1.4 -15.12			
	Camel	1.4 -15.12			
	Taw	1.3 -30.9	No shrimp, prawn, worm or maggot. Fly only 1/4 to 31/5	Numbers for Taw, Torridge in brackets: 2 (2) salmon a day, 3 (2) a week and 10 (7) a season, (2 salmon limit before June 1st) & return of all salmon > 70 cm after Aug 1st.	
	Torridge	1.3 -30.9	No shrimp, prawn, worm or maggot. Fly only 1/4 to 31/5		
	Lyn	1.2 -31.10	No worm or maggot before 1/6		
Yealm	1.4 -15.12	No worm, maggot, shrimp or prawn after 31/8			
Midlands	Severn	1.2 -7.10	No float fishing with lure or bait		

<b>EA Region / River NRW</b>	<b>Salmon Season (inclusive dates)</b>	<b>*Method Restrictions</b>	<b>*Bag limits/Catch and Release etc.</b>	<b>Effective from (date); expires (date)</b>	
Wales	Wye	3.3 -17.10 (a)	Fly only 1.9 to 17.10. No bait all season	Mandatory C&R all season	Commenced June 2012; expires 2021
	Usk	3.3 -17.10	Fly only 3.3 - 1.6. Fly & Spin 15.9 - 17.10		
	Taff & Ely	20.3 -17.10	Fly & Spin 20.3 -15.4 & 1.10 -17.10	Mandatory C&R all season	Commenced June 2012; expires 2018
	Ogmore	20.3 -17.10	Fly & Spin 20.3 -15.4 & 1.10 -17.10		
	Afan	20.3 -17.10	Fly & Spin 20.3 -15.4 & 1.10 -17.10		
	Neath	20.3 -17.10	Fly & Spin 20.3 -15.4 & 1.10 -17.10		
	Tawe	20.3 -17.10	Fly & Spin 20.3 -15.4 & 1.10 -17.10		
	Loughor	20.3 -17.10	Fly & Spin 20.3 -15.4 & 7.10 -17.10		
	Tywi	1.4 -17.10	Fly & Spin 7.10 -17.10	Daily bag limit of 2 salmon & 4 sea trout, weekly bag limit of 5 salmon. C&R 8.10 to 17.10	
	Taf	1.4 -17.10	Fly & Spin 7.10 -17.10	Daily bag limit of 2 salmon & 4 sea trout, weekly bag limit of 5 salmon. C&R 8.10 to 17.10	
	E+W. Cleddau	1.4 -17.10	Fly & Spin 7.10 -17.10	Daily bag limit of 2 salmon & 4 sea trout, weekly bag limit of 5 salmon. C&R 8.10 to 17.10	
	Nevern	1.4 -17.10	Fly & Spin 7.10 -17.10	Daily bag limit of 2 salmon & 4 sea trout, weekly bag limit of 5 salmon	
	Teifi	1.4 -17.10	Fly & Spin 7.10 -17.10	Daily bag limit of 2 salmon & 4 sea trout, weekly bag limit of 5 salmon	
	Aeron	1.4 -17.10	Fly & Spin 7.10 -17.10	Daily bag limit of 2 salmon & 4 sea trout, weekly bag limit of 5 salmon	
	Ystwyth	1.4 -17.10	Fly & Spin 7.10 -17.10	Daily bag limit of 2 salmon & 4 sea trout, weekly bag limit of 5 salmon	
	Rheidol	1.4 -17.10	Fly & Spin 7.10 -17.10	Daily bag limit of 2 salmon & 4 sea trout, weekly bag limit of 5 salmon	
	Dyfi	20.3 -17.10 (some sections to 31.10)	Fly & Spin 20.3 -15.4 & 7.10 -31.10	Catch & Release salmon and sea trout 18.10 to 31.10	
	Dysynni	20.3 -17.10	Fly & Spin 20.3 -15.4 & 7.10 -17.10	Catch & Release salmon and sea trout 18.10 to 31.10	
	Mawddach	20.3 -17.10	Fly & Spin 20.3 -15.4 & 7.10 -17.10		
	Artro	20.3 -17.10	Fly & Spin 20.3 -15.4 & 7.10 -17.10		
	Dwyrhyd	20.3 -17.10 (some sections to 31.10)	Fly & Spin 20.3 -15.4 & 7.10 -31.10	Catch & Release salmon and sea trout 18.10 to 31.10	
	Glaslyn	20.3 -17.10	Fly & Spin 20.3 -15.4 & 7.10 -17.10		
	Dwyfawr	20.3 -17.10	Fly & Spin 20.3 -15.4 & 7.10 -17.10		
	Llyfni	20.3 -17.10	Fly & Spin 20.3 -15.4 & 7.10 -17.10		
	Gwyrfai	20.3 -17.10	Fly & Spin 20.3 -15.4 & 7.10 -17.10		
	Seiont	20.3 -15.11	Fly & Spin 20.3 -15.4 & 7.10 -15.11	Catch & Release salmon and sea trout 18.10 to 15.11	
	Ogwen	20.3 -17.10 (some sections to 31.10)	Fly & Spin 20.3 -15.4 & 7.10 -31.10	Catch & Release salmon and sea trout 18.10 to 31.10	
	Conwy	20.3 -17.10 (some sections to 31.10)	Fly & Spin 20.3 -15.4 & 7.10 -31.10	Catch & Release salmon and sea trout 18.10 to 31.10	
	Clwyd	20.3 -17.10	Fly & Spin 20.3 - 1.6, Fly only 1.10 - 17.10		
	Dee	3.3 -17.10	Fly only 3.3 - 1.6, Fly & Spin 1.10 - 17.10		

EA Region / NRW	River	Salmon Season (inclusive dates)	*Method Restrictions	*Bag limits/Catch and Release etc.	Effective from (date); expires (date)
NW	Ribble	1.2 -31.10		Byelaw - no more than two salmon may be killed between 16.6 and 31.10	20.06.2017 – 19.06.2027
	Wyre	1.2 -31.10			
	Lune	1.2 -31.10		Byelaw - no more than four salmon may be killed during the season.	26.11.2009 – 26.11.2019
	Kent	1.2 -31.10			
	Leven	1.2 -31.10		Byelaw requiring release of all salmon after capture. Derogation allows anglers to take some fish (currently 3 for whole season) provided these marked with carcass tag.	10.06.2016 – 09.06.2026
	Crake	1.2 -31.10		Byelaw requiring release of all salmon after capture. Derogation allows anglers to take some fish (currently 3 for whole season) provided these marked with carcass tag.	10.06.2016 – 09.06.2026
	Duddon	1.2 -31.10			
	Esk (Cumb.)	1.2 -31.10			
	Irt	1.2 -31.10			
	Calder	1.2 -31.10			
	Ehen	1.2 -31.10			
	Derwent	1.2 -31.10			
	Ellen	1.2 -31.10			
	Eden	15.1 -14.10		Byelaw - 2 salmon bag limit a day between 16.6 and 14.10	13.11.2007 – 12.11.2017
				Byelaw - prohibits retention of female salmon 10.9 to 14.10	13.11.2007 – 12.11.2017
	Esk (Border)	1.2 -31.10		Byelaw - 2 salmon bag limit a day between 16.6 and 31.10	13.11.2007 – 12.11.2017
				Byelaw - prohibits retention of female salmon 10.9 to 31.10	13.11.2007 – 12.11.2017
	Others	1.2 -31.10 (b)			

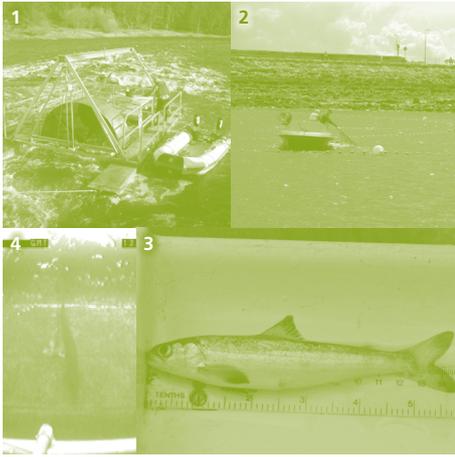
Notes: (a) Season 3.3 to 25.10 Rivers Irfon, Ithon and main River Wye upstream of Llanwrthwl Bridge

(b) Applies to all other watercourses in the North West not named specifically above.

\* National spring salmon byelaws apply.

Natural Resources Wales – variations apply to Anglesey and the Lleyn Peninsula (check local byelaws).

Always check local byelaws before fishing.



**Front cover images (clockwise from top left)**

- 1 – Rotary screw trap on the River Tyne (photo courtesy of Environment Agency)
- 2 – T net at South Shields (photo courtesy of Environment Agency)
- 3 – Salmon smolt from the River Frome (photo courtesy of Game and Wildlife Conservation Trust)
- 4 – Salmon crossing the River Test Nursling fish counter (photo courtesy of Environment Agency)

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