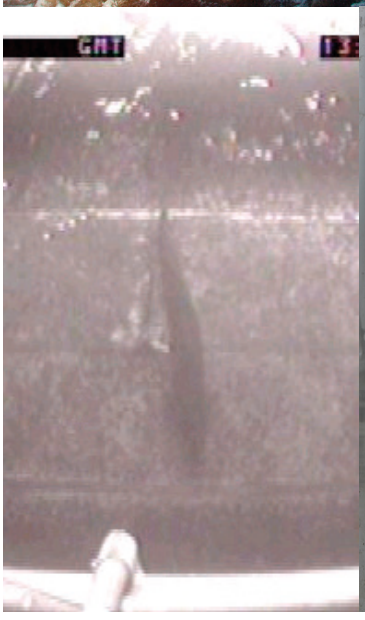
Salmon Stocks and Fisheries in England and Wales in 2018



Cefas
Centre for Environment Fisheries & Aquaculture Science

Environment Agency

Cyfoeth Naturiol Cymru
Natural Resources Wales

SALMON STOCKS AND FISHERIES IN ENGLAND AND WALES, 2018

Preliminary assessment prepared for ICES, March 2019

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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 2019 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 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 therefore changes relatively little from year to 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 2018

- The provisional declared salmon catch by nets and fixed engines in 2018 (11,140 fish; 40.3 t) was 10% more than the catch in 2017 but well below the average of the previous five years. These figures include a small number of fish (363) that were released alive. Of the retained catch, the majority (92%) was taken in the north east coast fishery. Net catches have declined substantially over the past 15-20 years reflecting increased regulatory controls and reduced abundance.
- The provisional declared rod catch in 2018 (7,349 fish) decreased by 46% on the confirmed catch for 2017 and was the lowest in the available time series.
- Conditions for returning salmon, and for angling, were particularly poor for much of 2018 due to the prolonged hot, dry weather, resulting in low flows and high temperatures. This affected both angler effort and catches.
- The level of under-reporting of catches in rod fisheries has increased in the last four years, due to various factors. 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 2018, it is provisionally estimated that 6,488 salmon (88% of the catch) were released, the highest percentage ever recorded. Released fish are estimated to have contributed 13 million eggs to spawning in 2018.
- Returning stock estimates and counts were below the values recorded in 2017 for all but one of the rivers where such data are available; estimates were the lowest in the time series for four rivers. In many rivers there has been a marked decline in the numbers of returning salmon over the last decade. However, for a small number of rivers, notably some of those on the south coast of England, there is evidence of an increase.
- Spawning escapement in 2018 was estimated to be above the conservation limit (CL) in just 14 of the 64 principal salmon rivers in England and Wales (22%). This is the joint lowest level of CL compliance in the time series. Rivers where spawning escapement was below CL were widely distributed.
- Formal compliance assessment in 2018 indicated that only 4 rivers (6%) 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 24 rivers (38%) were classified as 'at risk' – having a low probability (p ≤5%) of achieving the MO.
- New regulatory provisions were approved in England in December 2018 that will substantially reduce the exploitation of salmon from 2019. The measures include the closure of many net fisheries and mandatory catch-and-release (C&R) in others; increased levels of C&R, some mandatory and others voluntary, will also be required in many rod fisheries. Similar provisions will apply in Wales, including mandatory C&R of salmon in all rivers, but these are currently under review. If approved, the measures in Wales will likely not apply until 2020.
- The poor juvenile recruitment reported in 2016 is likely to have adversely affected smolt runs on many rivers in 2018, with potential implications for numbers of returning adults in 2019 and 2020.
- The occurrence of salmon returning to rivers with swollen and bleeding vents (Red Vent Syndrome) was relatively high in 2018.

REPORT ON SALMON FISHERIES IN 2018

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 (SAP) 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
		Torridge	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		
		Dwyryd	Yes	
		Glaslyn	Yes	
		Dwyfach & Dwyfawr	Yes	
		Llyfni		
		Gwyrfai		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.
** Salmon Action Plans in Wales are now referred to as 'Know Your Rivers' reports.*

English river systems

1 Aln
2 Coquet*
3 Tyne*
4 Wear*
5 Tees*
6 Esk (Yorkshire)*
7 Ouse
8 Trent
9 Thames*
10 Itchen*$
11 Test*
12 Avon (Hants)*$
13 Stour (Dorset)*
14 Piddle*
15 Frome*
16 Axe*
17 Exe*
18 Teign*$
19 Dart*$
20 Avon (Devon)*
21 Erme*$
22 Yealm*$
23 Plym*
24 Tavy*$
25 Tamar*
26 Lynher*
27 Looe
28 Fowey*
29 Camel*$
30 Torridge*
31 Taw*$
32 Lyn*
33 Severn*
65 Mersey
66 Ribble*
67 Wyre*
68 Lune*
69 Kent*
70 Leven*
71 Crake*
72 Duddon*
73 Esk (Cumbria)*
74 Irt*
75 Calder*
76 Ehen*$
77 Derwent*$
78 Ellen
79 Eden*$
80 Esk (Border)*

Welsh river systems

34 Wye*$
35 Usk*$
36 Taff*
37 Ogmore*
38 Afan*
39 Neath
40 Tawe*
41 Loughor*
42 Gwendraeth Fawr
43 Tywi*
44 Taf*
45 E & W Cleddau*
46 Nevern*
47 Teifi*$
48 Aeron
49 Ystwyth
50 Rheidol*
51 Dyfi*
52 Dysynni*
53 Mawddach*$ & Wnion*
54 Artro
55 Dwyryd*
56 Glaslyn*
57 Dwyfach & Dwyfawr*
58 Llyfni
59 Gwyrfai$
60 Seiont*
61 Ogwen*
62 Conwy*
63 Clwyd*
64 Dee*$

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 (see background report for further details).

- Table 4 provides details of other arrangements to reduce netting effort operating in 2018, 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 (C&R) of salmon by anglers prior to 16 June and imposed other method restrictions. In December 2018, the measures were approved for continuation in England for a further 10 years; in Wales the same measures were retained in 2019 by emergency byelaw (to ensure continued protection of stocks pending a decision on new byelaw proposals). A brief evaluation of the effect of these measures is included in Section 4.

In light of ongoing declines in stock status, proposals for further controls on exploitation by both nets and rods have been developed separately in England and Wales. Measures approved in England in December 2018 will close a number of net fisheries and require mandatory C&R in others, where a fishery is allowed to continue to operate for sea trout provided any salmon caught can be released. Mandatory C&R will be required for anglers on rivers with the lowest 'at risk' stock status and on all recovering rivers in England; high levels of voluntary C&R (>90%) will also be required in rod fisheries on rivers designated as 'probably at risk'. The latter will be subject to further review in 2020 to ensure that targets are being achieved. If proposed measures are approved, net fishery closures will also apply in Wales, and all Welsh rivers will be subject to mandatory C&R. Full details of the new regulatory provisions are provided in the background report.

Table 2. Statutory rod bag limits in force for salmon in 2018.

EA Region / NRW	Rod fishery bag limits					Net/FE catch limits	
	River	Salmon Bag Limits - per			Other constraints	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	Limit applies to catch on whole river by all anglers; mandatory carcass tagging scheme		
	Derwent	2			No female fish to be retained after 30 Sept. Voluntary 100% catch and release encouraged by Derwent Owners Association		
	Eden				No salmon may be retained. Mandatory 100% catch and release.	Solway haaf nets	No salmon may be retained. Mandatory 100% catch and release.
	Border Esk				No salmon may be retained. Mandatory 100% catch and release.		
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, 1992-2018.

Fishery		Phase Outs																				Closures [a]		
		NE Coast drift	NE Coast T/J	Anglian coastal	SW Wales coast wade & seine	R. Ogwen seine	R. Seiont seine	R. Clwyd sling	R. Llyfni seine	R. Dwyfawr seine	R. Usk drift	SW Cumbria drift	R. Lune seine	Taw/Torridge seine	R. Leven lave	R. Tamar seine	R. Lynher seine	R. Tavy seine	R. Dee trammel	R. Dee seine	R. Severn seine	R. Dart seine	R. Duddon seine	S. Caern seine	N. Anglesey seine
Phase out commenced		1993	2012	1996	1997	1997	1997	1997	1997	1997	1997	1998	2000	2002	2003	2004	2004	2004	2005	2005	2014	2015			
Year	1992	142		129	17	2	2	2	0	2	8	4	1	14 [b]	6	14	5	4	4	13			2	0	0
	1993	124		93	11	1	1	3	0	2	8	4	1	14 [b]	6	14	5	4	4	21			1	0	0
	1994	114		72	16	2	2	2	0	2	8	4	1	14 [b]	6	14	5	5	4	18			0	0	0
	1995	99		65	9	2	1	2	0	2	8	4	1	14 [b]	6	14	5	5	4	14			0	0	0
	1996	89		59	0	2	1	2	1	2	8	4	1	12	6	14	5	4	4	14			0	0	0
	1997	81		56	1	2	1	2	0	2	8	4	1	14	6	14	5	5	4	15			0	0	0
	1998	75		54	**0**	2	**0**	**0** *	0	1	8	4	1	14	6	15	5	5	4	14			0	0	0
	1999	72		54		2				1	8	1	1	14	6	14	5	4	4	12			0	0	0
	2000	71		46		1				**0**	**0** *	1	1	14	6	14	5	4	4	10			0	0	0
	2001	70		46		**0**						1	1	14	6	14	5	4	4	8			0	0	0
	2002	69		46								1	1	3 *	6	14	5	4	4	12			0	0	0
	2003	16 *		45								1	1	3	4	14	5	4	4	12			#	0	0
	2004	16		40	#	#	#	#	#	#	#	**0**	1	3	4	3 * [b]	1 * [b]	2 * [b]	4	11				#	#
	2005	16		39								#	1	3	4	3 [b]	1 [b]	2 [b]	4	13					
	2006	16		36									1	3	3	3 [b]	1 [b]	2 [b]	3 *	9 *					
	2007	16		35									1	3	3	3 [b]	1 [b]	2 [b]	2 *	4 *					
	2008	16		33									1	3	3	3 [b]	1 [b]	2 [b]	**0** *	3 *					
	2009	15		30									**0**	3	2	3 [b]	1 [b]	2 [b]		**0** *					
	2010	14		30										3	2	3 [b]	1 [b]	2 [b]							
	2011	14		26										3	2	3 [b]	1 [b]	2 [b]							
	2012	14	63	25										3 [c]	2	3 [b]	1 [b]	2 [b]							
	2013	13	56	24										3	1 [d]	3 [b]	1 [b]	2 [b]							
	2014	13	52	22										3	2	3 [e]	**0**	1 [e]			1				
	2015	12	49	20										3	2	3 [e]		1 [e]			1	1			
	2016	11	48	18										3	2	3 [e]		1 [e]			1	**0** *			
	2017	11	47	17										3	2	3 [e]		1 [e]			1				
	2018	11	43	17										3	2	3 [e]		1 [e]			1				

Note: *Bold text denotes target reached.*

Key: ** Phase out accelerated by full or partial buy-off.*
 # Denotes fishery closed by byelaw.
[a] Fisheries have not operated for a number of years, now formally closed through byelaw.
[b] Licences issued but fishermen compensated not to fish in these years.
[c] Phase out replaced by new NLO in 2012 permitting the use of 1 net.
[d] Phase out replaced by new NLO in 2013 permitting the use of 2 nets.
[e] 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 2018.

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 part funded by Game & Wildlife Conservation Trust

Notes: Fowey buy-off - fishing from 2 March to 31 May applies to sea trout only.
[a] Local arrangements apply in respect of provision of compensation.

Table 5. Summary of buy off arrangements and local agreements operating on net fisheries, 1993-2018. (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			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
2018	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 is 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 time spent fishing separately for salmon and sea trout.

Overview of fishing effort in 2018

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 further decrease in the number of licences issued in 2018 compared with 2017 (35 fewer licences issued), with total licence numbers in 2018 the lowest in the time series. The time spent fishing is reported by licensees and enables the percentage of the available days utilised by netsmen to be derived. In 2018, these values were typically below the levels seen in different areas in recent years. As in previous years, there was marked variation between the levels of utilised effort in individual fisheries, ranging from 79-81% (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). It was then somewhat higher in some subsequent years (25-30%) associated with some relatively good catches, suggesting that the take-up of available fishing opportunities is strongly influenced by catch rates. However, utilised effort has fallen sharply in the last two years and was the lowest in the time series in 2018.

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 progressive 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 7,300 recently and with the sales in 2018 being the lowest in the time series. 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. Annual 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). New 365-day licences (valid from day of purchase) were also introduced in 2017. There was a small drop in the annual licence sales in 2018, although over 7,000 free junior licences were issued, as in 2017.

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 2018 has been estimated at about 102,300, which is 30% below the average of the previous five years. This reflects the hot, dry conditions prevalent in 2018 and poor conditions for angling (Section 9.2). 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 (1994-2018) and net & fixed engine licences (1971-2018).

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
2018	5,479	26,176	38	30	87	57	2	212

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 2018 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 2018.

EA Region / NRW	River/ Fishery [a]	Method	No. of licences	NLO [c]	Days available [a,f]	Allowable effort net days [h]	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	594	831	79	59
	N Coastal (N) [b]	T	20	0	113	2,260	663	928	29	33
	N Coastal (S)	Drift	0	0	0	0	0	0	0	0
	N Coastal (S) [b]	T	0	0	0	0	0	0	0	0
	Y Coastal	Drift	1	0	66	66	54	75	81	54
	Y Coastal [b]	T or J	23	0	113	2,599	721	1,010	28	31
	Region total		**54**			**5,679**	**2,031**	**2,844**	**36**	
SW	Avon & Stour	Seine	0	0	0	0	0	0	0	0
	Poole Harbour [g]	Seine	1	1	44	44	4	6	10	4
	Exe	Seine	3	3	54	162	36	50	22	12
	Teign [b]	Seine	3	3	99	297	42	59	14	14
	Dart [b]	Seine	0	0	0	0	0	0	0	0
	Camel	Drift	0	6	21	126	0	0	0	0
	Tavy	Seine [i]	1	0	65	65	4	5	5	4
	Tamar	Seine [i]	3	0	65	195	33	46	17	11
	Lynher	Seine	0	0	0	0	0	0	0	0
	Fowey [b,g]	Seine	0	1	131	131	0	0	0	0
	Taw/Torridge	Seine	3	1	53	159	26	37	17	9
	Region total		**14**			**1,179**	**145**	**203**	**12**	
Midlands	Severn	Putchers [d,i]	4		76	304	47	66	16	12
	Severn	Seine [i]	1	0	66	66	3	4	4	3
	Severn	Lave [i]	22	15	66	1,452	11	15	1	0.5
	Region total		**27**			**1,822**	**61**	**85**	**3**	
NW	Ribble	Drift	4	1	66	264	17	24	6	4
	Lune	Haaf	12	12	66	792	96	134	12	8
	Lune	Drift	6	7	66	462	89	124	19	15
	Lune	Seine	0	0	0	0	0	0	0	0
	Kent	Lave	3	6	66	396	0	0	0	0
	Leven	Lave	2	2	44	88	3	4	3	1
	Eden & Esk	Haaf [i]	40	75	72	5,400	191	268	4	5
	Eden & Esk	Coops [d]	3		66	198	0	0	0	0
	Region total		**70**			**7,600**	**396**	**554**	**5**	
Wales	Wye	Lave	8	[e]	66	528	276	338	52	35
	Tywi [b]	Seine	3	3	109	327	202	221	62	67
	Tywi [b]	Coracles	4	8	109	872	187	187	21	47
	Taf	Coracles	1	1	44	44	0	0	0	0
	Taf	Wade	1	1	44	44	0	0	0	0
	E/W Cleddau	Compass	6	6	66	396	30	32	8	5
	Nevern[b]	Seine	1	1	109	109	6	6	6	6
	Teifi [b]	Seine	2	3	109	327	44	45	13	22
	Teifi [b]	Coracles	12	12	109	1,308	445	447	34	37
	Dyfi [b]	Seine	2	3	109	327	40	42	12	20
	Dysynni	Seine	1	1	66	66	0	0	0	0
	Mawddach	Seine	2	3	66	198	59	78	30	30
	Conwy	Seine	3	3	66	198	63	82	32	21
	Conwy	Basket [d]	1		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
	Wales total		**47**			**4,744**	**1,352**	**1,478**	**28**	

Key: [a] *National spring salmon byelaws apply - all net fisheries closed until June 1.*
[b] *Sea trout fisheries - exempted from national spring salmon byelaws (all salmon caught before 1 June to be released).*
[c] *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.*
[d] *Denotes fishery operates under an historical certificate of privilege.*
[e] *No NLO, but number of licences capped.*
[f] *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.*
[g] *Buy-off applies for all or part season (see Table 4 for details).*
[h] *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.*
[i] *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, 1994-2018.

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	36,095	160	2,999	17,981	3,875	32,749	47,967	141,826
2018	30,079	70	2,773	11,640	2,438	23,249	32,045	102,294
Mean (2013-17)	35,231	75	2,903	17,377	4,096	35,320	51,175	146,177
% change:								
2018 on 2017	-17	-56	-8	-35	-37	-29	-33	-28
2018 on 5-yr mean	-15	-6	-4	-33	-40	-34	-37	-30

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 2018 are provisional.

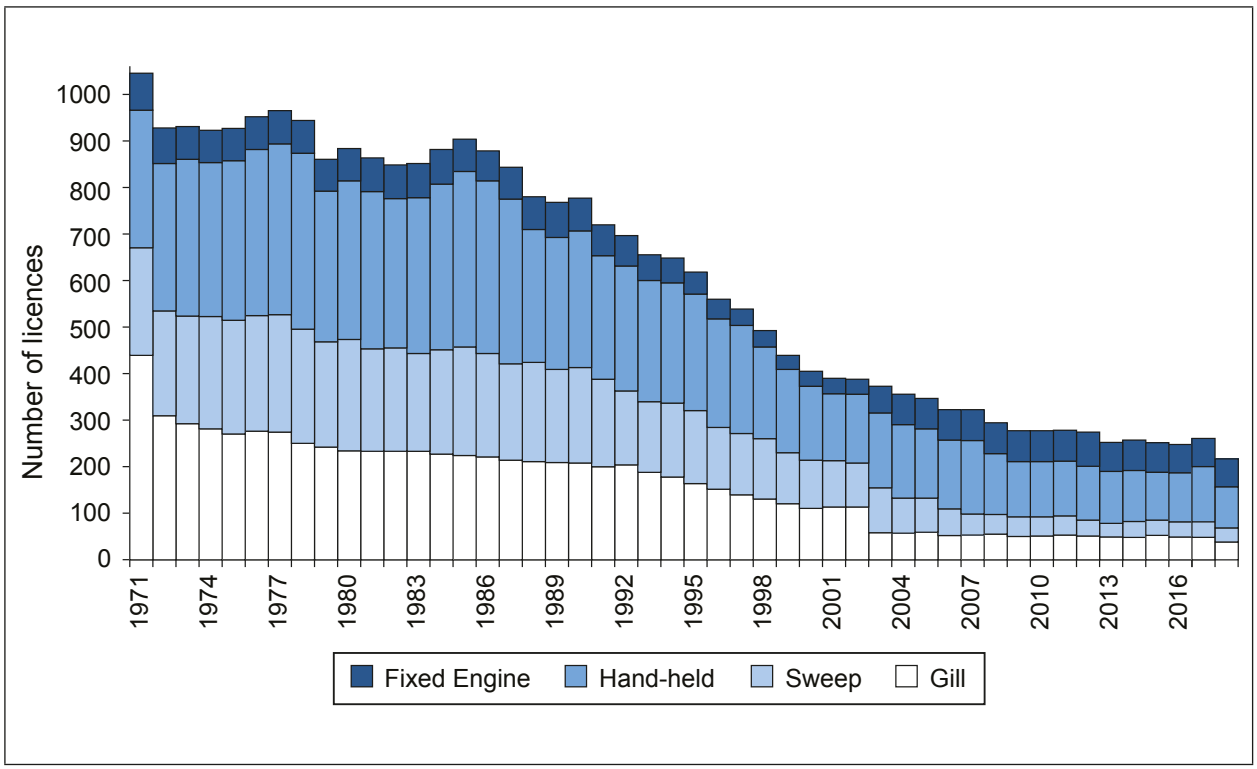

Figure 2. Numbers of salmon net & fixed engine licences issued in England and Wales, 1971-2018.

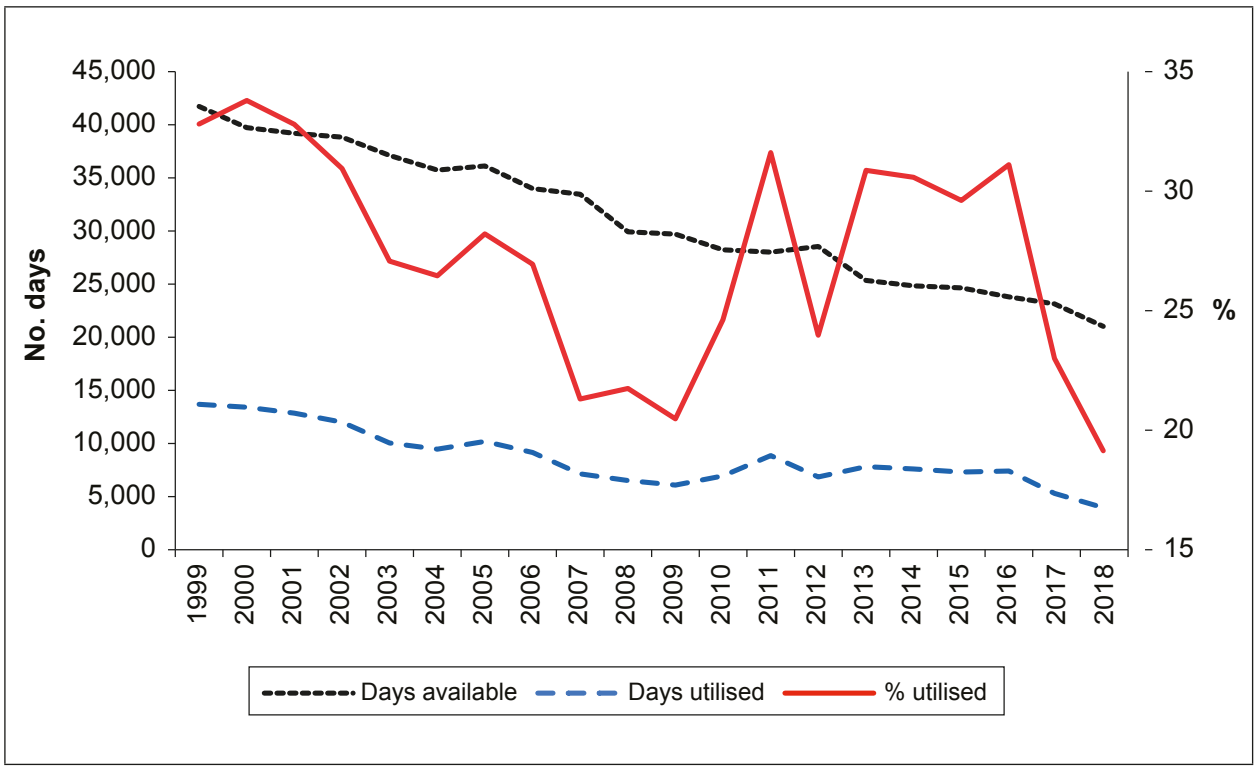

Figure 3. Numbers of fishing days available to net and fixed engine fisheries in England and Wales, and number and percentage of available days utilised, 1999-2018.

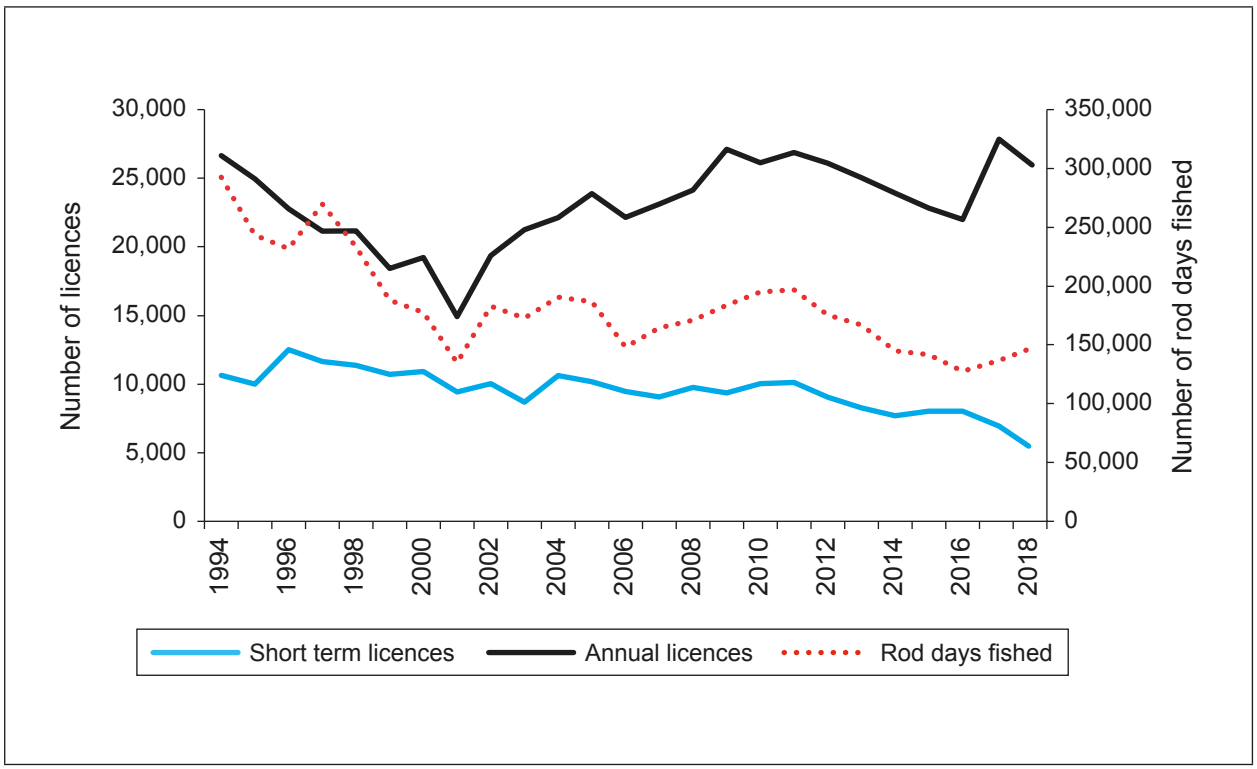

Figure 4. Numbers of annual and short-term rod licences issued, and the number of rod days fished in England and Wales, 1994-2018.

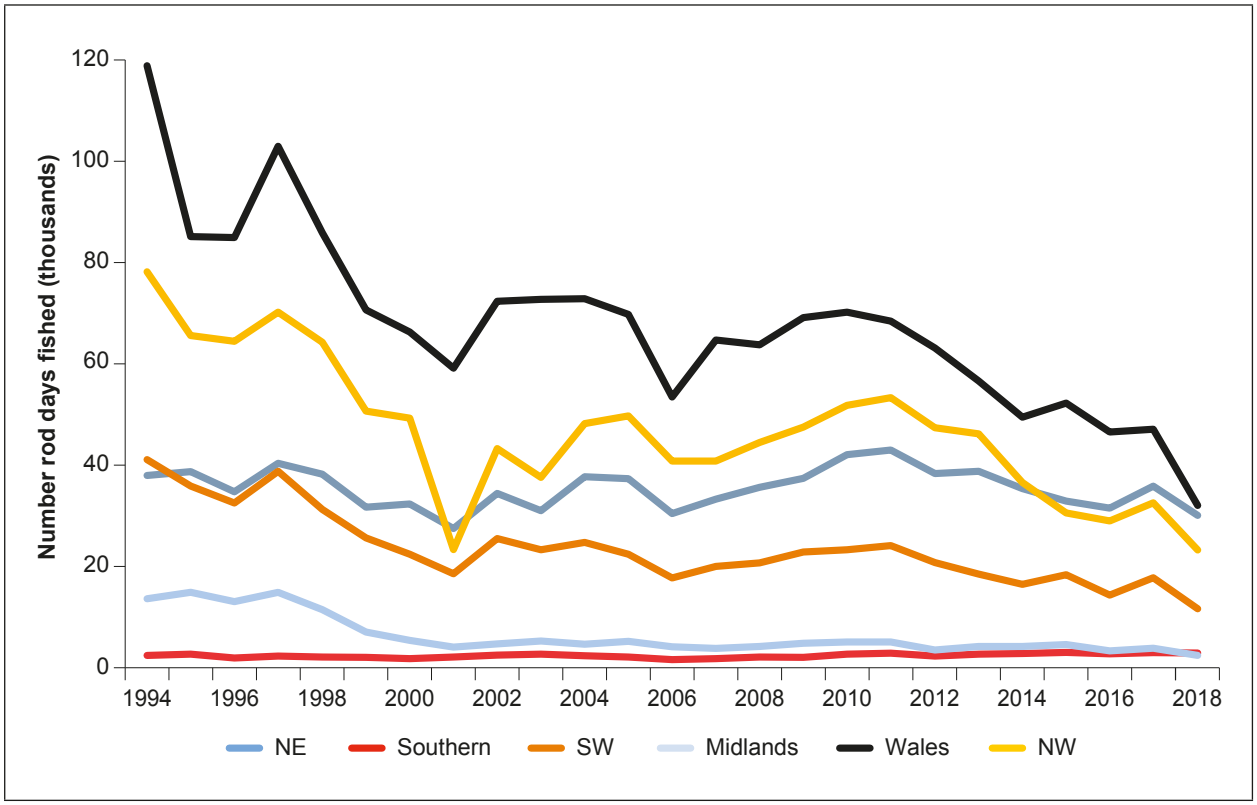

Figure 5. Numbers of rod days fished (as reported in catch returns), 1994-2018.

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 2018 are provisional. Final confirmed data for 2018 will be reported in the Environment Agency and Natural Resources Wales annual compilation of catch statistics, which will be available later in the year (e.g. Environment Agency, 2018).

Assessment of rod catch data in 2015 identified a decrease in the level of catch reporting, which was believed, initially, 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 in subsequent years, although other factors may have contributed (e.g. the new 365-day licences). 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 four 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 2018 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 2018 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 coast drift and fixed net fishery. Only two coastal fisheries remained in operation in 2018 and one of these, Anglian, takes very few salmon (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 C&R.

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 increase 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 measures to increase C&R levels have been introduced in England from 2019 and, if approved, C&R will become mandatory in rivers across Wales. 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 undeclared and illegal catch for England and Wales in 2018 (only fish retained) is estimated at about 5 tonnes. This represents approximately 11% of the total weight (including the unreported and illegal catch) of salmon caught and killed.

Of the total undeclared and illegal catch in 2018 (about 1,350 salmon), 33% by number is estimated to have derived from under-reporting in rod fisheries, 52% from illegal catches and 16% 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 C&R. The methodology used to derive these crude estimates is provided in the background report. No other substantial sources of non-catch fishing mortality were noted in 2018; in some previous years there have been reports of significant mortalities of fish in rivers / estuaries due to elevated temperatures or water quality issues. However, low flows and high temperatures were prevalent in 2018 (see Section 9.2).

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 winters 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 2018 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 2018 is provided in Table 18. Of these, 19 rivers (46%) 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 2 rivers (5%) 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 over the last seven 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 in Figure 19.

Overview of catches in 2018

The total salmon catch for 2018 (including those fish released alive by netsmen and anglers) is provisionally estimated at 72.4 t, representing 18,489 fish, and comprising 40.3 t (11,140 fish) by nets and fixed engines and 32.1 t (7,349 fish) by rods. A total of 363 fish (1.4 t) were released from nets and fixed engines. Of the rod caught fish, 6,488 were released (28.6 t), representing 88% of the catch by number. Thus, 10,777 fish (38.8 t) were retained by netsmen and 863 fish (3.5 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 5 t of additional fish caught in 2018.

The total declared catch by nets and fixed engines in 2018 increased by 10% on the catch recorded in 2017, but was 28% 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 43 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 retained net catch (92% in 2018). Under proposals approved in 2018, the north east coast drift net fishery will close in 2019 and there will be a requirement to release any salmon caught in T&J nets. The latter will be allowed to continue to fish for sea trout, although further season restrictions will apply in some Districts.

The provisional estimated rod catch in 2018 (including released fish) decreased by 46% on 2017, and was 40% below 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 2018 is the lowest in the entire time series. As noted above, the level of under-reporting of rod catches appears to have increased since 2015 and this will have contributed to the low catches declared over the last four 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 88% of rod caught fish were released in 2018. 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 over 5,000. 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 2018 was the lowest in the time series. 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 2018 fell sharply on 2017, but remained above levels in the early part of the time series, and MSW salmon have comprised 50% of the estimated total rod catch, on average, over the past eight 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 2018 (11,640) was the lowest in the time series, representing 63% of the 18,489 salmon caught.

Assessment of national catch trend

The annual assessment of the status of salmon stocks in the North-east Atlantic carried out by the ICES Working Group on North Atlantic Salmon, 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 for MSW salmon than for 1SW fish (grilse). However, there has been a marked increase in the proportion of MSW salmon in the catch in the last eight years (Figure 20) and the overall reduction in catches between the start and end of the time series is now less for MSW salmon (a reduction of 86% in the most recent 5-year mean compared with the 5-year mean at the start of the time series) than for 1SW salmon (91%).

Table 9. Declared number and weight of salmon caught by nets & fixed engines and by rods in England & Wales, 1998-2018.

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	13,570	60.4	23,703	100.6	12,195	48.8
2018	11,140	40.3	7,349	32.1	18,489	72.4	11,640	42.3
Mean (2013-2017)	15,583	58	12,226	52	27,809	110	18,155	68

Note: Data for 2018 are provisional.

Table 10. Provisional regional declared number and weight of salmon caught by nets and rods (including released fish), 2018.

Former EA Region / NRW	Net catch		Rod catch		Total catch	
	No.	Weight (kg)	No.	Weight (kg)	No.	Weight (kg)
North East	9,909	35,555	3,167	14,507	13,076	50,062
Anglian	4	11	0	0	4	11
Southern	0	0	135	517	135	517
South West	235	741	572	2,153	807	2,894
Midlands	113	425	163	812	276	1,237
North West	562	2,281	2,080	8,471	2,642	10,752
Wales	317	1,266	1,232	5,618	1,549	6,884
Unknown	0	0	0	0	0	0
E&W Total	**11,140**	**40,279**	**7,349**	**32,078**	**18,489**	**72,357**

Note: Since 2015, rod catches appear to have been subject to increased levels of under-reporting; there are various possible reasons for this, and these are under investigation. The data reported in this table are declared catches, however, adjusted values have been used for assessment purposes (see Table 19).

Table 11. Declared number of salmon caught by nets and fixed engines (E&W Total includes released fish), 1971-2018. (N.B. Since 1999, catches include fish that were subsequently released).

Year	Environment Agency Region						NRW Wales	E&W Total
	NE	Anglian [a]	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
2018	9,909	4		235	113	562	317	11,140
Mean (2013-2017)	14,257	2		313	129	613	224	15,538
% change:								
2018 on 2017	+8			-4	+169	+33	+20	+10
2018 on 5-yr mean	-30			-25	-13	-8	+42	-28

Note: Data for 2018 are provisional.

Key: [a] 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, 1993-2018.

Year	Environment Agency Region						NRW Wales	E&W Total #
	NE	Thames	Southern	SW	Midlands	NW		
Number caught								
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	4,977	0	283	1,622	330	3,124	3,234	13,570
2018	3,167	0	135	572	163	2,080	1,232	7,349
Number released								
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	3,977	0	282	1,393	253	2,567	2,783	11,255
2018	2,610	0	135	544	129	1,977	1,091	6,486
Number retained								
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
1996	1,782	9	296	2,171	586	4,388	4,784	14,016

Table 12. continued

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	2,315
2018	557	0	0	28	34	103	141	863
% of fish released								
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
2018	82		100	95	79	95	89	88
Mean total catch - including fish caught & released (2013-2017)	4,622		342	1,255	335	2,792	2,879	12,225
% change:								
2018 on 2017	-36		-52	-65	-51	-33	-62	-46
2018 on 5-yr mean	-31		-61	-54	-51	-26	-57	-40

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

Notes: Since 2015, rod catches appear to have been subject to increased levels of under-reporting; there are various possible reasons for this, and these are under investigation. The data reported in this table are declared catches, however, adjusted values have been used for assessment purposes (see Table 19).
Data for 2018 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, 1988-2018.

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	74	3.2	7	9.7	20	48.8
2018	35.5	84	3.3	8	3.5	8	42.3
Mean (2013-17)	52.8	77	4.6	7	10.7	16	68.1

Notes: Coastal catches in 2018 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/Gwyrfai 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 2018 are provisional.

Table 14. Declared number, weight and percentage of salmon released by rods, and declared number and weight of salmon released by nets, 1993-2018.

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	11,255	50.72	83	253	1.0
2018	6,486	28.59	88	363	1.4

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.

Since 2015, rod catches appear to have been subject to increased levels of under-reporting; there are various possible reasons for this, and these are under investigation. The data reported in this table are declared catches, however, adjusted values have been used for assessment purposes (see Table 19).

Data for 2018 are provisional.

Table 15. Declared number and percentage of salmon caught by nets and rods taken before (<) and from (≥) 1 June, 1989-2018.

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 [a]	1	7,504	7,505	0.01	925	14,638	15,563	5.9
2010 [a]	1	22,614	22,615	0.00	682	23,811	24,493	2.8
2011 [b]	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	1,086	12,484	13,570	8.0
2018	61	11,079	11,140	0.55	566	6,783	7,349	7.7
Mean (1994-98)	2,997	41,687	44,684	6.7	1,898	15,491	17,388	10.9
Mean (1999-18)	67	20,122	20,189	0.3	1,053	15,437	16,490	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.
Since 2015, rod catches appear to have been subject to increased levels of under-reporting; there are various possible reasons for this, and these are under investigation. The data reported in this table are declared catches, however, adjusted values have been used for assessment purposes (see Table 19).
Data for 2018 are provisional.

Key: # Excludes fish for which no capture date recorded.
[a] No requirement to record net-released fish on new logbooks, so pre-June catch under-estimated.
[b] 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, 1998-2018.

Season	April to June			July to August			September to October			April to October		
Wt. category (kg)	<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
Number caught												
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
2007	565	931	161	2936	1897	233	7876	3445	707	11,377	6,273	1,101

Table 16. continued

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	576	1,223	465	2,112	1,688	603	2,722	2,524	1,317	5,410	5,435	2,385
2018	58	582	196	613	998	155	1,271	2,709	601	1,942	4,289	952
Number released												
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	507	1,104	435	1,560	1,152	436	2,357	2,198	1,193	4,424	4,454	2,064
2018	51	541	187	499	826	125	1,115	2,432	546	1,665	3,799	858
Percentage (%) released												
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	72	87	87	91	82	82	87
2018	88	93	95	81	83	81	88	90	91	86	89	90

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).
Since 2015, rod catches appear to have been subject to increased levels of under-reporting; there are various possible reasons for this, and these are under investigation. The data reported in this table are declared catches, however, adjusted values have been used for assessment purposes (see Table 19).
Data for 2018 are provisional.

Table 17. Provisional declared number and percentage of small (<3.6kg) and large (>3.6kg) salmon caught by net fisheries, 2018 (excluding released fish).

EA Region/NRW	Small salmon (1SW)		Large salmon (MSW)		Total
	(<3.6 kg)	%	(>3.6 kg)	%	
Anglian	4	100	0	0	4
North East	5,731	58	4,168	42	9,899
South West	140	62	85	38	225
Midlands	14	13	90	87	104
North West	107	38	174	62	281
Wales	157	50	160	50	317
Total	**6,153**	**57**	**4,677**	**43**	**10,830**

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), 2018.

EA Region / NRW	River	No. 1SW	%	No. MSW	%
NE	Coquet	110	71	44	29
	Tyne	974	41	1394	59
	Wear	256	49	263	51
Southern	Itchen	33	56	26	44
	Test	37	48	39	52
SW	Hants Avon	6	9	60	91
	Frome	11	33	22	67
	Exe	44	63	26	37
	Teign	14	50	14	50
	Dart	3	50	3	50
	Tavy	10	77	3	23
	Tamar	45	54	39	46
	Lynher	21	84	4	16
	Fowey	59	73	22	27
	Camel	46	63	27	37
	Taw	21	47	24	53
	Torridge	10	38	16	62
	Lyn	0	0	1	100
Midlands	Severn	34	21	129	79
NW	Ribble	175	48	186	52
	Lune	109	56	84	44
	Kent	80	75	27	25
	Leven	22	73	8	27
	Irt	19	73	7	27
	Ehen	91	75	31	25
	Derwent	73	53	64	47
	Eden	200	43	270	57
	Border Esk	242	48	262	52
Wales	Wye	43	15	251	85
	Usk	40	31	87	69
	Ogmore	2	50	2	50
	Tywi	81	48	88	52
	Tawe	7	54	6	46
	Taf	11	69	5	31
	E & W Cleddau	10	63	6	38
	Teifi	48	48	52	52
	Dyfi	30	61	19	39
	Mawddach	18	64	10	36
	Ogwen	22	81	5	19
	Conwy	47	53	42	47
	Dee	76	32	162	68
E&W Total		**3,180**	**45**	**3,830**	**55**

Notes: 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), 1992-2018.

Year	Environment Agency Region										NRW Wales		E&W Total		
	NE		Southern		SW		Midlands		NW						
	1SW	MSW	1SW	MSW	1SW	MSW	1SW	MSW	1SW	MSW	1SW	MSW	1SW	MSW	Total
1992	1,085	723	235	29	3,186	476	112	175	4,029	945	2,282	1,074	10,927	3,422	14,349
1993	966	729	465	82	3,216	706	145	192	5,245	999	4,788	1,197	14,825	3,905	18,730
1994	1,173	660	277	156	4,172	1,043	217	339	7,162	1,680	5,609	2,291	18,611	6,169	24,780
1995	1,270	1,082	218	65	1,914	860	71	402	5,380	1,102	2,769	1,491	11,622	5,002	16,624
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	18,058
1997	1,325	1,084	120	30	1,932	483	54	266	3,780	667	2,382	1,021	9,593	3,551	13,144
1998	2,226	909	378	24	2,543	501	66	131	5,975	699	3,548	843	14,736	3,107	17,843
1999	1,586	1,351	206	72	1,386	683	70	132	3,589	955	2,278	1,175	9,115	4,368	13,483
2000	2,188	1,618	292	56	2,270	441	200	139	6,507	807	3,196	816	14,653	3,877	18,530
2001	2,628	1,478	344	61	1,275	261	90	210	3,936	694	3,638	1,149	11,911	3,853	15,764
2002	2,924	1,440	520	64	1,452	459	92	123	5,233	852	2,550	1,093	12,771	4,031	16,802
2003	2,353	1,505	151	74	947	446	117	249	3,121	780	1,766	1,129	8,455	4,183	12,638
2004	5,222	2,245	528	81	2,633	446	123	228	9,790	1,234	5,927	1,386	24,223	5,620	29,843
2005	5,481	2,088	306	132	1,404	494	151	322	7,804	1,487	3,588	1,261	18,734	5,784	24,518
2006	4,637	1,715	256	76	1,388	595	145	247	5,810	1,639	3,593	1,198	15,829	5,470	21,299
2007	3,798	1,431	382	84	1,615	656	171	136	6,725	1,029	4,110	1,267	16,801	4,603	21,404
2008	4,651	1,547	633	78	2,245	710	106	217	7,724	1,147	5,387	1,347	20,746	5,046	25,792
2009	3,686	1,346	157	95	1,326	477	74	157	4,686	1,346	2,323	1,163	12,252	4,584	16,836
2010	6,119	2,623	498	88	2,486	335	106	153	7,194	1,687	5,027	1,103	21,430	5,989	27,419
2011	4,422	4,788	420	183	1,882	760	105	293	4,564	2,775	3,066	2,126	14,460	10,925	25,385
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	20,294
2013	3,978	3,138	140	158	778	416	76	289	2,790	1,103	1,828	1,719	9,590	6,822	16,412
2014	2,153	2,200	256	100	463	339	48	161	1,738	901	953	1,197	5,610	4,897	10,507
2015	2,074	1,919	326	287	1,232	933	136	502	1,323	1,641	1,414	2,171	6,505	7,453	13,958
2016	2,285	3,602	263	223	881	674	78	363	1,614	1,805	1,439	2,702	6,560	9,369	15,928
2017	2,133	4,238	237	125	1,233	843	96	327	1,773	2,225	1,525	2,614	6,997	10,372	17,370
2018	2,107	2,675	105	98	455	409	51	195	1,628	1,512	692	1,169	5,039	6,058	11,097
Mean (2013-2017)	2,525	3,019	244	179	917	641	87	328	1,848	1,535	1,432	2,081	7,052	7,783	14,835
% change:															
2018 on 2017	-1	-37	-56	-21	-63	-51	-46	-40	-8	-32	-55	-55	-28	-42	-36
2018 on 5-yr mean	-17	-11	-57	-45	-50	-36	-41	-41	-12	-1	-52	-44	-29	-22	-25

Table 19. continued

Percentage MSW

Year	Environment Agency Region					NRW Wales	E&W Total
	NE	Southern	SW	Midlands	NW		
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
2018	56	48	47	79	48	63	55
Mean (2013-2017)	54	42	41	79	45	59	52

Note: Data for 2018 are provisional.
Since 2015, rod catches appear to have been subject to increased levels of under reporting; there are various possible reasons for this, and these are under investigation. 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.

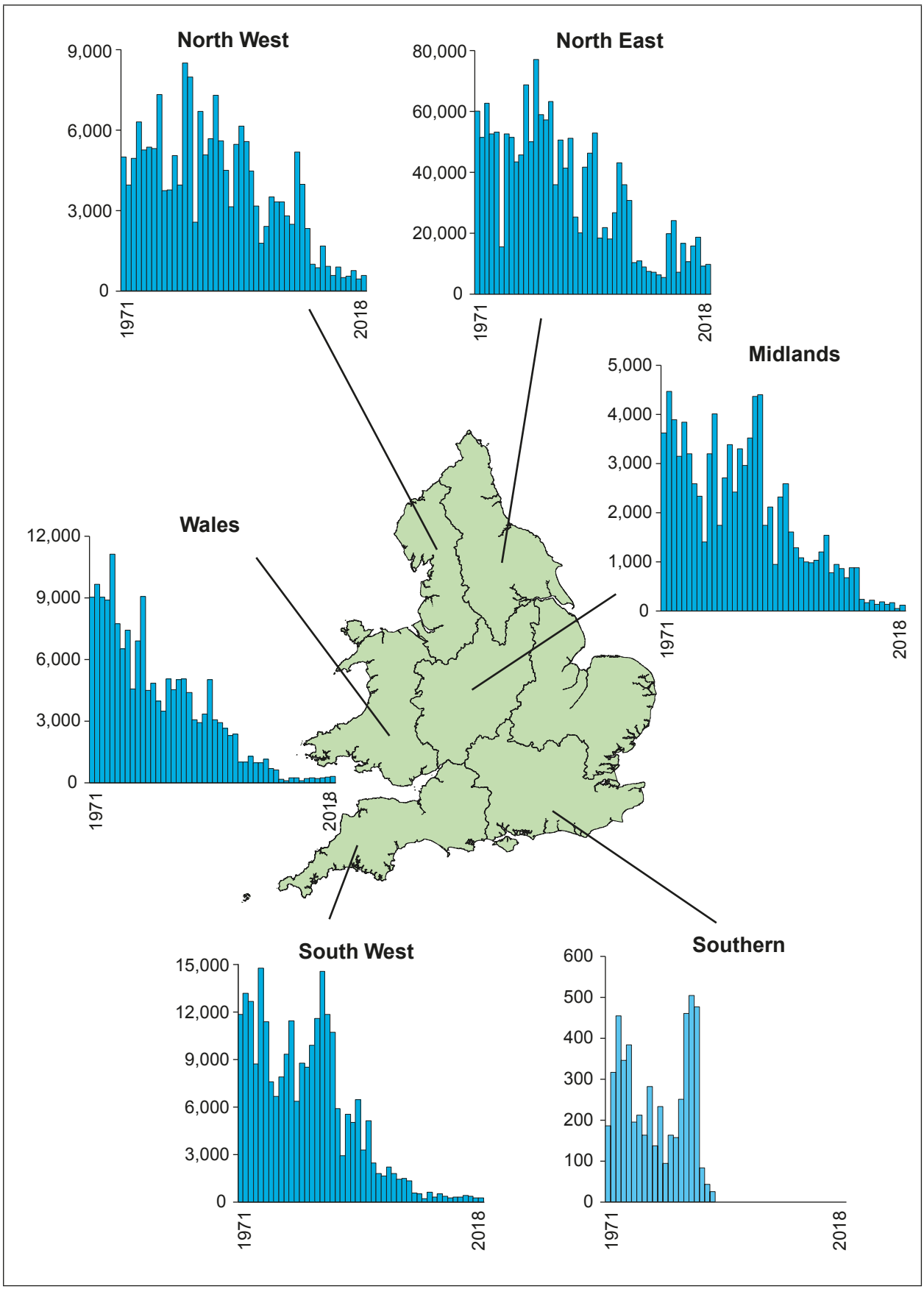

Figure 6. Declared number of salmon caught by nets and fixed engines, 1971-2018. (Note: y-axes not to same scale.)

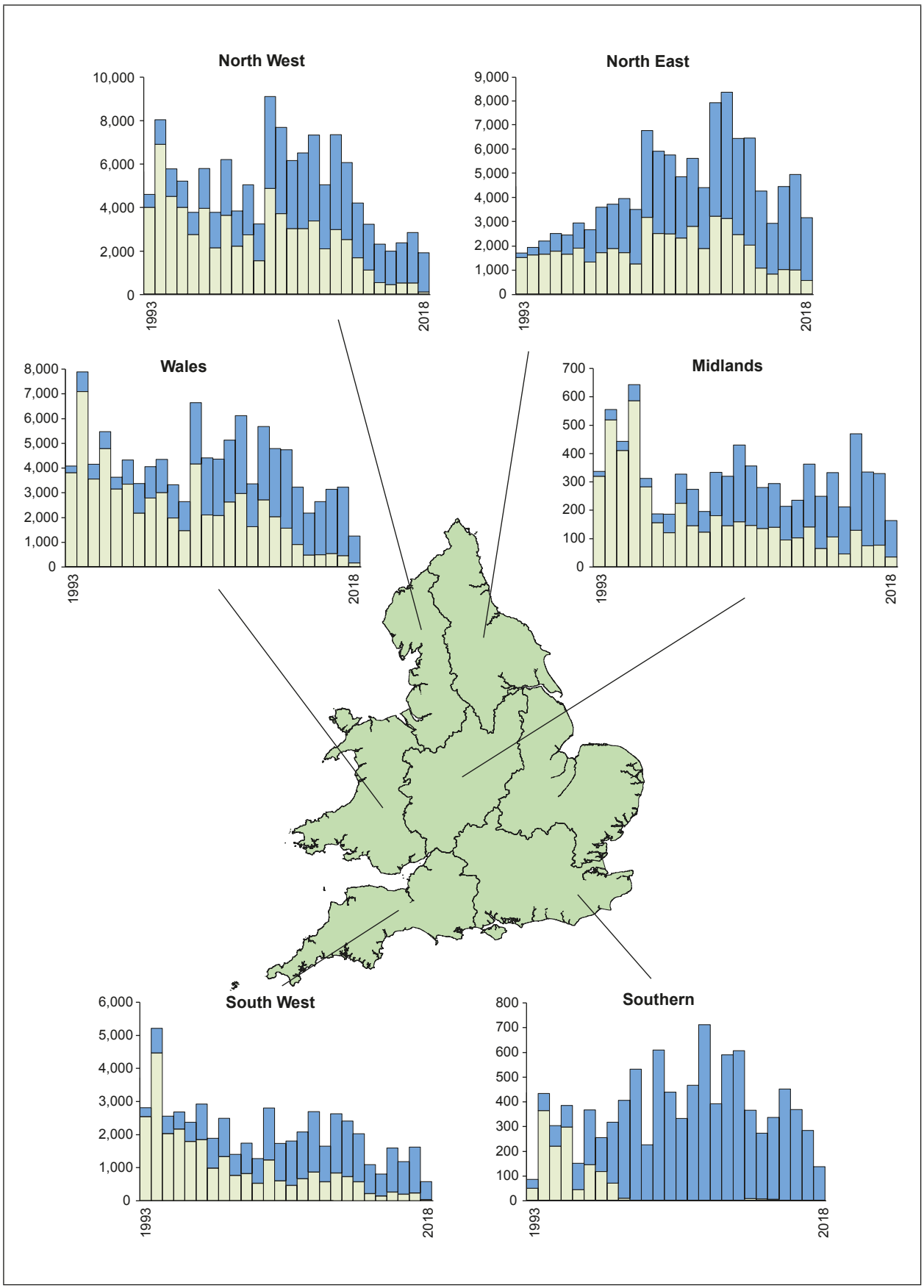

Figure 7. Declared number of salmon caught by rods and the number of salmon released, 1993-2018. The histograms display the total declared catch, with the blue shaded area denoting fish caught and released. (Note: y-axes not to same scale.)

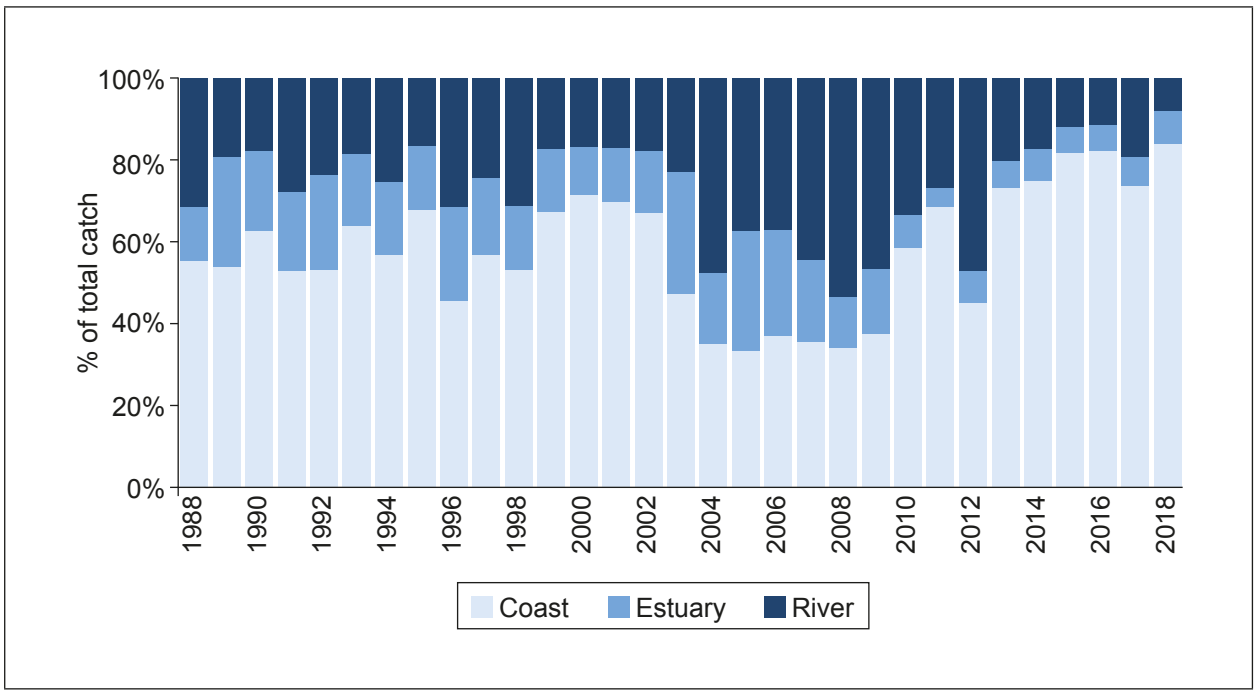

Figure 8. Percentage (by weight) of the declared total catch of salmon (caught and retained only) taken in coastal, estuarine and riverine fisheries, 1988-2018.

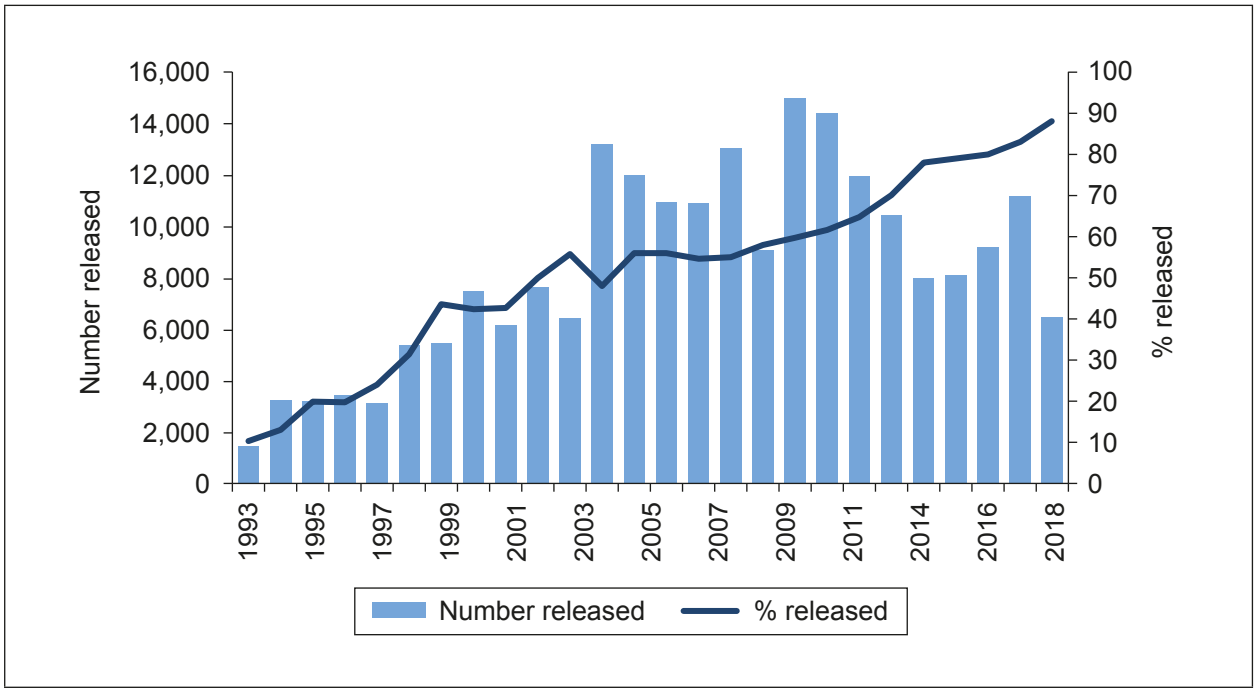

Figure 9. The number and percentage of the declared salmon catch released by anglers, 1993-2018.

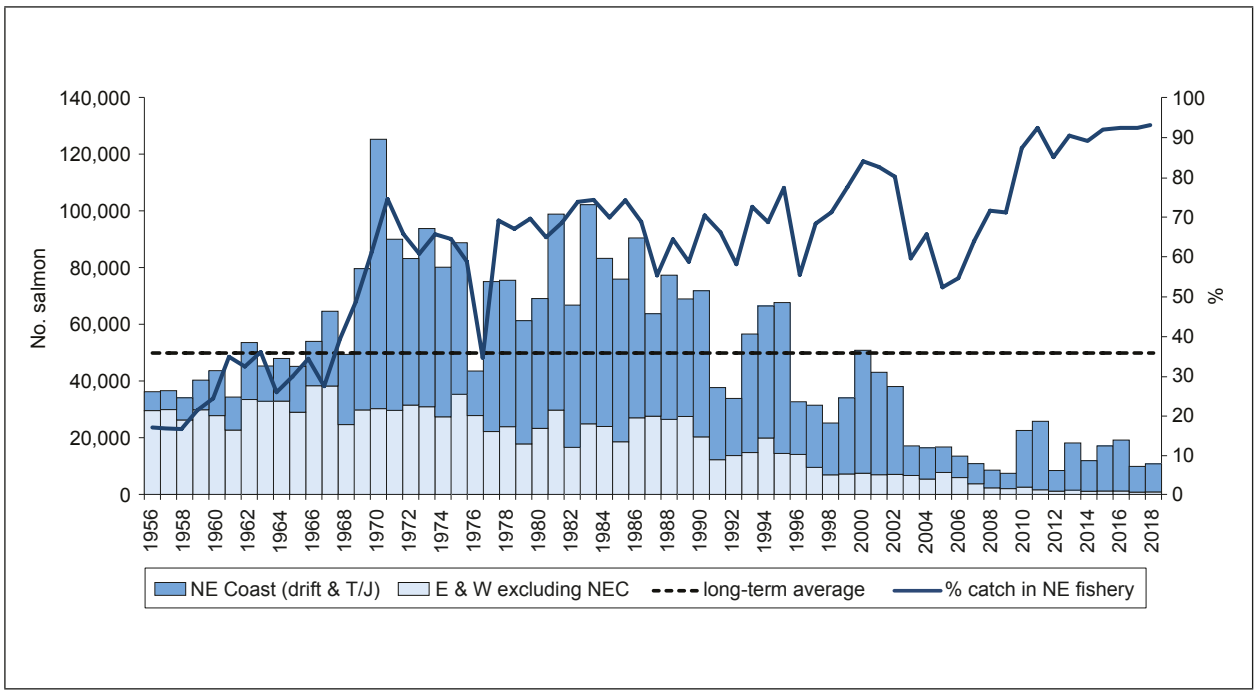

Figure 10. Declared number of salmon caught by nets and fixed engines in England & Wales and the percentage of the catch taken in the north east coast fishery, 1956-2018.

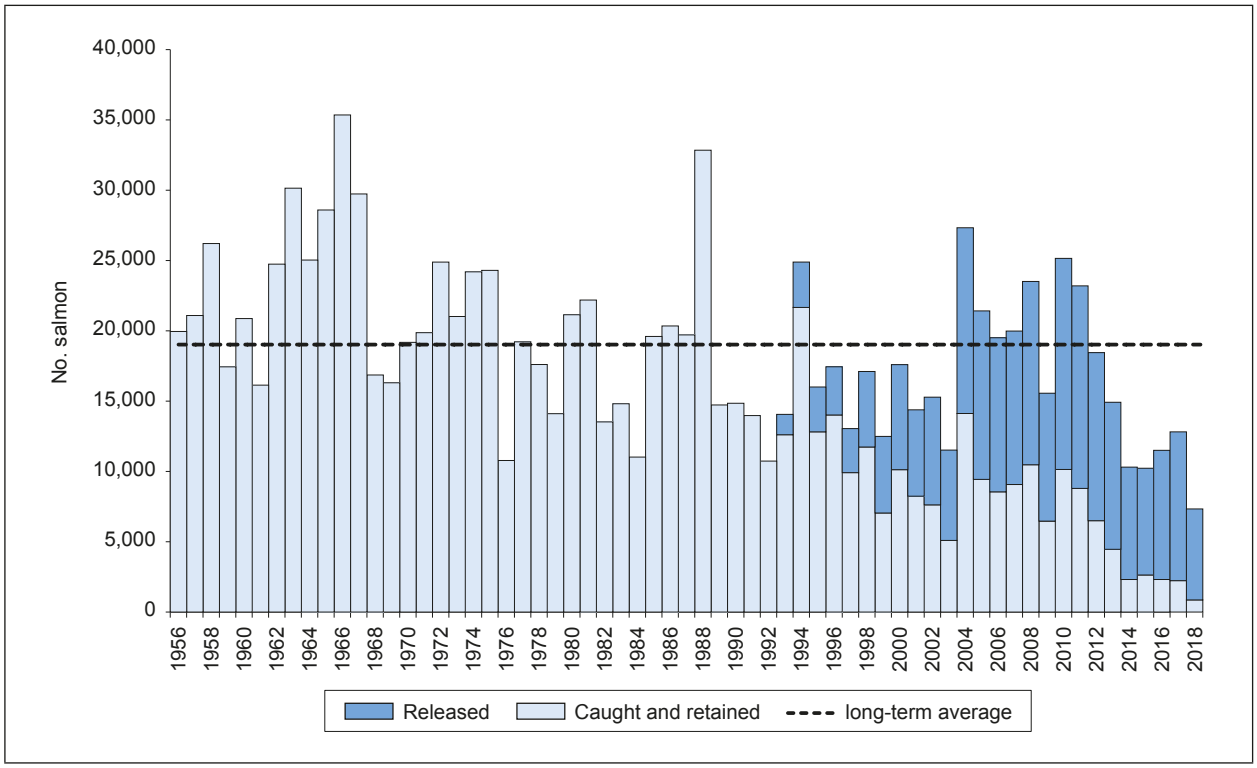

Figure 11. Declared number of salmon caught by rods in England & Wales, 1956-2018.

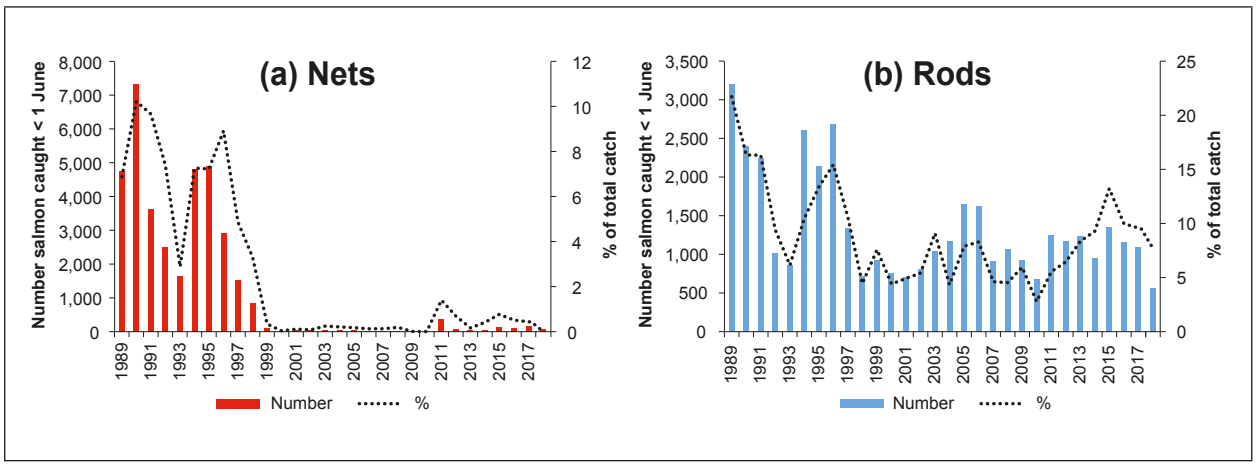

Figure 12. Declared number and percentage of salmon caught by (a) nets and (b) rods before 1 June, 1989-2018.

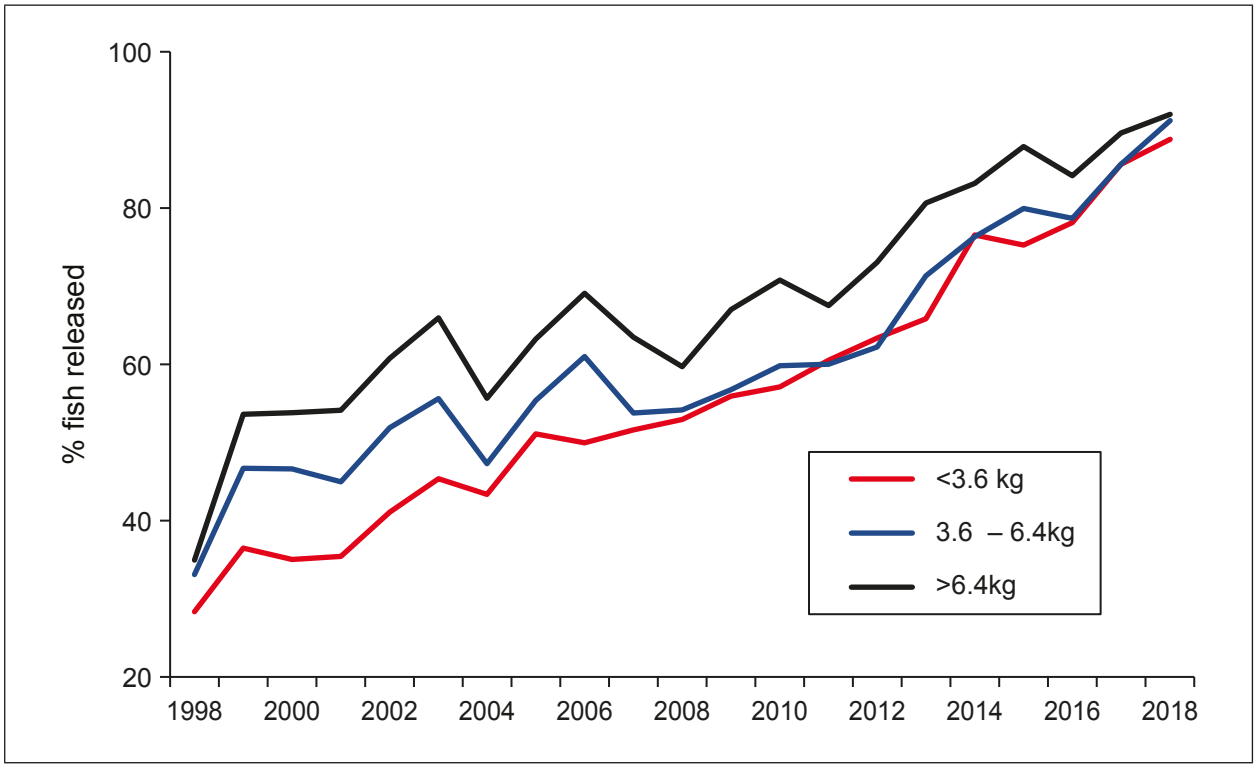

Figure 13. Percentage of rod caught fish released by anglers by weight category, 1998-2018.

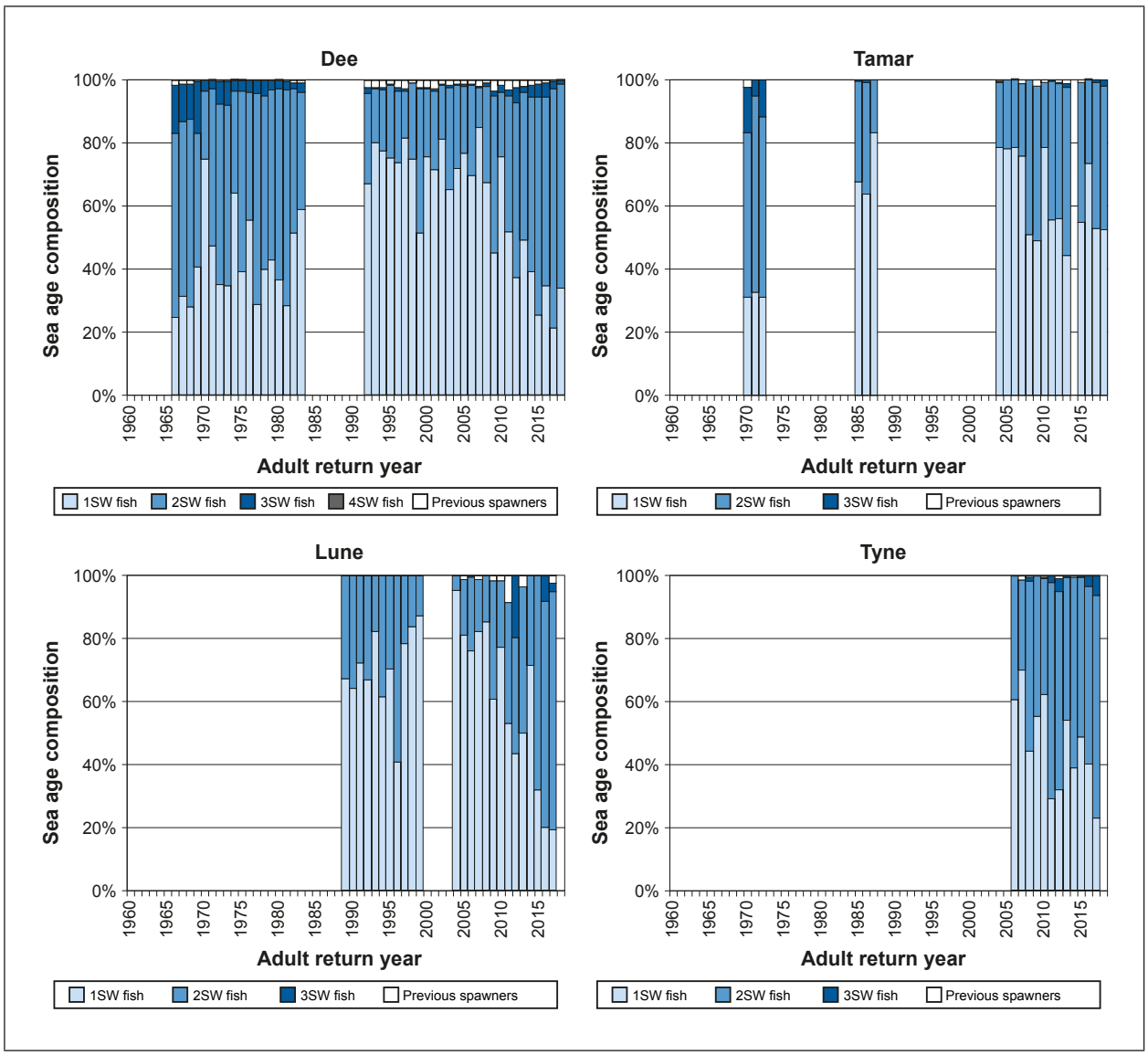

Figure 14. Variation in the proportions of 1SW and older salmon returning to the Rivers Dee, Tamar, Lune and Tyne over available time series.

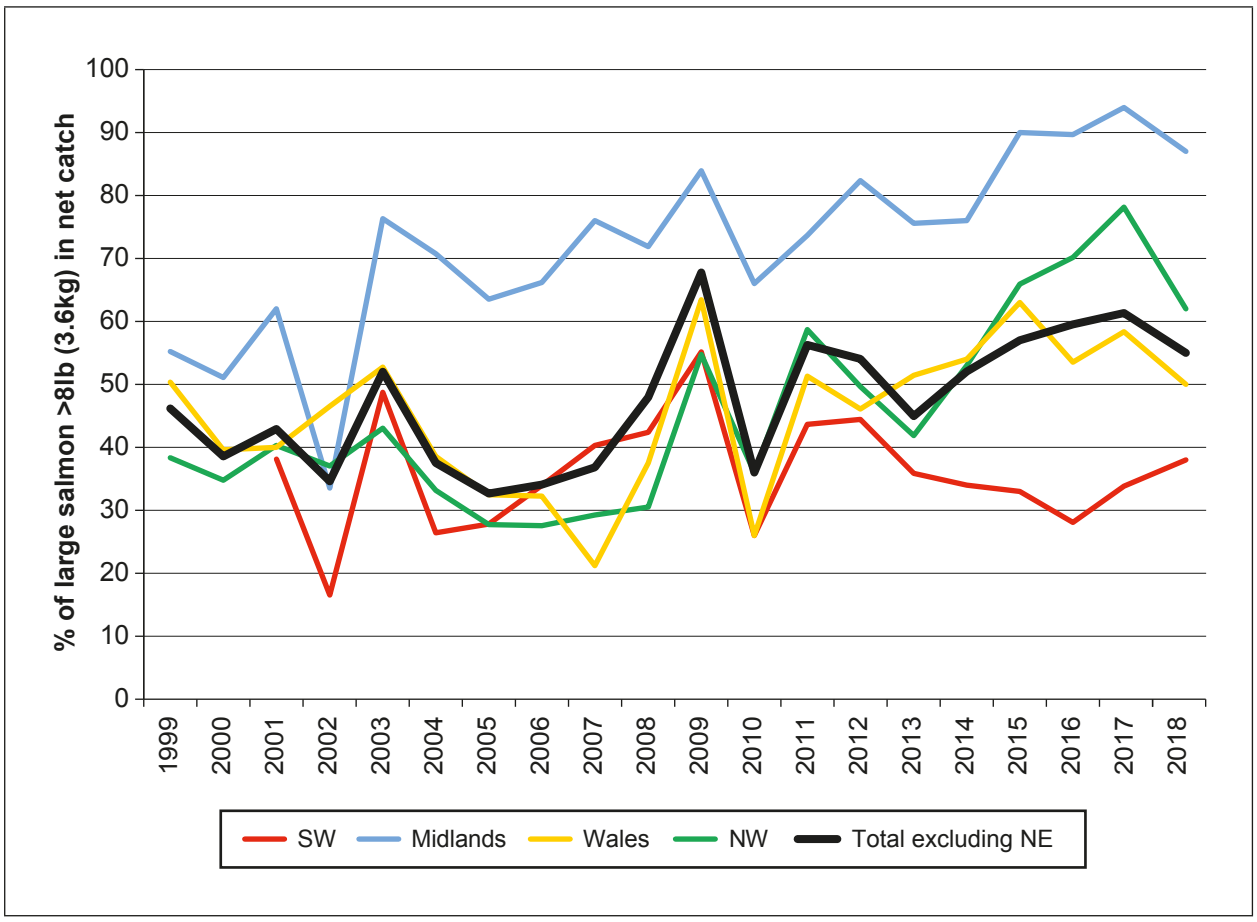

Figure 15. Percentage (%) of salmon >8lb (3.6 kg) caught in net and fixed engine fisheries (excluding NE Region), 1999-2018.

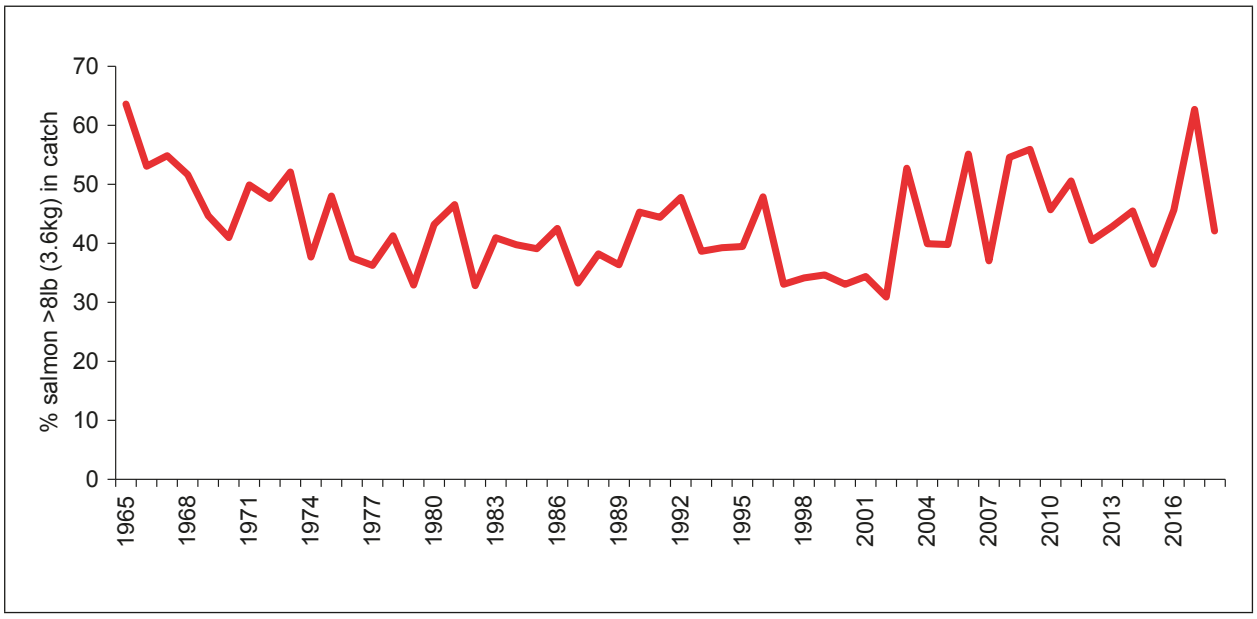

Figure 16. Percentage (%) of salmon >8lb (3.6 kg) caught in the north east coast net fishery (as declared by netsmen), 1965-2018.

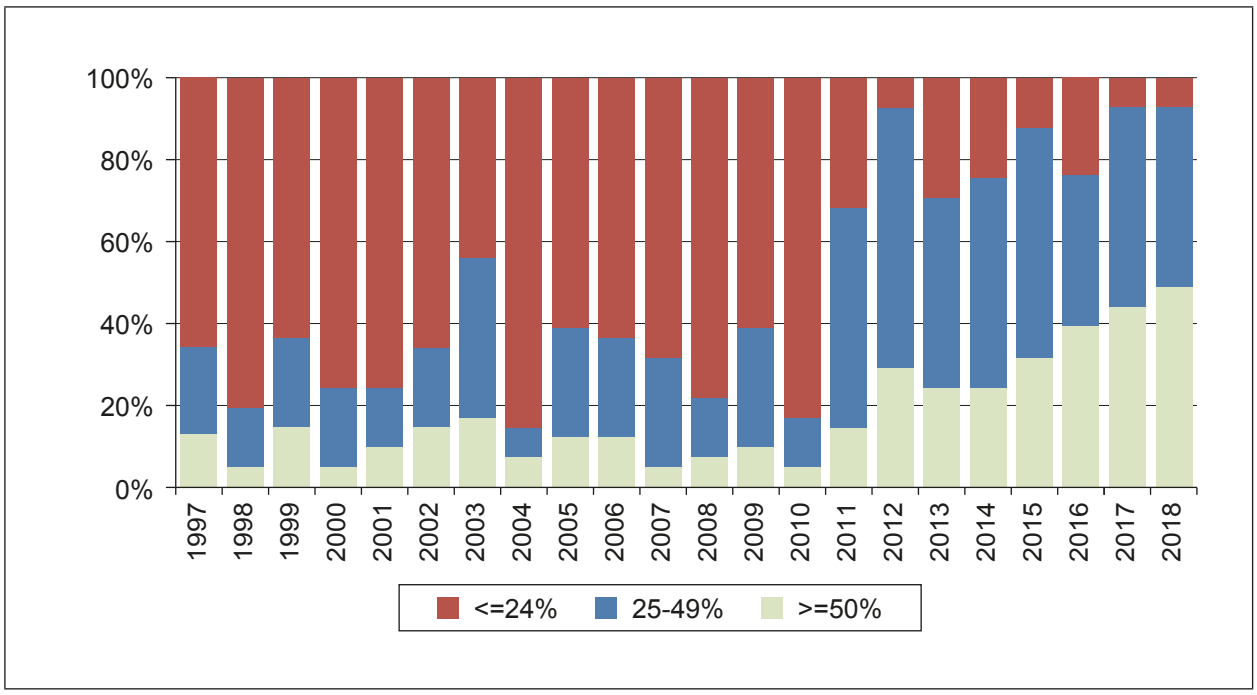

Figure 17. Percentage of selected principal salmon rivers with ≥50%, 25-49% and ≤24% of MSW salmon in the declared rod catch, 1997-2018.

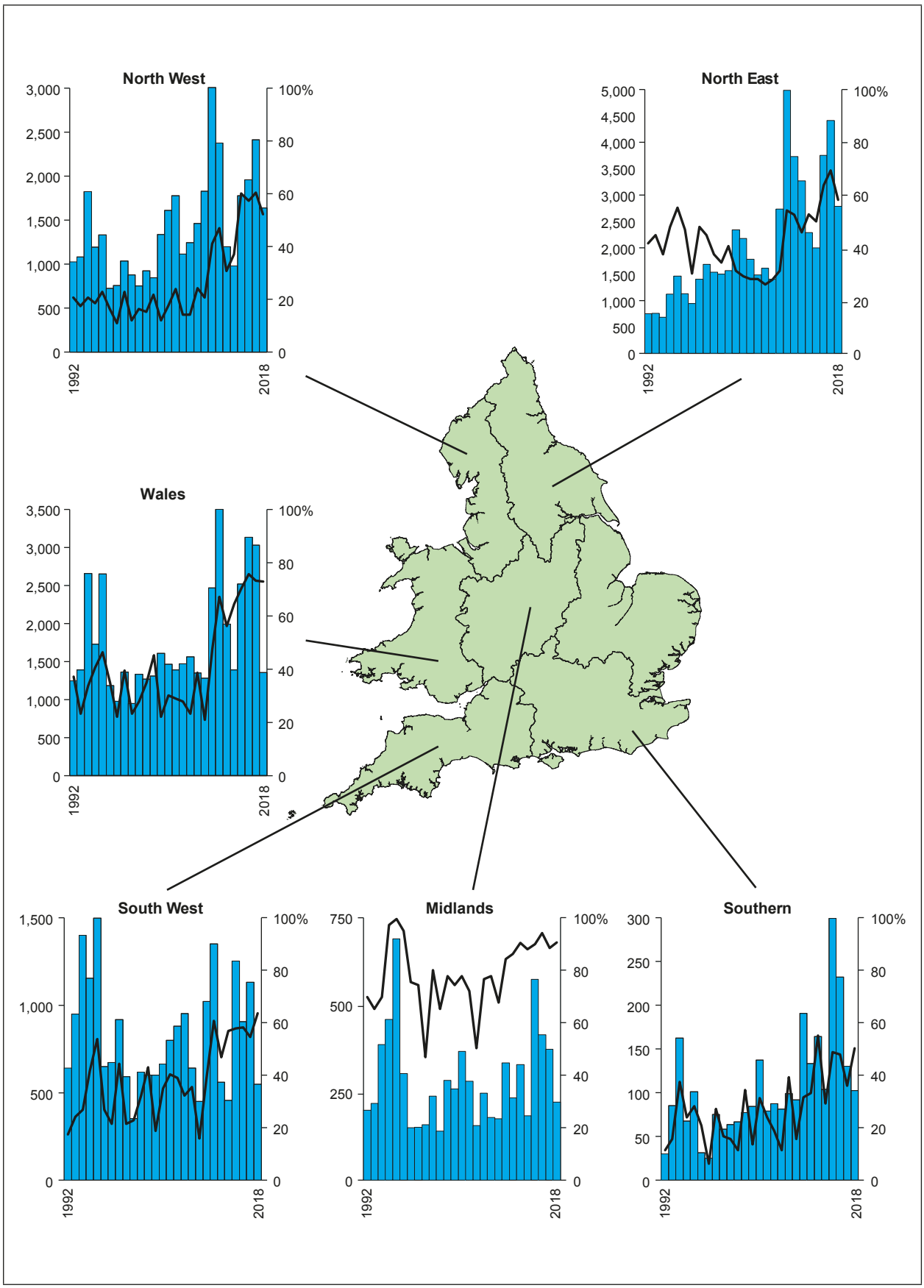

Figure 18. Estimated number (histogram) and percentage (solid line) of MSW salmon caught by rods, 1992 to 2018.

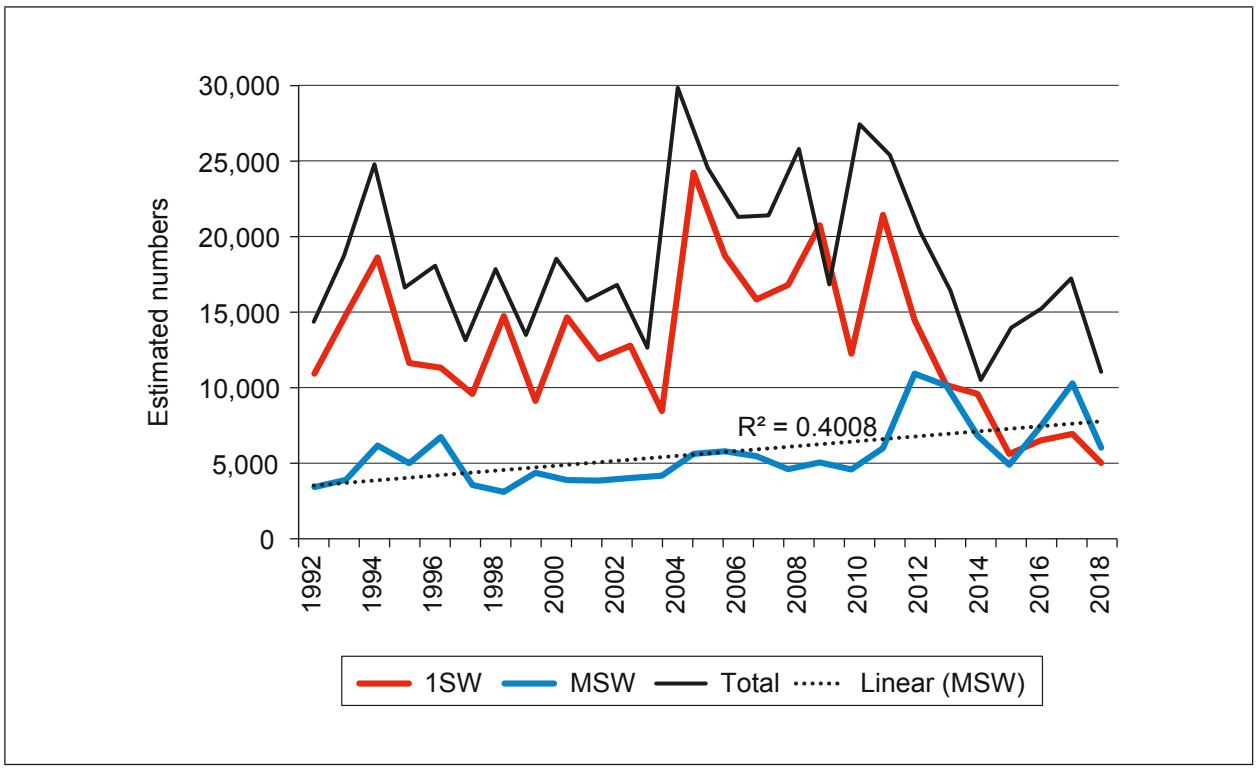

Figure 19. Estimated total number (corrected for under-reporting) of 1SW and MSW salmon caught by rod fisheries in England and Wales (including fish caught and released), 1992-2018.

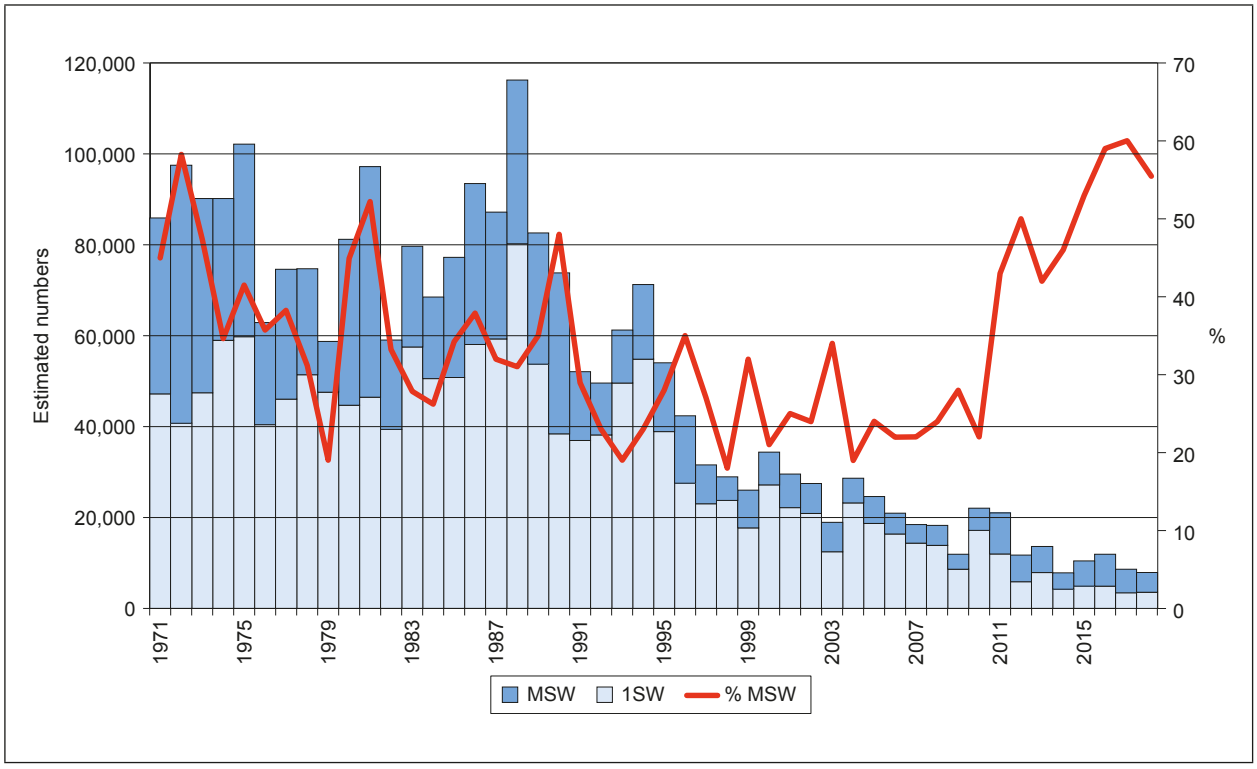

Figure 20. Estimated total catch of 1SW and MSW salmon in England and Wales (fish caught and killed only), 1971-2018, as used in the ICES PFA assessment.

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, 2018). 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 2018

The overall CPUE for nets and fixed engines in 2018 increased on that in 2017, but was 4% below the previous 5-year mean (2013-2017). CPUE in 2018 was above the 5-year mean in all regions, except the North East (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 2000-2002, 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 2018 it was slightly above 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 2018 decreased on 2017 and was below the previous 5-year mean in all regions, except the North West (Table 21). 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 until 2017 and then a decline thereafter. Overall CPUE in 2018 was just below the long-term average of the time series.

Table 20. Mean catch per unit effort (CPUE) for salmon net fisheries, 1997-2018.

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	2.38
2017	7.58	5.64	0.58		0.26	0.15	1.41
2018	6.27	6.05	1.07		0.92	0.15	1.68
Mean (2013-2017)	10.57	7.44	0.59		0.35	0.10	1.76
No. fisheries	2	4	3	1	6	4	17
% change (2018 on 5-yr mean)	-41	-19	+80		+167	+56	-5

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 2018 are provisional.

Table 21. Mean catch per unit effort (CPUE) for salmon rod fisheries, 1997-2018.

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
2018	10.5	0.0	5.0	4.9	6.7	9.0	4.0	7.2
Mean (2013-2017)	12.9	0.0	13.8	7.2	7.9	7.9	5.6	8.3
% change:								
2018 on 2017	-22		-63	-44	-16	-4	-40	-24
2018 on 5-yr mean	-18		-64	-32	-15	+14	-29	-14

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 2018 are provisional.

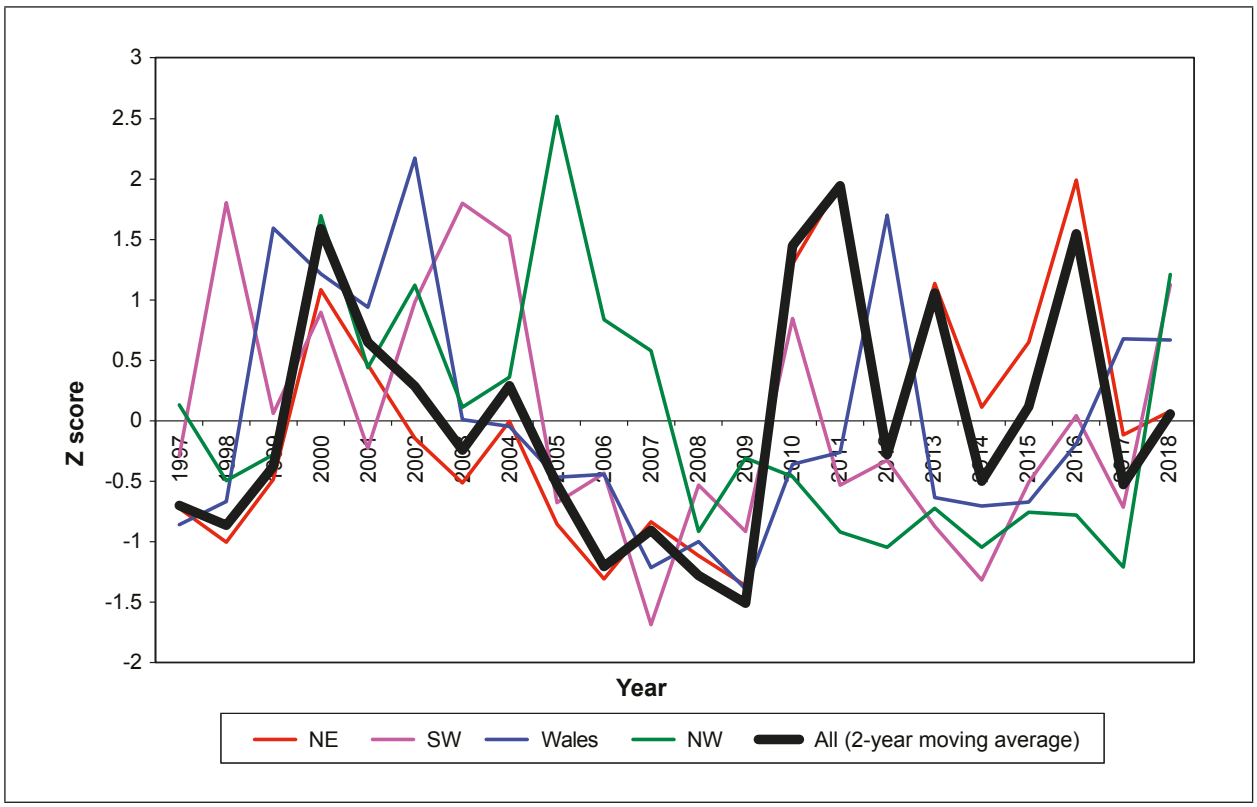

Figure 21. Normalised catch per unit effort (CPUE) (Z-score) for salmon net fisheries, 1997-2018. Note: the bold black line for all fisheries has been smoothed using a 2-year moving average.

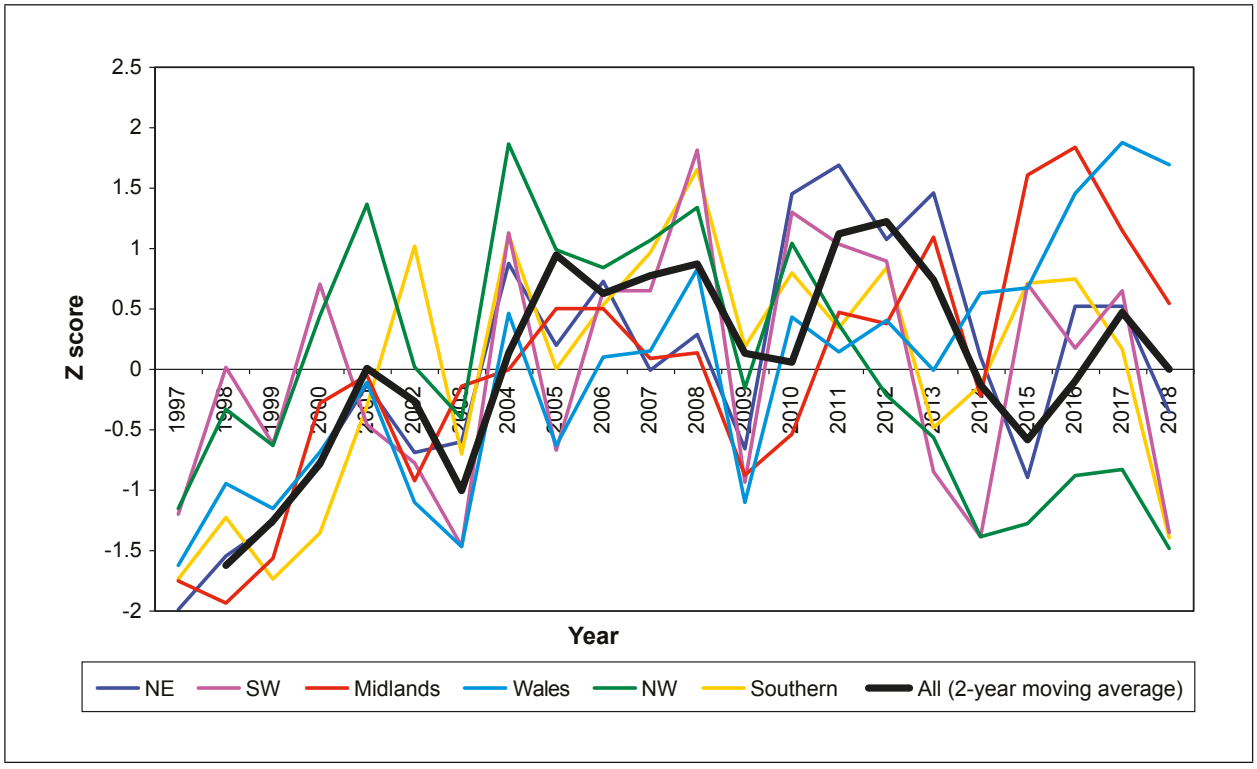

Figure 22. Normalised catch per unit effort (CPUE) (Z-score) for salmon rod fisheries, 1997-2018. Note: the bold black line for all fisheries has been smoothed using a 2-year moving average.

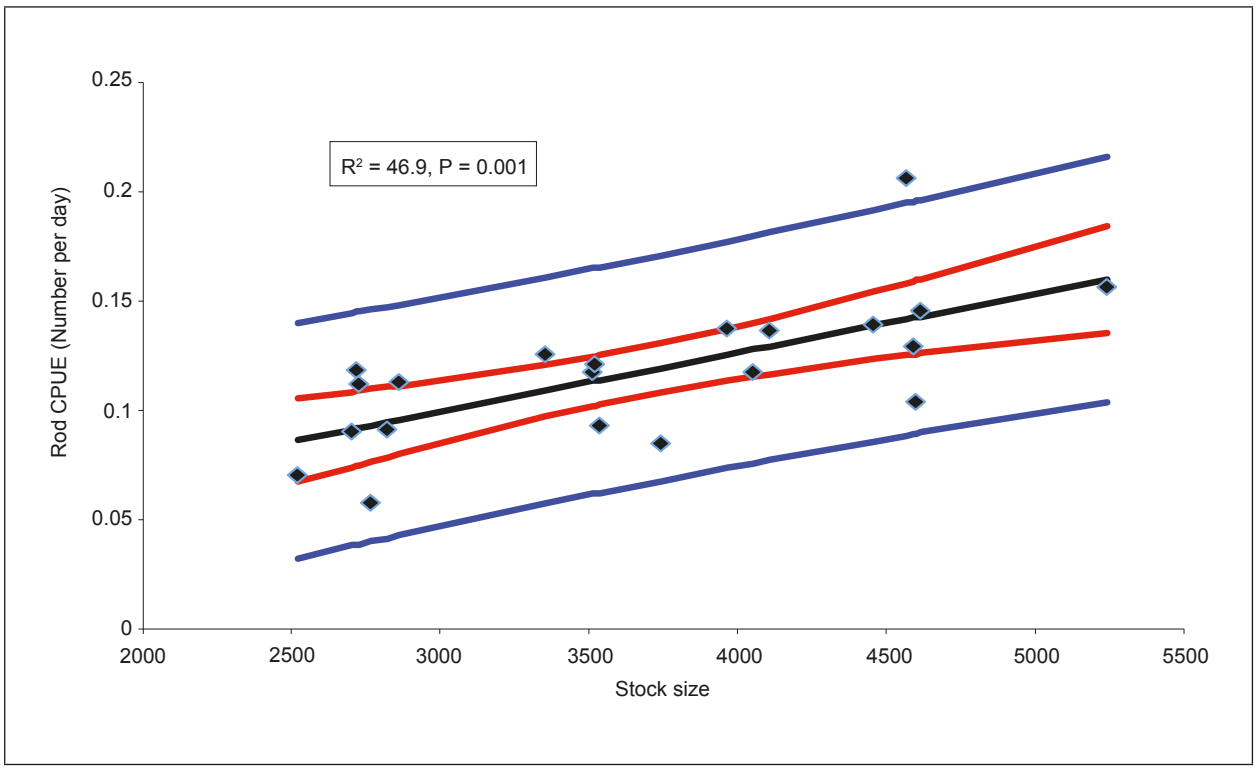

Figure 23. The relationship between the mean catch per unit effort (CPUE) and mean stock size for the Rivers Frome, Tamar, Dee and Lune, 1997-2017 (black line). Note: the red lines are 95% confidence intervals and the blue lines are 95% prediction intervals.

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 C&R.

Overview of exploitation rates in 2018

Exploitation rates for rod fisheries on most rivers were well below those in 2017 and the average of the previous five years, although values remain highly variable between rivers. An increase in the exploitation rate was reported on only one river (Test) but remained close to the 5-year mean. 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 C&R, which has increased from 10% to almost 90% over the past 2 to 3 decades. 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 10% and 5%, respectively, currently, due to the measures taken to control both legal and illegal fisheries. A further reduction in exploitation rates will be expected as a result of the latest regulatory measures (Section 2).

Table 22. Estimated exploitation rates (%) for selected rod and net fisheries, 1988-2018.

			Rod Fisheries																						Net Fisheries			
Region/NRW	NE		Southern				SW								NW						Wales						NW		Wales	
River	Tyne [c]		Test		Itchen		Hampshire/Avon		Frome [a]		Tamar		Fowey		Kent		Leven		Lune		Dee [b]		Dee [b]		Teifi		Kent	Leven	Lune	Dee
Wild/Hatchery	W		W/H		W		W		W		W		W		W		W		W		W (1SW)		W (MSW)		W		W	W	W	W
Year	All	Ret.	All	Ret.	All	Ret.	All	Ret.	All	Ret.	All	Ret.	All	Ret.	All	Ret.	All	Ret.	All	Ret.	All	Ret.	All	Ret.	All	Ret.	Ret.	Ret.	Ret.	Ret.
1988			40	40	34	34			12	12																				
1989			29	29	45	45			8	8					37	37			29	29							26		44	
1990			37	37	53	53			12	12					28	28			45	45							9		36	
1991			26	26	68	68			9	9					52	52			51	51							11		31	
1992			53	53	85	85			13	13					43	43			54	54	14	14	18	18			4		29	15
1993			37	34	30	30			12	7					53	47			47	41	11	10	15	13			7		30	11
1994			40	31	59	54			15	14	13	12			36	31			34	29	15	13	21	19			4		35	22
1995			32	26	17	10			10	9	8	7	16	12	22	18			23	17	8	7	13	12			4		27	18
1996			24	18	68	52			16	13	8	7	21	14	15	12			22	17	9	7	10	8			1		24	17
1997			15	1	41	15			8	6	6	4	30	16	22	18			24	18	8	7	9	6			7		28	17
1998			27	15	39	7			9	6	10	6	25	11	37	27			21	12	10	7	10	5			1		12	15
1999			20	11	44	14			16	7	7	3	13	6	24	15			23	12	13	10	10	5			5		15	22
2000			27	9	82	9			14	8	7	4	22	10	26	16	6	1	19	8	8	5	20	13			3	10	17	13
2001			53	1	89	1			16	9	3	2	16	8	10	6			10	4	15	11	12	5			6		17	14
2002			33	0	79	0			14	6	2	1	23	10	12	6	3	1	16	6	7	4	5	0			1	2	18	12
2003			46	0	34	0			11	3	2	1	15	5	9	5	4	0.1	13	6	10	7	8	2			2	1	12	13
2004	23	10	41	0	37	0			9	4	7	3	13	6	21	12			16	6	17	11	17	10			0		6	9
2005	29	12	31	0	21	0			12	4	2	1	23	8	20	11			17	7	15	8	20	7			3		19	13
2006	25	10	20	0	29	0	12	0	8	0.3	4	1	27	10	20	12	31	0	17	8	11	6	14	5			3	10	15	8
2007	33	16	39	0	70	0	10	0.3	10	0	5	2	14	5	19	12	8	0	11	4	12	7	17	6			0.2	0.9	7	8
2008	39	20	28	0	58	0	9	0	5	0.2	5	1	23	7	52	31	12	1.0	16	7	13	5	26	15			0	0.3	3	0.8
2009	38	16	20	0	74	0	11	0.3	6	1	7	2	15	6	41	21	26	0	11	4	10	4	12	7			2	2	5	0
2010	27	11	26	0	48	0	9	0.2	5	0	6	2	28	7	31	16	18	1.3	15	6	15	8	17	4	17	10	1	0.3	5	0
2011	34	13	32	0	42	0	17	0.3	7	0.2	6	2	21	6	n/a	n/a	42	1.7	19	8	16	6	20	10	16	9	n/a	0	4	0
2012	41	16	31	0	60	0	9	0	13	0	17	5	21	8	n/a	n/a	26	0	16	7	18	6	20	4	19	10	n/a	0.5	3	0
2013	27	8	32	0	32	0	10	0	23	0	6	1	12	4	n/a	n/a	19	0	11	5	9	3	13	2	18	7	n/a	0.7	5	0
2014	22	6	23	0	35	0	9	0	14	1	4	1	18	4	n/a	n/a	8	0	11	2	10	2	10	1	18	5	n/a	0.3	6	0
2015	19	5	25	0	38	0	29	0	18	1	8	1	25	7	n/a	n/a	3	0	13	4	11	3	11	2	23	9	n/a	0.3	7	0
2016	28	7	24	0	87	0	18	0.1	13	0	6	1	35	9	n/a	n/a	10	0	n/a	n/a	9	1	14	2	20	7	n/a	0.4	n/a	0
2017			18	0	51	0	18	0.6	10	1	10	1	45	10	n/a	n/a	11	0	n/a	n/a	14	1	15	1	26	7	n/a	0	n/a	0
2018			25	0	39	0	n/a	n/a	10	0	5	0.3	31	0	n/a	n/a	n/a	n/a	12	2	4	0.2	9	2	16	2	n/a	n/a	9	0
Mean (2013-2017)	24	7	24	0	48	0	17	0	15	1	7	1	27	7			10	0	12	4	10	2	13	2	21	7		0.3	6	0
% change																														
2018 on 2017			+38		-23				-7		-49	-73	-31	-100							-68	-86	-40	+6	-39	-68				
2018 on 5-yr mean			+2		-19				-39		-29	-72	+15	-100					+5	-49	-58	-91	-26	+4	-23	-66			+57	

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 2018 are provisional.

Key: [a] *Data based on Game & Wildlife Conservation Trust counter at East Stoke, and supplied courtesy of GWCT.*
[b] *Data derived from mark recapture investigation.*
[c] *Tyne values are provisional; work is ongoing with Newcastle University to further refine RSEs.*

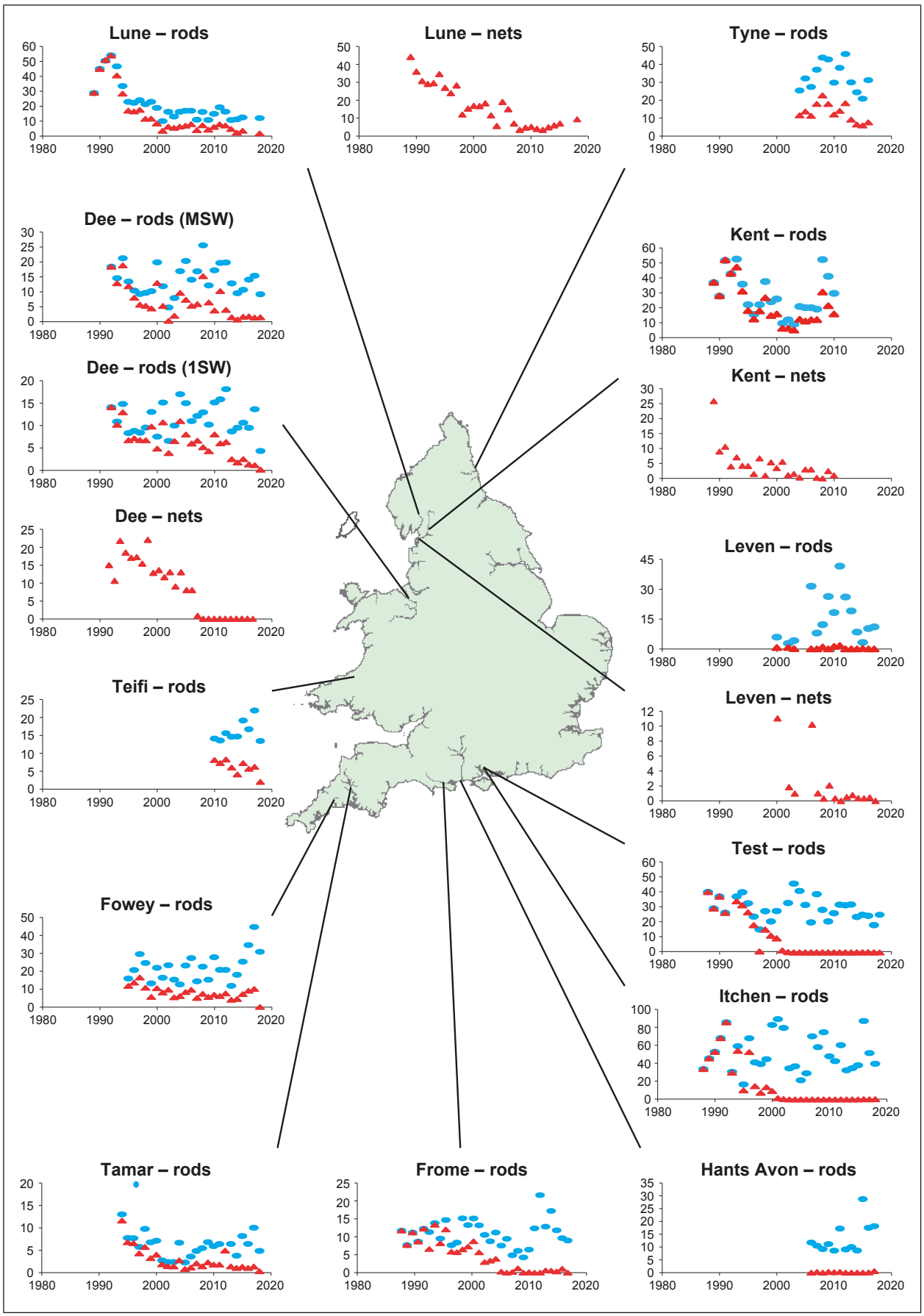

Figure 24. Estimated exploitation rates (%) for selected rod and net fisheries in England & Wales, 1988-2018. For rod fisheries, the figures display exploitation rates for all fish caught – i.e. including fish released (blue dots) and fish killed (red triangles). Note that estimates for the Dee rods 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.

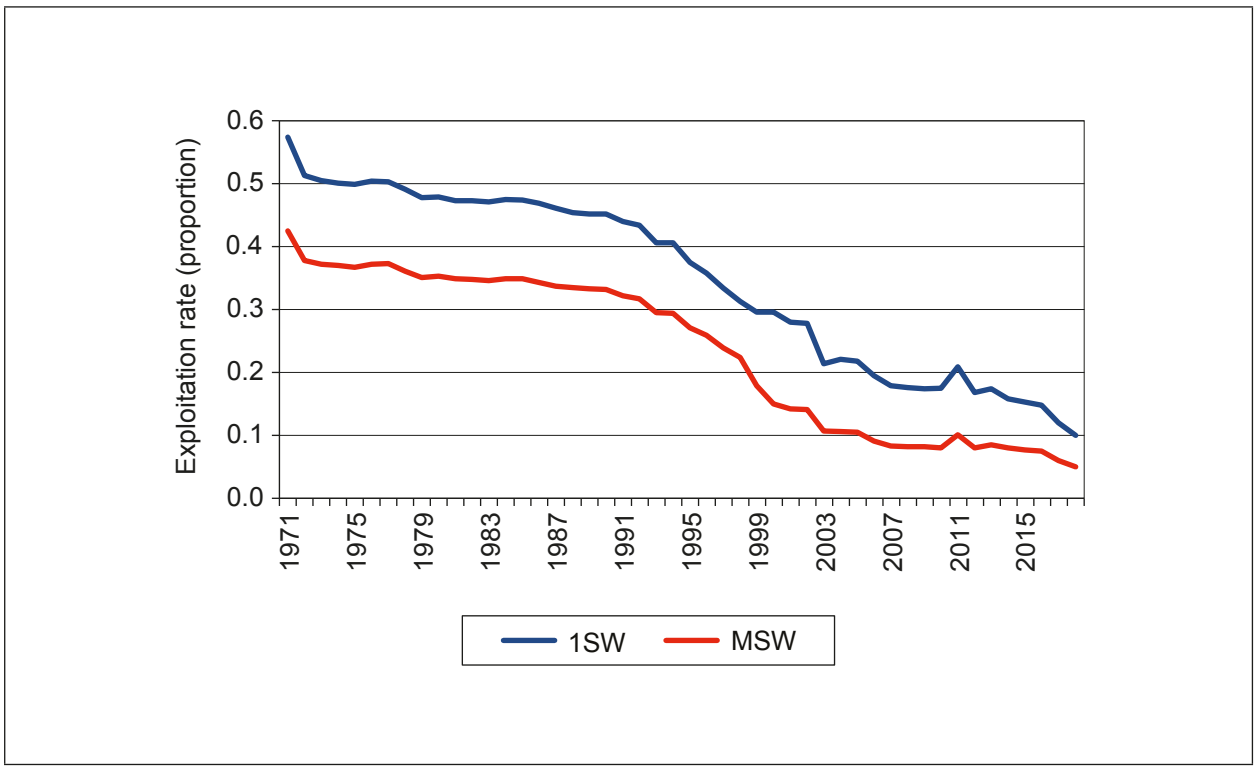

Figure 25. Estimated national exploitation rates for 1SW and MSW salmon caught in England and Wales (fish caught and killed only), including estimated non-reported catch, 1971-2018, as used in the ICES PFA assessment.

REPORT ON STATUS OF STOCKS IN 2018

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, respectively. 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 2013 to 2018. 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 (67%) of sites surveyed over the period were in the lowest two classes (Classes E or F).

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 (2005-2018). It should be noted that not all the same sites are sampled every year and so the data 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 to C, ranging from over 50% in 2009 to a low of 23% in 2016. The latter reflected the poor juvenile recruitment that was observed throughout England and Wales in that year (Section 10). There has been a small improvement in the percentage of sites falling within classes A to C in the last two years, with the value for 2018 (34%) a little below the average for the time series (37%).

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 that data may not be available for the latest year. Available time series, including those that have been recently discontinued, are presented in Table 23 and Figure 28.

Returning stock estimates and counts for 2018 were below the levels recorded in 2017 and the recent 5-year means for all rivers, except the Dee. On four rivers (Tamar, Lune, Teifi and Taff) the estimates were the lowest in the available 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, numbers of returns show 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 declined in recent years. In 2018, about 4,500 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 3,500 hatchery parr and smolts and 10,000 wild parr were marked with adipose fin clips; all the wild parr were also tagged with PIT tags. Other internal tags were fitted to about 250 smolts of hatchery and wild origin for use in tracking investigations. In addition, about 600 adult salmon were tagged to aid in 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 2018 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, 2019). 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 River Tamar, the return rate of 1SW fish (from the 2017 smolt cohort) was lower than the previous year, the opposite applied on the River Frome. In both cases, the estimates remained within the range of observed values (back to 2002). The survival estimates for 2SW salmon on the Tamar and Frome in 2018 (from the 2016 smolt cohort) were also within the range of recent values. Reduced numbers of tagged fish mean that it has not been possible to derive estimates for the Dee in the most recent year.

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, 1986-2018.

Stage:	Smolts		Adults															
Region/NRW:	Southern	SW	NE		Thames	Southern		SW				NW				Wales		
River:	Test [a]	Frome [d]	Tyne [b]	Tees	Thames [c]	Test	Itchen	Hants Avon	Frome [d]	Tamar [e]	Fowey [f]	Lune	Kent	Leven	Caldew	Dee	Teifi	Taff
Method:	Run estimate		RSE1	T [g]	T	RSE1	RSE1	RSE1	RSE1	RSE1	C	RSE1	RSE1	C	T [h]	RSE2	RSE1	C
1986					81													
1987					41													
1988					288	1,507	1,336		3,614									
1989					91	1,730	791		3,156			4,985	1,137					
1990					63	790	367		1,917			5,520	2,216					
1991					36	538	152		861			5,322	1,736					
1992	11,967				247	488	305		871			4,066	1,816			4,643		
1993	7,131				259	920	646		1,291			7,883	1,526			9,757		
1994	3,381				143	618	311		1,141	6,295		6,254	2,072		1,461	5,285		
1995	6,853			87	162	517	798		1,102	5,581	756	4,589	2,762		1,456	5,703		
1996	4,712			98	122	515	386		1,499	3,948	669	4,739	3,246		1,202	4,931		
1997	7,229			125	25	317	232		1,207	2,959	467	3,205	1,473		831	5,496		
1998	14,672			224	6	748	412		1,307	4,134	521	7,457	2,166		1,042	6,661		
1999	4,085			141	35	777	207		827	3,552	713	4,936	1,023		969	3,664		
2000	3,516			152	53	537	204		660	3,503	745	8,364	2,354	321	1,288	3,751		
2001	2,625			163	9	408	214		672	4,142	717	6,198	2,882	n/a		4,766		
2002	2,190	9,300		239	22	1,046	239		883	5,993	935	7,612	3,149	285	1,231	7,216		
2003	7,585	11,200		126	18	367	169		582	4,786	741	6,911	2,741	323	759	4,915		
2004	5,024	8,300	20,131	571	7	1,129	410		715	4,720	1,301	12,982	2,982		1,579	7,123		
2005	7,580		13,868	171	0	1,117	411		550	5,724	1,046	10,024	3,082		1,031	5,435		
2006	6,118	9,689	17,180	209	0	1,058	419	1,319	754	5,459	930	7,531	2,625	180	1,242	5,663		
2007	13,400	13,429	10,363	423	1	664	301	1,135	655	3,866	796	11,376	2,304	420	1,017	5,839		
2008	3,498	13,654	9,597	529	9	1,487	500	810	994	7,247	938	9,577	1,147	347	1,026	5,707		
2009	n/a	10,885	8,911	225	4	903	276	759	602	3,727	717	8,434	995	152	539	5,006		
2010	n/a	13,022	21,268	229	4	833	757	609	1,058	7,230	1,220	8,572	2,468	622	637	5,615	6,056	361
2011	n/a	9,787	18,334	n/a	4	980 [j]	697 [k]	782	1,406	4,146	675	6,592	n/a	326	236	4,831	3,940	1,211
2012	15,378	6,310	10,851	n/a	15	949 [j]	622	762	458 [m]	5,225	515	4,383	n/a	209	84	4,096	2,619	
2013	7,387	13,369	15,999	n/a	3	1,020	478	789 [n]	383 [m]	2,733	886	4,568	n/a	408	245	4,044	2,201	867
2014	n/a	9,010	13,671	n/a	n/a	1,001	779	683 [n]	335 [m]	3,004	501	3,486	n/a	594	n/a	3,530	1,901	687
2015	n/a	6,912	14,194	n/a	n/a	2,007	903	1,181	829	4,554	683	3,479 [p]	n/a	636	n/a	3,051	1,304	787
2016	n/a	9,539	14,696	n/a	n/a	1,454	361	1,331 [n]	748	4,407	336	[q]	n/a	271	n/a	3,330	1,442	476
2017	n/a	4,381	n/a	n/a	n/a	1,850	640	1,037	991	4,424	484	[q]	n/a	406	n/a	3,043	1,182	315
2018	n/a	11,875	n/a	n/a	n/a	683	355	n/a	524	2,603	396	2,413	n/a	n/a	n/a	3,796	937	150
Mean (2013-2017)		8,642	13,882	14,640	3	1,466	632	1,004	657	3,824	578	3,844		463	245	3,400	1,603	547

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 2018 are provisional.

Key:

[a] *Smolt run estimates from 2010 are from a new trapping location further upstream, so shouldn't be compared directly with the earlier time series.*
[b] *Tyne RSEs have been updated based on video validation, but remain provisional pending work to further develop analytical methods for count speciation.*
[c] *Denotes stock originally supported by large-scale stocking from hatchery programme.*
[d] *Data based on Game & Wildlife Conservation Trust monitoring facilities at East Stoke, and supplied courtesy of GWCT.*
[e] *Data for some years revised in 2014 to take account of high summer flows and reduced counter efficiency.*
[f] *Count relates to period from 1 March to end of February.*
[g] *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.*
[h] *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.*
[j] *Due to counter malfunction, estimates for 2011-12 based on relationship between rod catch and RSE for the period 1990-2010.*
[k] *Slight under-estimate due to counter malfunction during May/June.*
[m] *Estimates informed by return rate of PIT tagged fish in addition to adult counter.*
[n] *Due to significant resistivity counter downtime, estimates based on a correlation between rod exploitation rate and validated counter estimates (from 2006 – 2012).*
[p] *Counter damaged by high flows at end of year and some degree of 'leakage' reported due to some fish by-passing counter.*
[q] *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 – 2018 season.

Marking season: 2018

Country: UK (England and Wales)

Totals	Origin	Primary Tag or Mark			Other internal [a]	Total
		Microtag	External Mark	Adipose Clip		
	Hatchery juvenile			3,463	239	3,702
	Wild juvenile	4,521		10,150	96	14,767
	Adult		628			628
	Total fish marked	**4,521**	**628**	**13,613**	**335**	**19,097**

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	85	2251 - 2535	None	Nov - Dec 2018	Tyne & tributaries
EA North East	Various	Parr/Smolt	H	Tyne	Adipose clip	1,330		None	March-Dec 2018	Tyne
Natural Resources Wales	Various	Smolt	W	Dee (Worthenbury)	CWT	159	01/42/34	Adipose clip	Apr-May 2018	Dee - Worthenbury
Natural Resources Wales	Various	Smolt	W	Dee (Ceiriog)	CWT	403	01/42/38	Adipose clip	May 2018	Dee - Ceiriog
Natural Resources Wales	Various	Adult	W	Dee	Floy tag	543	Various (blue and blue/green)	None	March-Oct 2018	Dee - Chester
Natural Resources Wales	1+	Parr	H	Dee	Adipose clip	2,133		None	16-Oct-18	Dee - Tryweryn
EA South West	Various	Smolt	W	Tamar	CWT	3,959	01/42/94	Adipose clip	April-May 2018	Tamar
GWCT	Various	Smolt	W	Tamar	Acoustic	59	PIT codes start DC00xxxxxx	PIT tag	April-May 2018	Tamar
GWCT	1+	Smolt	W	Frome	Acoustic & PIT	35	PIT codes start 3DD.003xxxxxx	Adipose clip	April-May 2018	Frome
GWCT	0+/1+/2+	Parr	W	Frome	Adipose clip	10,044	PIT codes start 3DD.003xxxxxx	PIT tag	Aug/Sept 2018	Frome
Cefas	0+ & 1+	Parr	W	Itchen	Adipose clip	106	PIT codes start DC00xxxxxx	PIT tag	September 2018	Itchen
Cefas	1+ & 2+	Smolt	H	Taff	Acoustic	239		None	April 2018	Taff - Radyr weir
Cefas	1+ & 2+	Smolt	W	Taff	Acoustic	2		None	May 2018	Taff - Fiddlers elbow

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, 2019 and Environment Agency/Cefas/GWCT data) for 1984 to 2017 smolt years.

Smolt migration year	Ireland			UK (N. Ireland)	UK (Scotland)		UK (England and Wales)									
	River Corrib		Burishoole	River Bush [a]	River North Esk [b]		Dee [c]				Tamar				Frome [d]	
	1SW	2SW	1SW	1SW	1SW	MSW	1SW	95% CL	MSW	95% CL	1SW	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	3.6	2.5	2.2						
1994	9.8	1.4	26.9	27.1	10.9	3.6	1.3	1.2	1.2	1.3						
1995	8.4	0.1	14.6		8.4	3.8	2.7	1.8	0.4	0.7						
1996	6.3	1.2	18.3	31.0	5.9	2.7	4.8	1.7	2.1	1.3						
1997	12.7	0.8	15.6	19.8	7.2	4.2	6.2	2.9	3.4	1.9						
1998	5.5	1.1	12.4	13.4	2.6	1.4	2.3	2.4	3.7	3.6						
1999	6.4	0.9	14.9	16.5	6.8	3.8	5.0	8.3	12.4	11.8						
2000	9.4		22.5	10.1	6.0	2.8	2.0	1.1	0.9	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	0.7	0.9	3.6	2.1	1.4	0.9	5.6	1.7
2003	8.3	2.1	19.4	6.8			2.6	1.7	0.4	0.4	6.1	2.0	1.8	1.1	4.8	0.9
2004	6.3	0.8	12.8	6.8			4.5	1.1	1.0	0.5	6.0	2.3	1.5	1.0	5.3	2.9
2005			8.1	5.9	6.7	2.8	5.1	1.6	0.5	0.4	6.4	1.6	1.2	0.8		
2006	3.6	0.7	12.9	14.0	3.3	3.4	4.3	1.2	1.5	0.9	3.8	1.3	5.3	2.5	5.1	2.2
2007	1.3	1.6	8.4	8.3	5.0	4.0	1.3	1.1	0.9	0.7	7.6	3.8	3.3	2.0	5.7	1.3
2008	1.7	1.0	8.2	4.0	6.4	5.3	2.5	2.0	1.3	1.5	1.6	0.9	0.9	0.7	3.1	1.6
2009	6.0	1.0	8.9	5.9	9.0	8.7	4.8	2.1	1.1	1.0	8.2	2.1	1.9	0.9	7.7	2.6
2010	2.9	1.2	7.5	4.0			1.9	1.9	0.7	1.3	3.4	1.5	5.0	3.1	8.6	2.8
2011	2.4	0	10.8	2.7					0.3	0.5	1.1	1.6	1.9	1.2	1.2	1.7
2012	1.5	0	9.4	11.7			4.8	4.9			2.5	1.4			3.1	2.0
2013	2.2	0.3	4.5	4.6			1.9	1.7	1.4	1.3			4.7	2.6	1.5	2.1
2014	2.9	0.5	8.0	2.9					0.5	1.1					2.0	2.7
2015	5.5	0.6	7.8	6.7			0.5	1.0	1.8	1.6	4.2	2.1	2.3	1.9	5.9	3.0
2016	6.9	0.2	7.5	3.8			0.3	0.6			3.5	2.6	1.4	1.2	4.4	2.0
2017	3.6		7.1	3.2							4.6	2.6			2.6	
Mean (2012-16)	3.8	0.3	7.4	5.9			1.9		1.2		3.4		2.8		3.4	2.4
Mean (2007-16)	3.3	0.7	8.1	5.5	6.8	6.4	2.3		1.0		4.0		2.7		4.3	2.2

Key: [a] *Based on microtagging, corrected for tagging mortality.*
[b] *Based on tagging with Carlin tags, not corrected for tagging mortality*
[c] *Based on microtagging with a 90% tag retention rate, not corrected for tagging mortality.*
[d] *Data based on Game & Wildlife Conservation Trust monitoring facilities at East Stoke, and supplied courtesy of GWCT.*

Notes: Data for 2017 smolt migration year are provisional.

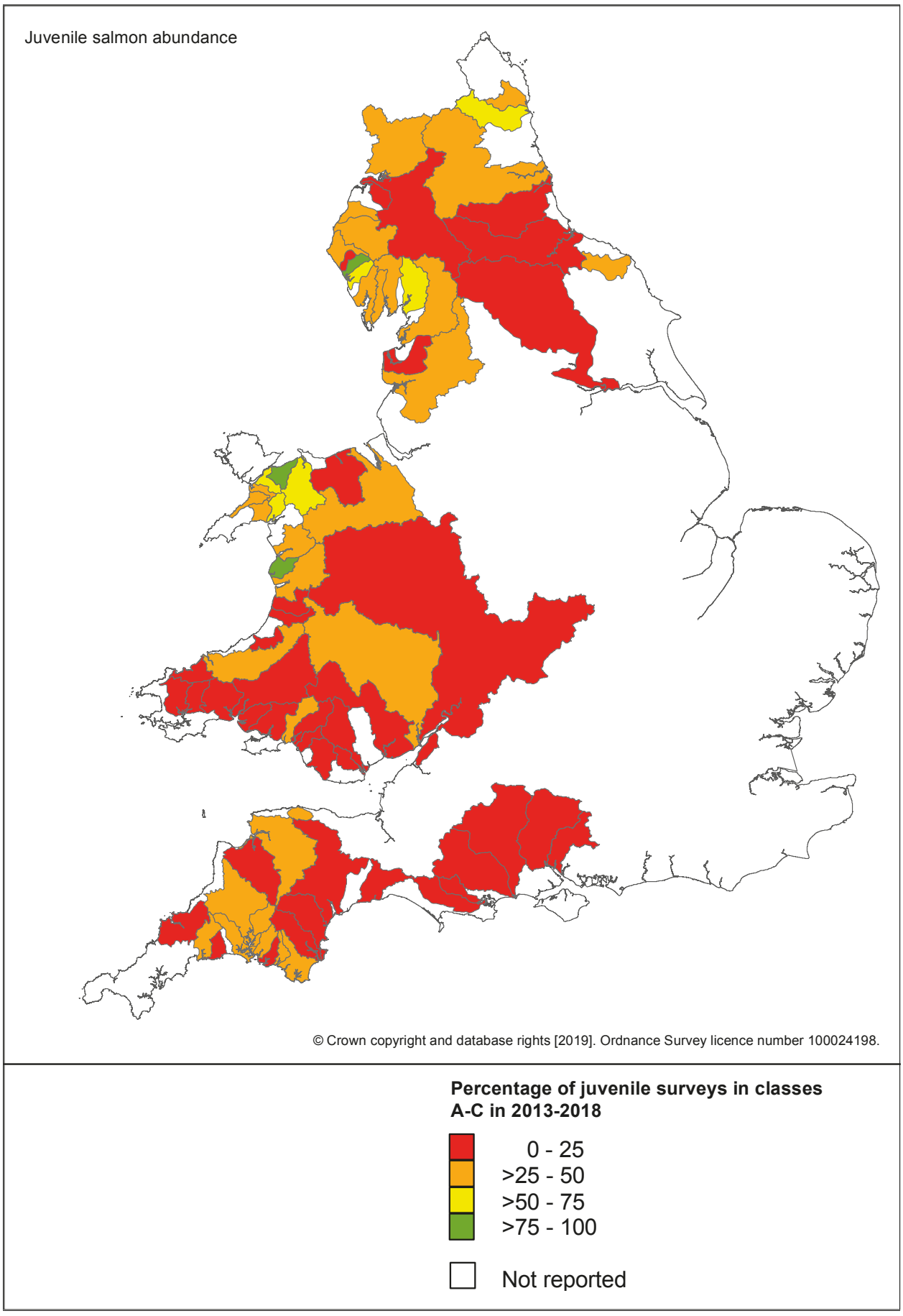

Figure 26. Juvenile salmon abundance indices for each catchment, presented as percentage of surveys in classes A to C only, 2013-2018.

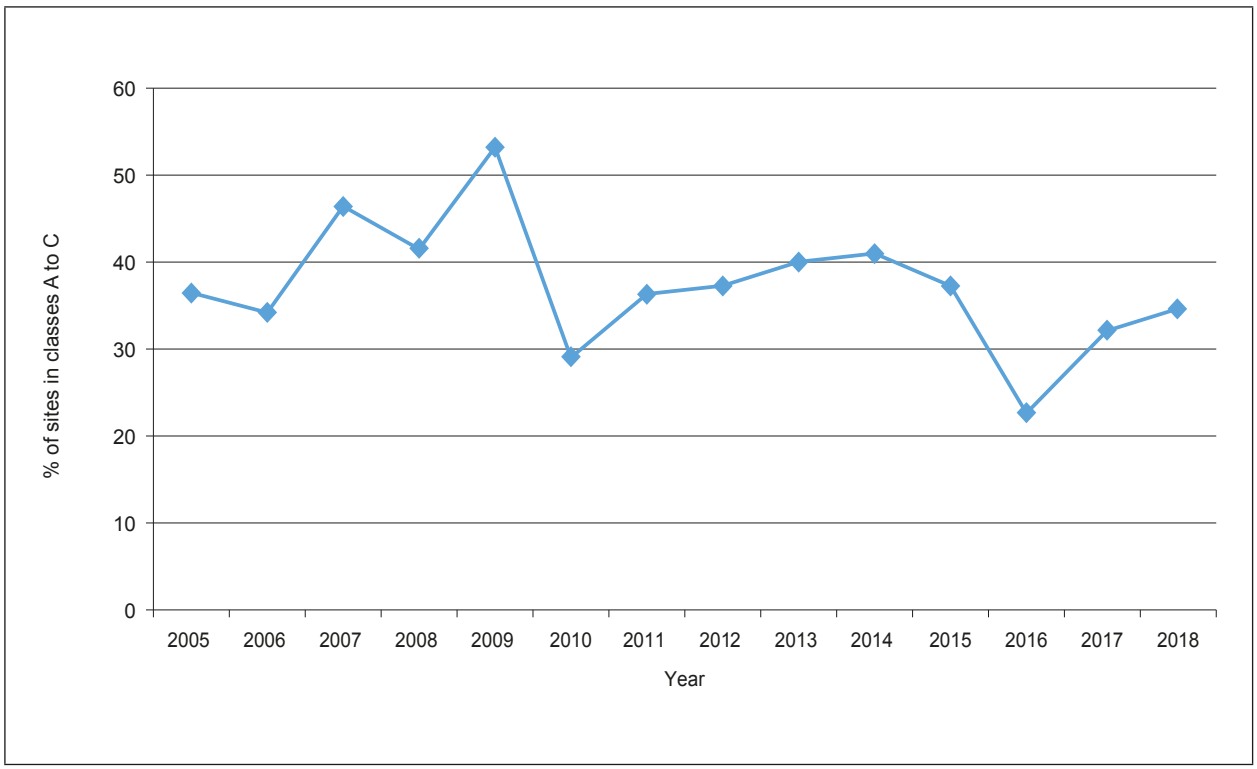

Figure 27. Overall percentage of juvenile survey sites in England and Wales in classes A to C, 2005-2018. Data include all surveys conducted in a single year from principal salmon rivers only.

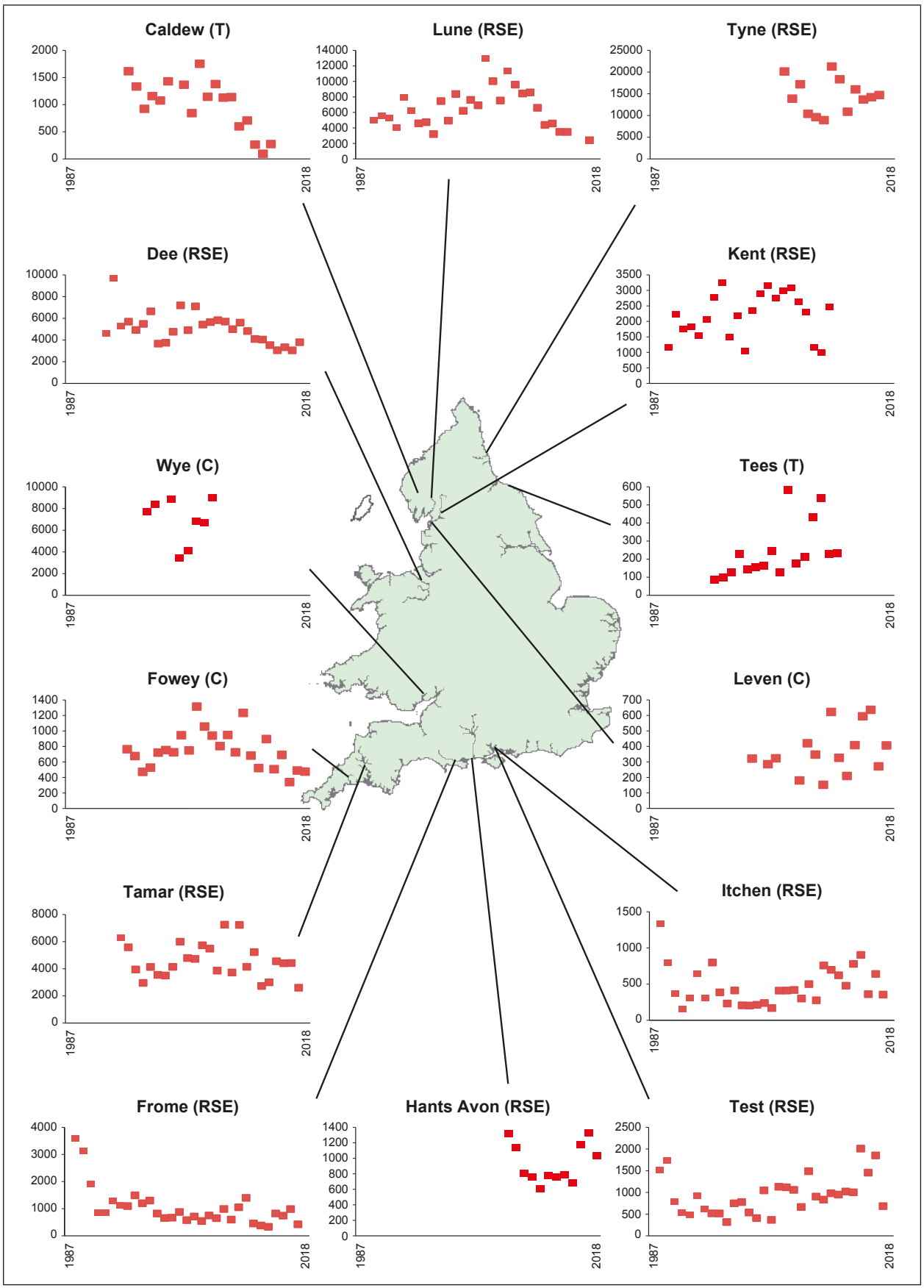

Figure 28. Counts from electronic counters (C) and monitoring traps (T), and returning stock estimates (RSE) (based on trapping and tagging, or validated counts plus catch below counter) for selected salmon stocks in England and Wales, 1988-2018.

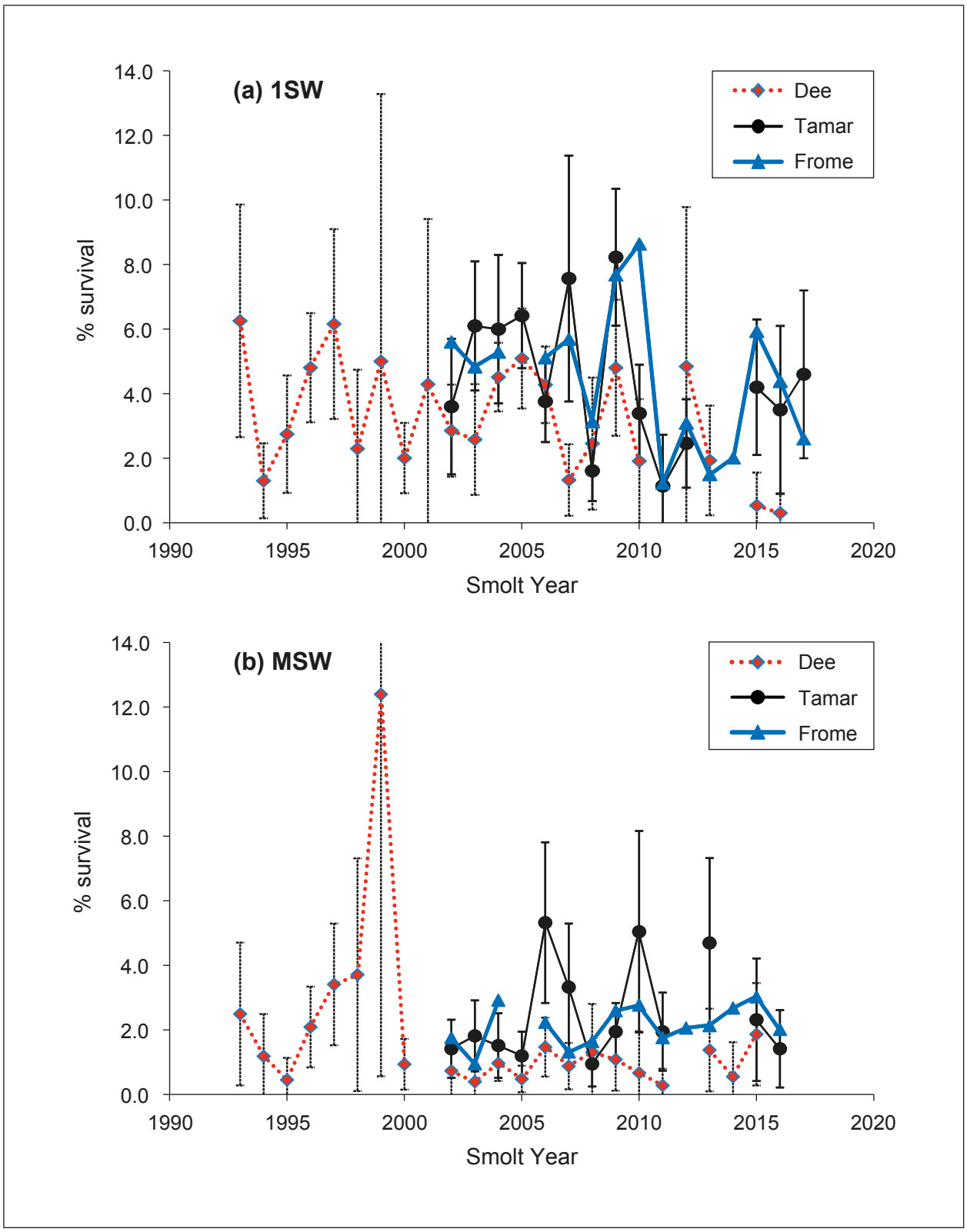

Figure 29. Estimated survival (±95 CLs where available) of wild smolts (%) to return to homewaters (prior to coastal fisheries) for (a) 1SW and (b) MSW salmon for the Rivers Dee, Tamar and Frome.

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 2018

Egg deposition estimates for 2018 have been calculated for each of the 64 principal 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.

Just 14 rivers (22%) were provisionally assessed as meeting their CL in 2018 (Table 27), a marked reduction on 2017 (30 rivers) and the joint lowest in the time series (Figure 31). Twenty four rivers (38%) were below 50% of their CL in 2018, compared with 18 rivers in 2017. River-to-river variation in the proportion of the CL attained in 2018 (Figure 30) indicates that rivers where spawning escapement was below the CL were widely distributed throughout England and Wales.

In 2018, additional egg deposition resulting from fish that were caught and released is estimated at about 13 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 2018.

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 (i.e. at least 80% of the time). 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 2018 and projected to 2023 (Table 26 and Figure 32).

The latest compliance assessment indicates that none of the principal rivers in England and Wales were classified as 'not at risk' in 2018 – i.e. having a high probability ($p \geq 95\%$) of achieving the management objective. The same has applied in each year since 2014 and is forecast to continue to apply in 2023. In 2018, 24 rivers (38%) were classified as 'at risk' – having a low probability ($p \leq 5\%$) of achieving the management objective, an increase on 2017 (19 rivers); 15 rivers (23%) are projected to be 'at risk' in 2023. Thirty-six rivers in England and Wales in 2018 (56%) are classified as 'probably at risk' ($5\% < p < 50\%$ of achieving the management objective); this is projected to rise to 69% in 2023. Only 4 rivers (6%) are classified as 'probably not at risk' ($50\% \leq p < 95\%$) in 2018. 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	2018		2023	
		Number of rivers	%	Number of rivers	%
Not at risk	>95%	0	0	0	0
Probably not at risk	50–95%	4	10	5	12
Probably at risk	5–50%	26	62	30	71
At risk	<5%	12	29	7	17

Rivers in Wales

Stock status category	Probability of meeting the management objective	2018		2023	
		Number of rivers	%	Number of rivers	%
Not at risk	>95%	0	0	0	0
Probably not at risk	50–95%	0	0	0	0
Probably at risk	5–50%	10	45	14	64
At risk	<5%	12	55	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 15 years, and this is projected 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 five years, and this is projected to continue to 2023. There was a decrease in the number of rivers classified as 'probably not at risk' in 2018 (4) compared with 2017, and this is the joint lowest in the time series. The majority of rivers (62%) continue to be assessed as 'probably at risk' as in the previous four years. The 2018 assessment suggests that the majority (88%) of English rivers will fall in the 'probably at risk' and 'at risk' categories in 2023.

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 2018, all the rivers are classified as either 'at risk' (55%) or 'probably at risk' (45%). The projected trend suggests that all rivers will continue to fall in the same two categories in 2023, 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 North-east 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 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 this time period.

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 eight years, and the decline in PFA between the start and the end of the time series is now greater for 1SW fish (over 60%) than for MSW salmon (under 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 C&R. The recent upturn in MSW returns means that MSW spawner numbers are now estimated to be 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, 2009-2018. Current compliance against the management objective and projected compliance in 2023 are also shown (see background report for details).

EA Region/NRW River	Accessible wetted area (ha)	CL eggs / 100m^2	CL eggs (x10^6)	Mgmt Target eggs (x10^6)	2018 egg deposition (x10^6)	Percentage of Conservation Limit attained (%) [a]										Current compliance [b] 2018	Predicted compliance [b] in 2023
						2009	2010	2011	2012	2013	2014	2015	2016	2017	2018		
NE																	
Coquet	144	218	3.14	5.91	3.03	185	370	325	366	228	134	93	160	190	97	PaR	PaR
Tyne [c]	542	208	11.25	22.87	23.86	214	519	518	277	436	408	434	541	403	212	PNaR	PNaR
Wear	232	250	5.80	11.61	10.93	181	383	460	321	526	351	196	228	310	188	PNaR	PNaR
Tees	620	240	14.90	16.57	0.68	14	14	21	50	23	4	8	13	21	5	AR	AR
Esk-Yorks	86	236	2.02	2.66	0.97	44	120	105	89	100	84	73	100	174	48	PaR	PaR
Southern																	
Test	138	246	3.40	4.24	2.31	62	56	66	64	68	68	137	99	128	68	PaR	PaR
Itchen	69	234	1.63	2.02	1.08	35	103	96	82	67	109	125	45	86	67	PaR	PaR
SW																	
Avon-Hants	369	175	6.48	7.32	4.14	48	31	50	43	61	37	59	85	63	64	PaR	PaR
Stour	142	149	2.12	2.18	0.29	10	7	11	9	13	8	13	18	14	14	AR	AR
Piddle	18	177	0.31	0.39	0.21	55	96	129	50	33	27	66	63	74	69	PaR	PaR
Frome	88	171	1.50	2.21	2.11	102	179	239	93	57	52	133	128	151	141	PaR	PaR
Axe	83	175	1.45	1.72	0.04	51	25	58	77	26	16	37	37	16	3	AR	AR
Exe	282	253	7.14	13.15	4.84	192	221	341	279	70	48	130	86	106	68	PaR	PaR
Teign	98	251	2.47	3.34	2.15	96	133	175	207	123	100	121	72	95	87	PaR	PaR
Dart	137	218	2.98	4.01	0.44	53	96	93	143	37	18	23	52	43	15	AR	AR
Avon-Devon	35	202	0.70	0.92	0.35	57	151	122	127	50	69	63	64	60	50	AR	PaR
Erme	20	180	0.37	0.53	0.54	47	87	86	66	76	13	19	31	176	149	PaR	PaR
Yealm	11	212	0.24	0.29	0.06	56	80	64	57	49	29	25	24	11	26	AR	AR
Plym	29	188	0.55	0.67	0.06	15	54	91	43	24	35	32	7	29	12	AR	PaR
Tavy	68	201	1.37	1.84	0.33	68	152	84	102	64	45	130	37	86	24	AR	PaR
Tamar	293	395	11.56	13.68	9.15	104	139	104	126	74	77	111	84	104	79	PaR	PaR
Lynher	29	233	0.68	1.16	0.39	149	266	104	162	150	75	277	172	293	57	PaR	PaR
Fowey	42	207	0.86	1.39	1.22	206	345	196	153	261	139	235	100	147	141	PaR	PaR
Camel	56	176	0.98	1.94	0.77	170	462	241	142	158	88	88	112	93	79	PaR	PaR
Taw	274	211	5.78	9.56	4.77	158	134	287	199	52	109	253	139	244	82	PaR	PaR
Torridge	198	207	4.10	4.98	2.15	58	80	68	131	58	49	91	83	101	53	PaR	PaR
Lyn	27	359	0.97	1.73	0.10	90	227	291	166	85	103	95	60	257	10	AR	PaR
Midlands																	
Severn	898	143	12.85	19.24	13.05	88	88	161	113	156	99	270	196	178	102	PaR	PaR
NW																	
Ribble	351	202	7.10	10.35	5.34	202	240	210	189	120	124	111	108	174	75	PaR	PaR
Wyre	67	73	0.49	0.55	0.06	46	31	44	37	14	16	23	2	27	11	AR	PaR
Lune	423	237	10.01	13.94	6.66	210	190	190	132	112	94	111	112	132	67	AR	AR

Kent	68	223	1.52	2.64	1.58	148	326	275	160	138	70	55	105	113	104	PaR	PaR
Leven	46	182	0.83	1.21	1.40	42	175	109	58	119	170	186	62	125	167	PaR	PNaR
Crake	16	194	0.32	0.43	0.27	57	104	152	119	91	45	29	13	60	86	PaR	PaR
Duddon (& Lickle)	26	121	0.31	0.62	1.06	357	427	540	343	316	177	230	342	548	342	PNaR	PNaR
Esk	20	181	0.37	0.49	0.48	78	64	176	112	156	147	98	120	169	130	PNaR	PNaR
Irt	35	198	0.69	1.04	0.43	81	192	192	143	164	42	44	63	87	62	PaR	PaR
Ehen	41	230	0.94	1.99	1.16	216	513	371	220	279	162	75	116	181	124	PaR	PaR
Calder	13	261	0.33	0.52	0.03	79	204	174	124	91	34	22	16	42	8	AR	AR
Derwent	213	185	3.93	6.75	2.91	211	306	271	152	144	82	58	90	162	74	PaR	PaR
Eden	688	200	13.75	16.87	12.34	139	128	115	105	65	52	99	114	93	90	PaR	PaR
Esk-Border [d]	306	255	7.79	11.31	14.62	113	196	191	125	67	68	71	90	81	188	PaR	PaR
Wales																	
Wye	1,721	224	38.57	49.31	21.15	35	25	50	79	79	43	95	132	96	55	PaR	PaR
Usk	407	248	10.11	15.42	6.43	97	99	137	222	122	97	160	228	235	64	PaR	PaR
Taff & Ely	146	219	3.19	3.47	0.26	14	25	34	25	30	15	43	26	17	8	AR	AR
Ogmore	61	180	1.10	1.37	0.07	48	110	52	47	17	36	32	27	25	6	AR	AR
Tawe	88	211	1.85	2.31	0.20	58	114	55	34	37	24	26	28	31	11	AR	AR
Tywi	500	226	11.30	15.08	7.51	85	178	120	78	84	41	52	82	119	66	PaR	PaR
Taf	90	189	1.70	2.70	0.51	68	268	122	78	58	53	85	31	54	30	AR	PaR
E&W Cleddau	87	179	1.55	1.75	0.36	69	61	44	55	37	35	45	24	48	23	AR	AR
Teifi	326	265	8.65	11.41	1.26	47	141	97	62	53	47	30	32	28	15	AR	AR
Rheidol	31	222	0.68	0.79	0.08	31	37	62	46	66	35	24	30	6	12	AR	AR
Nevern	19	259	0.48	0.60	0.21	33	91	57	60	81	89	127	72	117	43	PaR	PaR
Dyfi	179	235	4.21	5.38	1.91	56	93	125	70	24	16	29	50	56	45	AR	PaR
Dysinni	31	216	0.68	0.73	0.09	13	11	0	30	18	6	17	24	11	14	PaR	PaR
Mawddach	57	242	1.37	2.05	1.23	99	236	199	199	73	75	106	144	167	90	PaR	PaR
Dwyryd	9	201	0.19	0.25	0.12	72	52	116	44	56	74	83	48	186	66	PaR	PaR
Glaslyn	25	191	0.48	0.64	0.26	106	78	122	107	193	104	147	68	88	55	PaR	PaR
Dwyfawr	33	258	0.86	1.02	0.07	15	79	43	27	19	30	15	38	4	9	AR	PaR
Seiont	21	226	0.48	0.76	0.04	99	214	127	158	49	21	15	37	41	9	AR	AR
Ogwen	24	362	0.87	1.55	1.07	216	347	244	231	112	39	135	101	270	124	PaR	PaR
Conwy	63	185	1.17	1.89	2.03	153	331	200	164	107	76	100	134	221	174	PaR	PaR
Clwyd	84	237	1.99	3.33	0.19	104	233	175	138	33	15	14	17	48	9	AR	AR
Dee	617	248	15.30	16.80	13.79	106	80	85	87	79	80	68	66	73	90	AR	PaR
E & W Total			**262.75**	**365.39**	**197.21**												

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

Key:
[a] *Estimates include eggs contributed by rod-released fish.*
[b] *Basis for current and predicted compliance explained in background report (see text for details).*
[c] *Provisional salmon counts now used on the Tyne to estimate egg deposition.*
[d] *Prior to 1 April 2005, Border Esk egg deposition estimates were based only on English rod catch and likely to be undersestimates.*

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 2018 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, 1993-2018.

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	26	41	24	38	14	22
2001 [a]	20	34	19	33	19	33
2002	27	42	20	31	17	27
2003	20	31	16	25	28	44
2004	41	64	15	23	8	13
2005	31	48	18	28	15	23
2006	37	58	15	23	12	19
2007	32	50	17	27	15	23
2008	42	66	16	25	6	9
2009	23	36	24	38	17	27
2010	38	59	17	27	9	14
2011	40	63	15	23	9	14
2012	35	55	16	25	13	20
2013	21	33	26	41	17	27
2014	14	22	20	31	30	47
2015	23	36	19	30	22	34
2016	22	34	19	30	23	36
2017	30	47	16	25	18	28
2018	14	22	26	41	24	38
Average % 1993-2018		45		30		25

Key: [a] *No CL possible for 6 rivers due to impact of foot and mouth disease.*
Notes: Data for 2018 are provisonal.

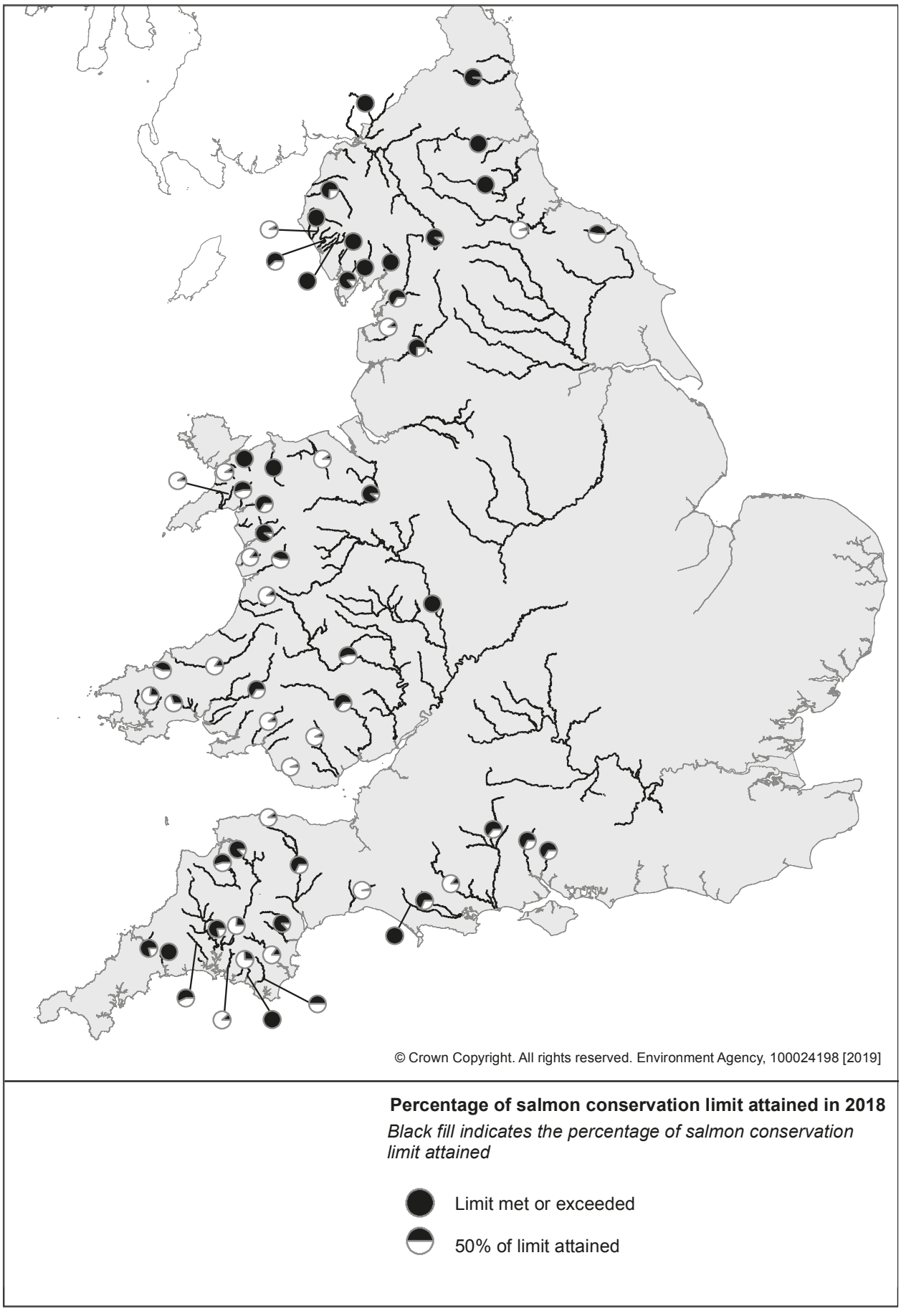

Figure 30. Pie charts for individual rivers for which Conservation Limits (CLs) have been set showing the % of the CLs attained in 2018.

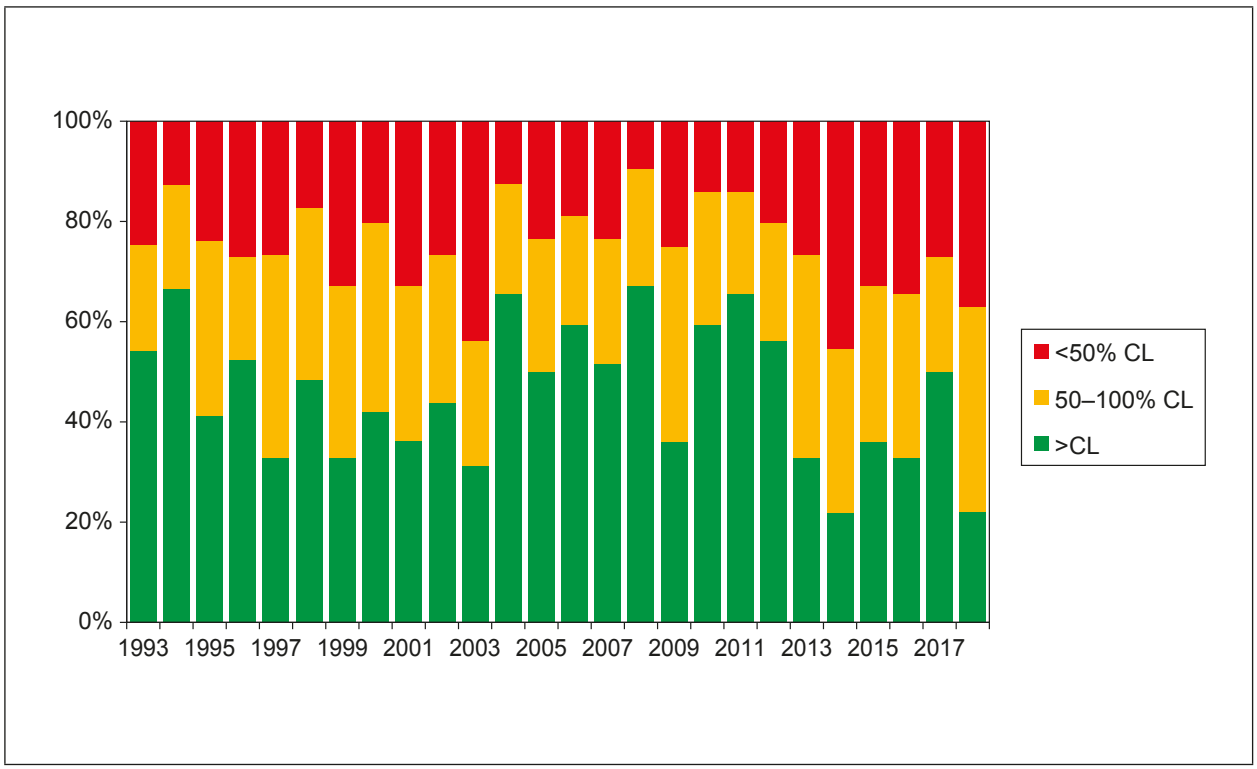

Figure 31. Percentage of salmon river stocks exceeding their Conservation Limit (CL), between 50% and 100% of the CL, and less than 50% of the CL, 1993-2018. Data for 2018 are provisional.

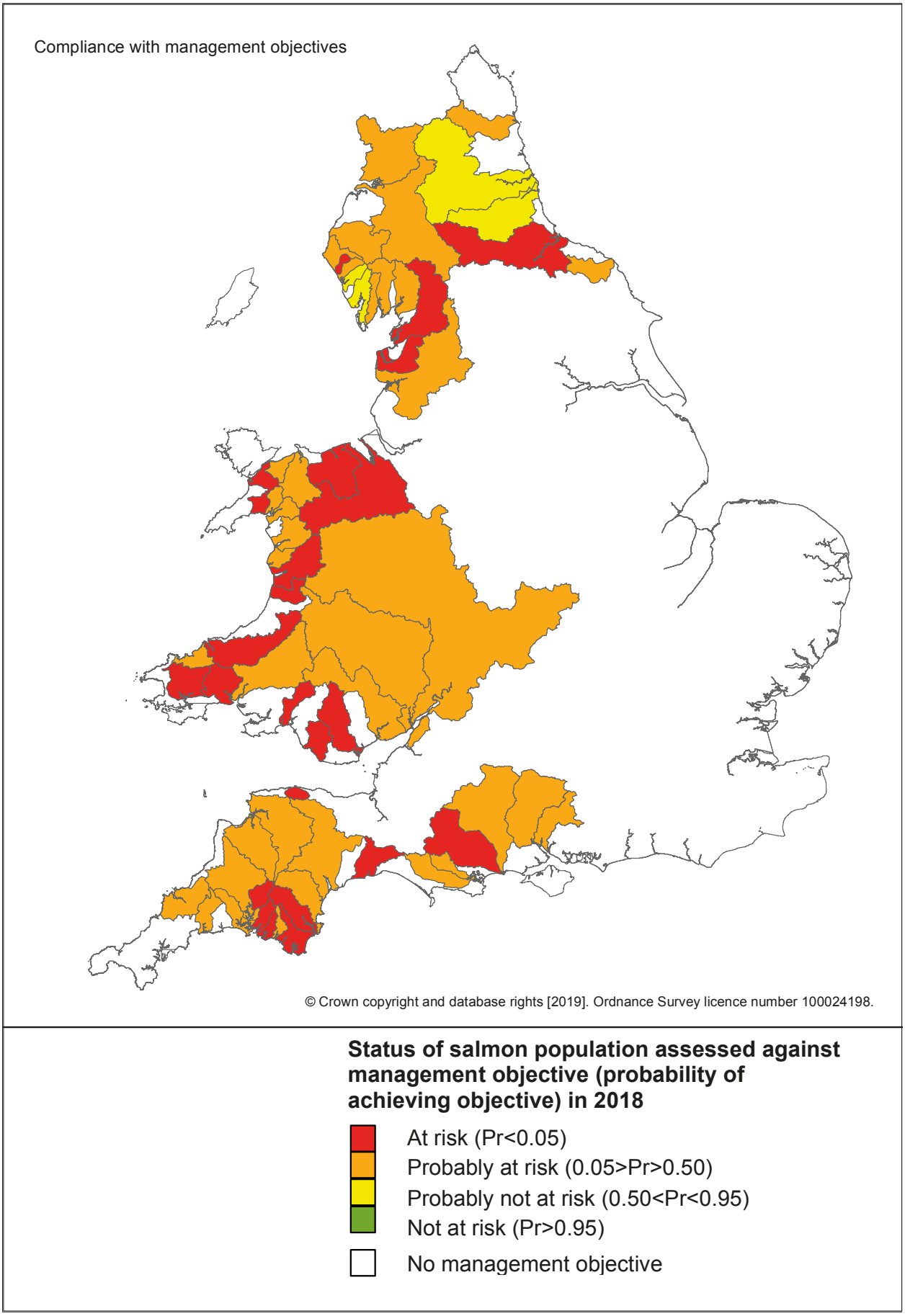

Figure 32. Status of river catchments in 2018 assessed against the management objective (i.e. that the CL is met or exceeded in at least 4 years out of 5).

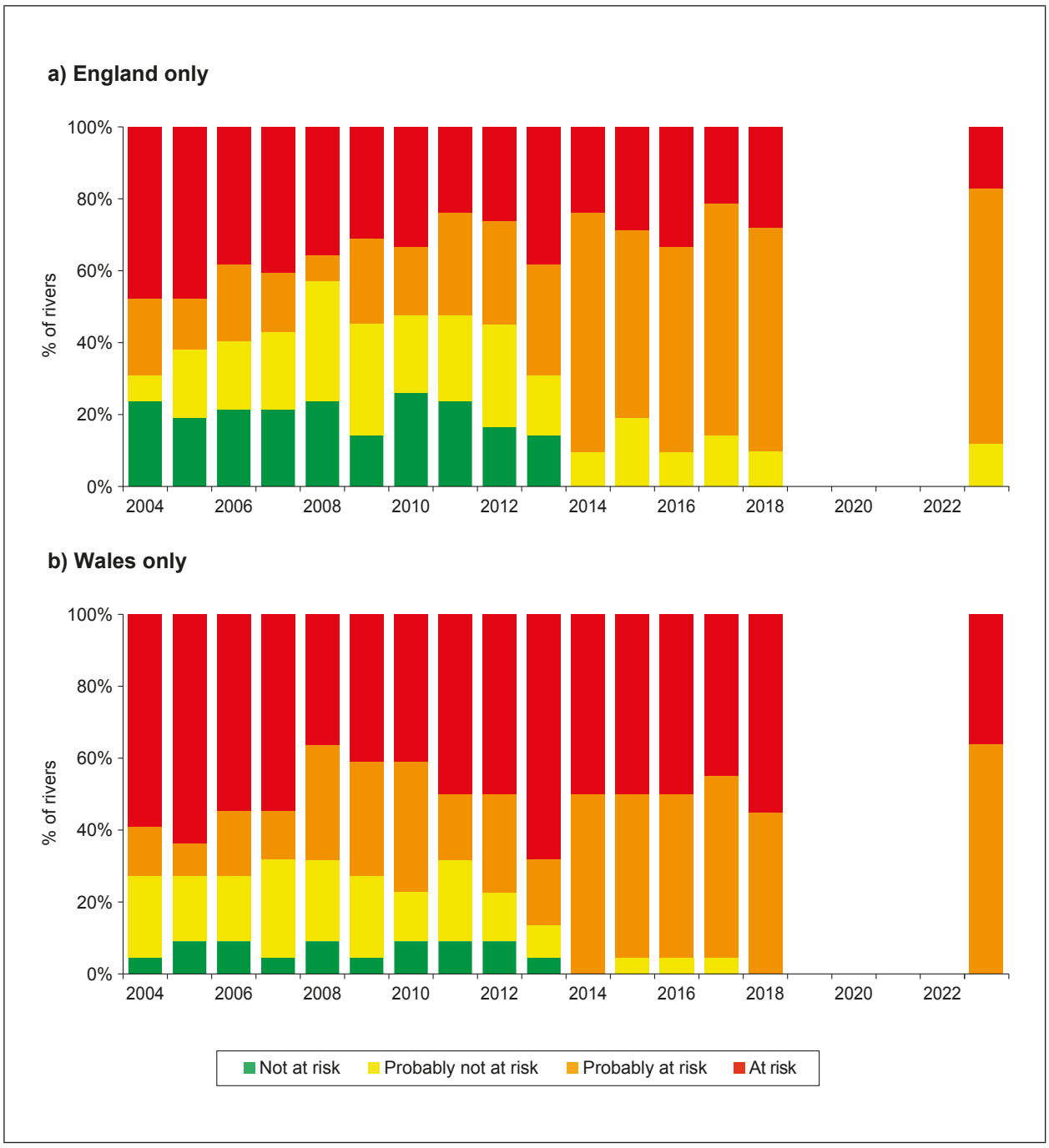

Figure 33. Percentage of principal salmon rivers in each risk category, assessed against the management objective, for 2004-2018, and as projected for 2023 for rivers in (a) England and (b) Wales.

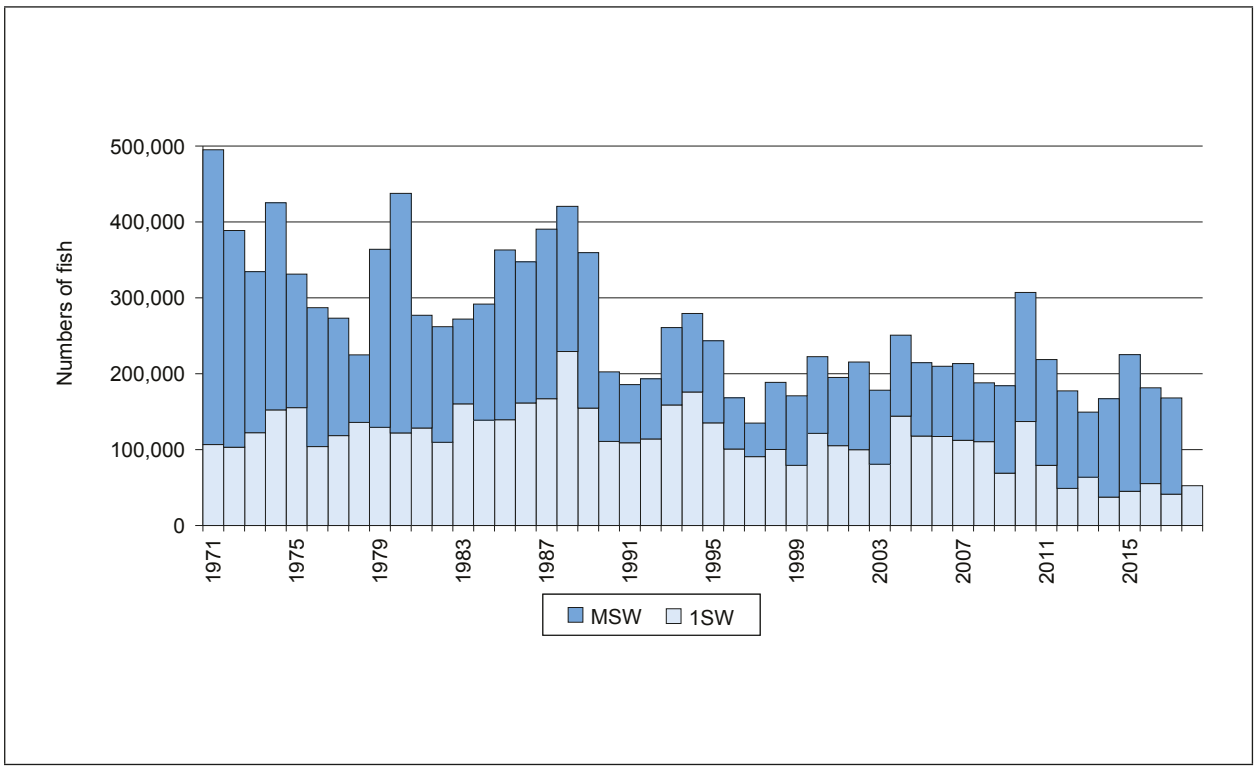

Figure 34. Estimated Pre-fishery Abundance (PFA) of salmon from UK (England & Wales), 1971-2018, as derived from the ICES-NEAC PFA model, 2018. Note no estimate for MSW salmon in 2018 because the model cannot provide an estimate of PFA of potential MSW fish for the most recent year, as this relies on an assessment of the returns to homewaters of these fish, which will not occur until the subsequent year.

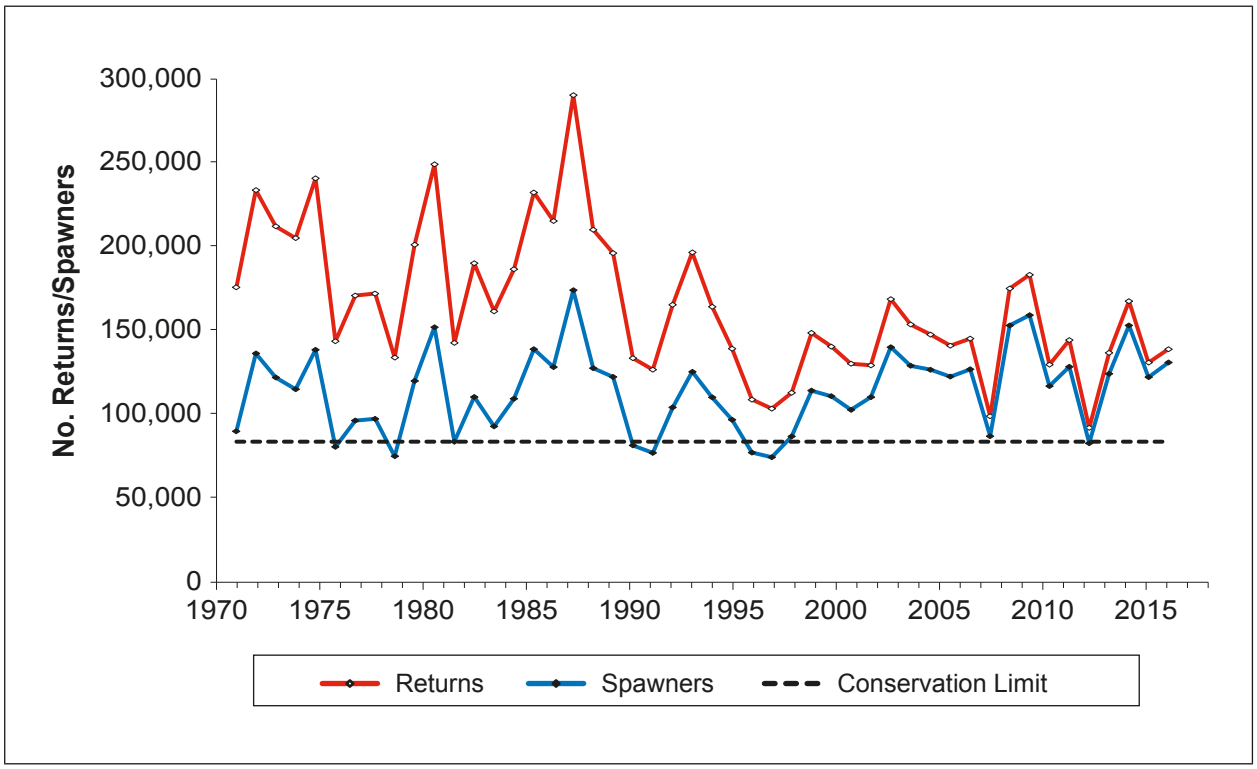

Figure 35. Estimated numbers of returning and spawning salmon for UK (England & Wales), 1971-2018, as derived from the ICES-NEAC PFA model, 2018, together with the national Conservation Limit (derived from the sum of river-specific CLs).

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 independently developed a range of new measures to protect salmon stocks in England and Wales, respectively. This followed initial consultations to better understand how further regulation of salmon fishing might help to safeguard stocks. New measures have now been approved in England (coming into effect in 2019), but remain subject to confirmation in Wales pending the outcome of a Local Inquiry and may not come into force until 2020. The measures include the closure of many net fisheries (or for requirements to release any salmon caught where a fishery is authorised to continue to operate for sea trout) and for requirements to achieve very high levels of C&R in rod fisheries (including mandatory C&R on rivers with the lowest stock status in England and for all rivers in Wales). In Wales, some restrictions have also been proposed on the methods used (e.g. number, size and type of hooks) when angling. Full details of the new provisions are provided in the background report.

As well as further controls on exploitation, a range of other actions are being taken forward in both England and Wales to better protect salmon and the habitats in which they live. Progress on these actions is summarised in the England and Wales Annual Progress Reports to NASCO, available at: http://www.nasco.int/implementation_plans_cycle2.html

In addition to the above, a number of measures aimed at better management of this valuable resource have 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 80% 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 have remained in place since this time.

- 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). From 2019, the two remaining coastal mixed stock fisheries in England will be prevented from landing salmon. The drift net fishery on the north east coast will close and fishing by T & J nets will be restricted to sea trout, with mandatory C&R required for any salmon caught. Mandatory C&R will also be required for any salmon taken in the Anglian coastal fishery.

- Previous 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, fixed engine and rod fisheries and are expected to continue to apply.

- The introduction of new fishery restrictions in Ireland in 2007, including the cessation of coastal drift netting, was estimated at the time to have resulted in up to 5,000 more grilse returning to homewaters, particularly 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 a mean of 6.4% for the period since 1999, and these fish are required to be released.

- C&R has represented an increasingly important measure for stock conservation. The proportion of salmon released by anglers has increased steadily from 10% in 1993 to at or above 60% in the last nine years (88%, provisionally, in 2018, the highest in the time series). Tracking studies suggest that, if handled appropriately, the majority of released salmon go on to spawn successfully. The measures recently approved in England, and the proposed new measures in Wales, will be seeking to further increase levels of C&R.

- A range of non-statutory restrictions on methods and fishing areas have also been imposed by fishery owners and angling associations. These include measures such as weekly and seasonal bag limits and method restrictions aimed at improving the survival of fish after C&R.

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 2018:

The effect of river flows on angler effort and catches

For rod fisheries, river flow is a key factor affecting angler effort. In 2018, river flows were above the long-term average in March and April, but below the long-term average for the remainder of the fishing season up until October due to a prolonged dry summer and autumn (Figure 36). Flows in the summer months (June to August) were particularly low. Periodic freshets are important for stimulating river entry and upstream migration of salmon and in improving angling opportunities. As such, the conditions for angling in 2018 were considered particularly poor for much of the season and this will have affected fishing effort and catches.

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 C&R 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.

The poor conditions for angling and the poor runs are reflected in the reported catch. Median monthly rod catches in 2018 were well below the long-term average over the entire fishing season from February to October, with median catches after April less than 50% of the long-term average. The 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 continued low abundance of 1SW salmon (Figure 19) is likely to have been a significant contributory 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 (many MSW fish return earlier in the season) will have an impact on catch rates, in addition to river flows.

Above average temperatures

As well as being relatively dry, conditions during the summer of 2018 were also relatively warm resulting in above average water temperatures in many river catchments. Elevated temperatures can affect the survival of salmon subject to C&R and measures to prevent this can substantially reduce angling effort. For example, on the Hampshire Avon there is a voluntary agreement not to fish when the river temperature, measured at 09:00 at a fish counter site (Knapp Mill), exceeds 19ºC. In 2018, this threshold was exceeded on 44 days during the fishing season and during the period 26 June to 10 August, anglers were only able to fish on 4 days. Similar voluntary restrictions on angling will have applied on other catchments and affected effort and catches.

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 from 1978 to 2016. The data are provided for a single month, August. Further discussion on these price changes is provided in the background report.

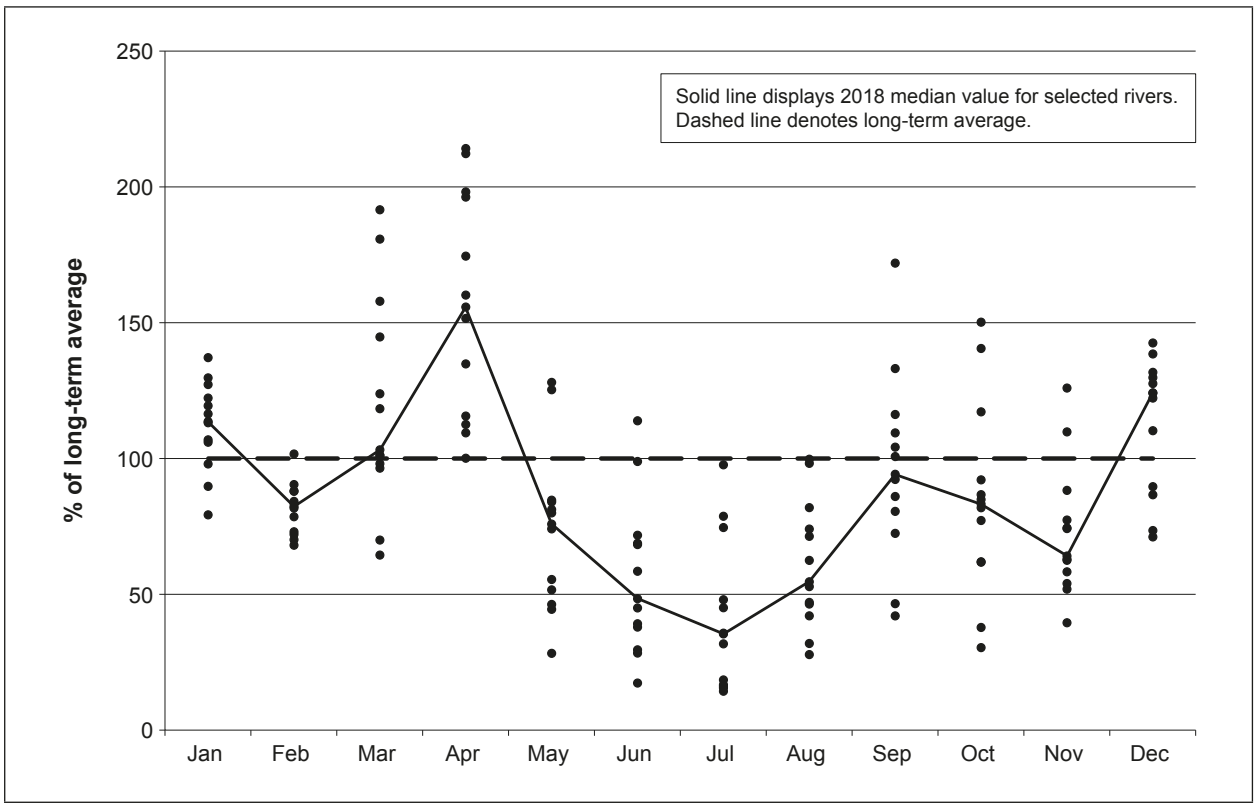

Figure 36. Monthly mean river flows (cubic metres per second) in 2018 for 12 rivers (South Tyne, Itchen, Avon, Exe, Taw, Severn, Wye, Cynon, Teifi, Dee, Lune and Eden) in England & Wales, expressed as a percentage of the long-term average on each river for the same month. (Data supplied courtesy of the 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.

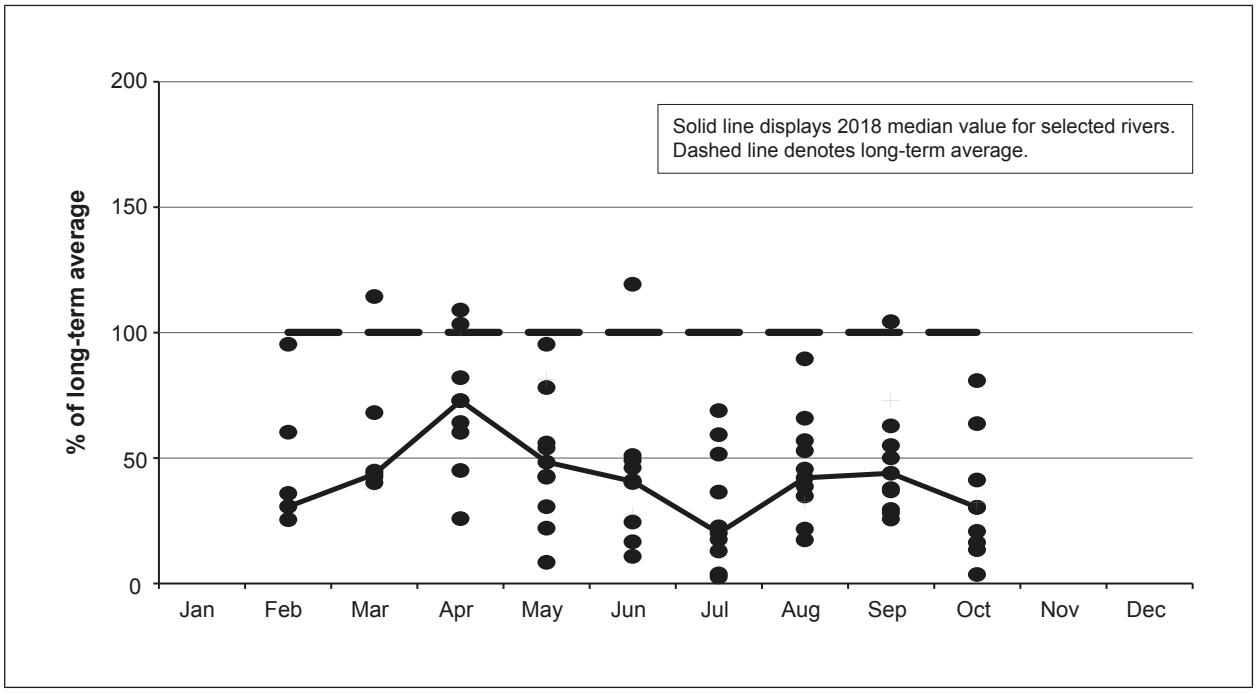

Figure 37. Monthly rod catches in 2018 for 11 rivers (Tyne, Itchen, Avon, Exe, Taw, Severn, Wye, Teifi, Dee, Lune and Eden) in England & Wales, expressed as a percentage of the long-term average on each river for the same month. The long-term average is derived from data for the period since 1999.

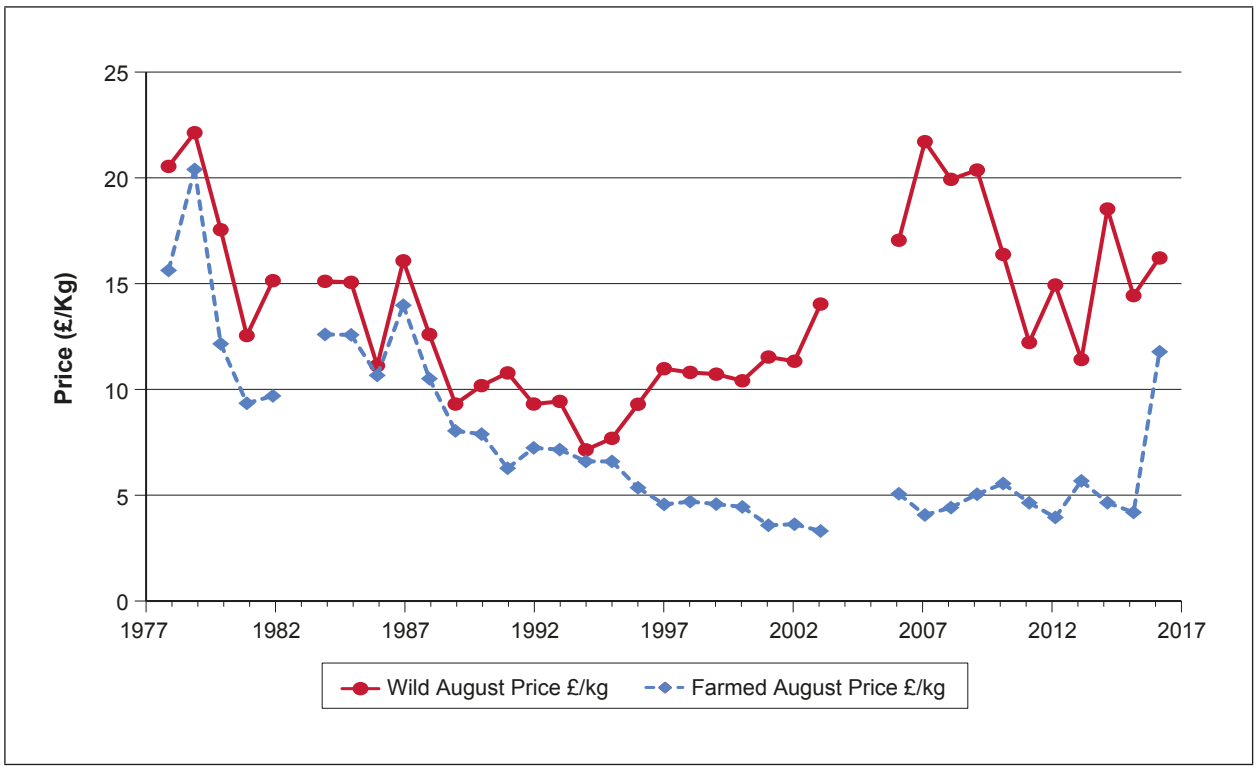

Figure 38. The average price of farmed salmon and wild Scottish salmon sold in August at Billingsgate, London, 1978 to 2016.

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. 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 five years and sampling effort has been substantially reduced at two others. For all sites, the incidence of RVS was higher in 2018 than the previous year, with levels on the Dee and Lune the highest in the time series. For the River Lune, the high values in the last two years include a higher proportion of fish than usual exhibiting mild symptoms of the disease. It is unclear whether the increased prevalence of RVS may have been linked to the above average temperatures observed in 2018 (Section 9).

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 for 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. 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. This work has included genetic comparisons of samples obtained over the last two years to help identify the diversity and behaviour of this fungal-like pathogen in rivers across England and Wales. Nationally, 2018 was a quiet year for *Saprolegnia*, with only a small number of isolated reports across the country. These were considered to be within natural levels for this disease.

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 an earlier report. The effects of this event are, however, likely to continue to be impacting on

current stock status. 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, consistent with the poor juvenile recruitment in 2016. Adult returns on the Frome were also relatively poor in 2018 (Table 23). For rivers where the majority of smolts migrate as two-year-olds, smolt output may well have been below average in 2018 and this will be expected to affect numbers of returning adults in 2019 and 2020.

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 remains unclear whether the marked increase in numbers in 2017 represented a one-off occurrence, due to particularly favourable conditions for a cohort of fish, or whether this might mark the start of a wider range expansion by the species.

Table 28. Percentage of returning salmon showing signs of Red Vent Syndrome in monitored rivers in England and Wales, 2005-2018.

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 [a]
2008	0.8	45.3	20.9	24.7	0.3 [a]
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 [a]	6.1
2013	10.1	44.5 #	20.5	41.6	0.8 [a]
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 # [b]	n/a
2018	7.4	38.9 #	34.7	60.8 # [b]	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. Tyne estimates, from 2012, are based on fish captured up river for use as broodstock.

[a] Considered minimum values.

[b] A high proportion of returns had mild symptoms in 2017 and 2018.

11. REFERENCES

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ICES. 2019. Report of the Working Group on North Atlantic Salmon (WGNAS). ICES Scientific Reports. 1:16, 368 pp. http://doi.org/10.17895/ices.pub.4978

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ANNEX 1. NASCO's request for scientific advice from ICES in 2019

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 2018[1];

1.2 report on significant new or emerging threats to, or opportunities for, salmon conservation and management[2];

1.3 provide a compilation of tag releases by country in 2018; and

1.4 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 2018 fisheries[3];

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;

In the event that NASCO informs ICES that the Framework of Indicators (FWI) indicates that reassessment is required: (The aim should be for NASCO to inform ICES by 31 January of the outcome of utilising the FWI).

2.4 provide catch options or alternative management advice for the 2019/20 – 2021/22 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[4]; 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 2018 fisheries (including the fishery at St Pierre and Miquelon)[3];

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;

In the event that NASCO informs ICES that the Framework of Indicators (FWI) indicates that reassessment is required: (The aim should be for NASCO to inform ICES by 31 January of the outcome of utilising the FWI).

3.4 provide catch options or alternative management advice for 2019-2022 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[4]; 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 2018 fisheries[3];

4.2 describe the status of the stocks[5];

In the event that NASCO informs ICES that the Framework of Indicators (FWI) indicates that reassessment is required: (The aim should be for NASCO to inform ICES by 31 January of the outcome of utilising the FWI).

4.3 provide catch options or alternative management advice for 2019-2021 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[4]; 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. *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.*
4. *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.*
5. *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 2017	2027		Drift (hang or whammel) nets	1
	North	River Kent Estuary 2013	2023		Lave net	6
	North	River Leven Estuary 2013	2023		Lave net	2
	North	Solway Firth 2018	2028		Heave or Haaf net	75 [a]
Southern	Solent & S Downs	Southern Region Byelaw 2018	n/a		Seine	1 [b]
South West	Cornwall	Camel Estuary 2013	2018		Draft, seine, drift or hang net	6 [c]
	South Wessex	Christchurch Harbour 2012 (Hants Avon & Stour)	2022		Draft or seine net	0
	South Wessex	Poole Harbour 2017 (Piddle & Frome)	2027		Seine net	1 [d]
	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 [e]
	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 2017	2028	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 & Dwyryd	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	2025		Draft or seine net	0
					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.

Key:
[a] Byelaw also introduced for Solway (Eden & Esk) on 24 May 2018 requiring mandatory release of all salmon caught; byelaw in force for 10 years.
[b] Southern Region NLO replaced in 2018 by byelaw (not time-limited). This precludes all netting for salmon and sea trout in the Region with the exception of a single seine net authorised by the Environment Agency for the capture of sea trout only in the estuary of the River Beaulieu.
[c] Fishing currently precluded on the River Camel under the terms of an emergency byelaw; this expires on 30 April 2019.
[d] Poole Harbour NLO worded as: "Such number as is equal to the number of applicants who in the preceding year held a fishing licence for salmon and sea trout in Poole Harbour". Under the previous NLO a single licence applied and only one net has operated in recent years.
[e] River Fowey seine net compensated not to fish in recent years. A new NLO is currently pending confirmation; this would be be a zero NLO accompanied by a buy-out of the one remaining licensee. This would mean that there would no net fishing on the river for the duration of the new NLO (10 years).

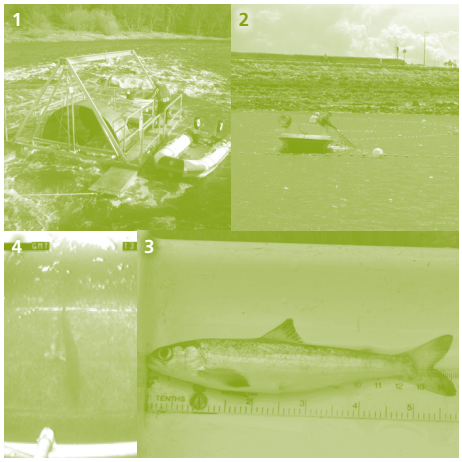
ANNEX 3. Byelaws applying to salmon rod fisheries in England and Wales

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 (Byelaw dis-applied during 2018 to facilitate spinning trial; anglers able to fish with artificial lure with fishery owner's permission 01/02/18 to 15/05/18, subject to specific conditions).		
	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	No worming for salmon; single barbless hooks on spinners, plugs, artificial lures; maximum gape on artificial flies of 8mm; prawn and shrimp barbless hook gape <8mm.	Mandatory C&R applies as well as bait and method restrictions under emergency byelaw.	30/10/2017 – 30/04/2019

EA Region / NRW	River	Salmon Season (inclusive dates)	*Method Restrictions	*Bag limits/Catch and Release etc.	Effective from (date); expires (date)
	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		
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		
	Dwyryd	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		

EA Region / NRW	River	Salmon Season (inclusive dates)	*Method Restrictions	*Bag limits/Catch and Release etc.	Effective from (date); expires (date)
	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		
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 unless marked with a carcass tag. Number of tags available is based on the previous year's salmon stock assessment (currently 3 for whole season).	10.06.2016 – 09.06.2023
	Crake	1.2 - 31.10		Byelaw requiring release of all salmon after capture unless marked with a carcass tag. Number of tags available is based on the previous year's salmon stock assessment (currently 3 for whole season).	10.06.2016 – 09.06.2023
	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		Byelaw - two salmon per angler per day bag limit between 16.6 and 31.10; all female salmon caught between 01.10 and 31.10 to be returned.	24.05.2013 – 23.05.2023
	Ellen	1.2 - 31.10			
	Eden	15.1 - 14.10		Byelaw requires that all salmon be released immediately between 16.6 and 14.10 (national spring byelaw covers early part of season).	24.05.2018 - 23.05.2028
	Esk (Border)	1.2 - 31.10		Byelaw requires that all salmon be released immediately between 16.6 and 14.10 (national spring byelaw covers early part of season).	24.05.2018 - 23.05.2028
	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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