

# Know Your River – Glaslyn Salmon & Sea Trout Catchment Summary

## Introduction

This report describes the status of the salmon and sea trout populations in the Glaslyn catchment. Bringing together data from rod catches, stock assessments and juvenile monitoring, it will describe the factors limiting the populations and set out the challenges faced in the catchment.

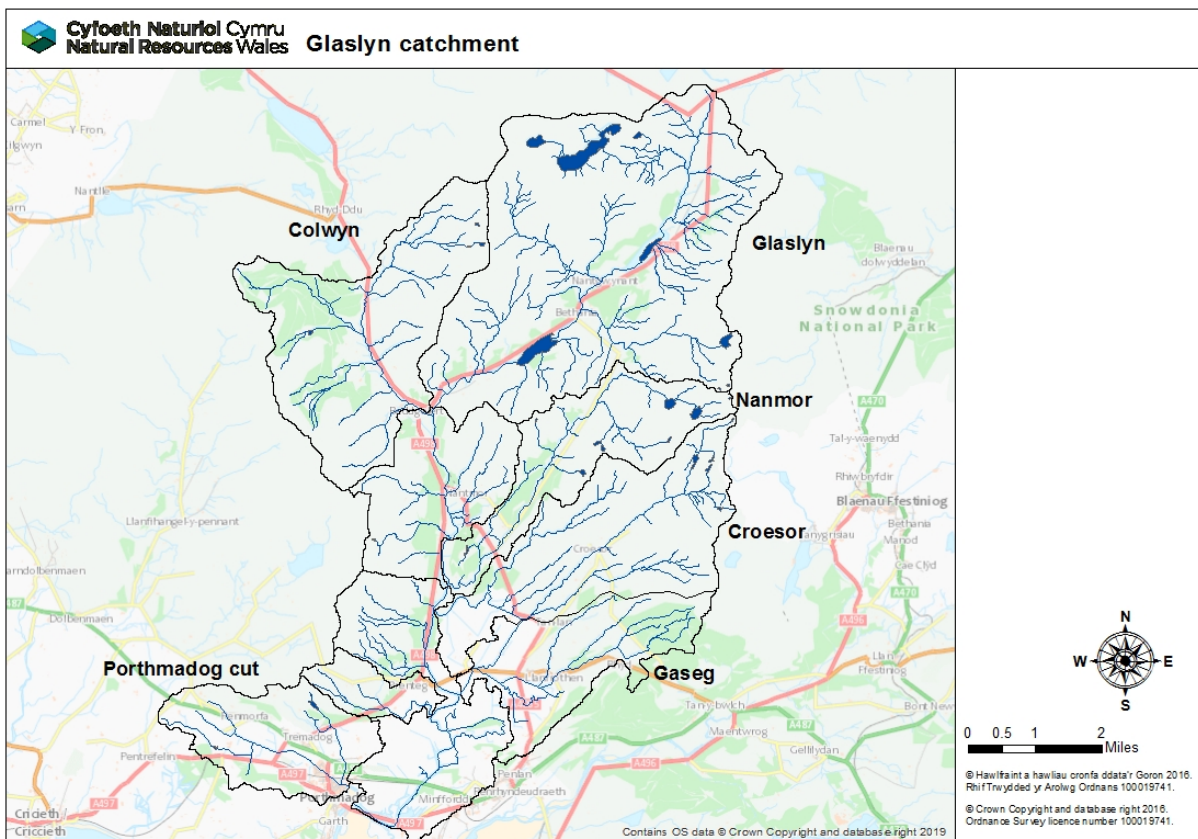
Action tables set out habitat improvements to restore freshwater productivity of salmon and sea trout populations. These tables also include some work which will be carried out by our partner organisations, not just Natural Resources Wales (NRW).

NRW has a duty, defined in the Environment (Wales) Act 2016 to have Sustainable Management of Natural Resources (SMNR) at the core of everything that we do. By applying the principles of SMNR in all of our activities - from agriculture, forestry and flood defence to development planning - we are undertaking catchment-wide initiatives that will deliver for fish stock improvements. Our reports highlight the importance of considering the whole catchment when identifying and addressing fisheries issues; and of working with partners.

NRW is committed to reporting on the status of salmon stocks in all of our principal salmon rivers for the Salmon Action Plans and condition assessments under the Habitats Directive in SAC rivers; all fish species in all of our rivers are reported for the Water Framework Directive (WFD). This report will fulfil these commitments and provide an informative and useful summary of stock status and remedial work planned, for our customers, specifically anglers, fishery and land owners; as well as our partners.

## Catchment

The Glaslyn is predominantly rural with sheep farming in the upper reaches of the catchment, gradually changing to mixed sheep and beef further down the valley. The Glaslyn valley holds a small number of large scale dairy units. There is a large area of afforestation situated on the afon Colwyn.



The soils are glacial in origin and are generally thin, poor, peaty and acidic, but are enriched in places by mineral ores from underlying rocks. The evidence of small scale mineral working of copper and zinc is widespread throughout the Glaslyn catchment, however there are no active metal mines at present. The Sygun copper mine at Beddgelert has been opened as a tourist attraction.

This mountainous area, directly open to the prevailing south westerly winds, receives heavy rainfall. Although the acidity of rainwater is not high, the volume of rain falling in the area gives rise to high annual acid deposition. In the absence of neutralising bases within the thin soils, these areas are 'acid vulnerable' and as a result their water courses are subjected to periodic acid flushes which can reduce water quality and salmonid fish survival. In addition, the abundance of old mine workings, slate quarries and coniferous afforestation are known to exacerbate the impact of acidification in parts of the Glaslyn catchment.

## Rod Catches

The following tables show the total declared rod catches of salmon and sea trout on the Glaslyn, and also the catch per licence day (CPLD). CPLD is an estimate of the average catch per fishing day on a catchment.

**Salmon Rod Catch** – declined compared to 2017, and is the lowest in the past ten years. Catches may have been influenced by the high temperatures and low flows between May and July. The release rate was 50% which is very poor and must improve to conserve stocks.

Year	Caught	Rod Killed	Rod Released	10 Year mean	Percentage released	Catch per license day
2018	10	5	5	24	50	0.03
2017	16	2	14	27	88	0.03
2016	14	3	11	28	79	0.03
2015	27	5	22	29	81	0.05
2014	24	8	16	27	67	0.04
2013	47	22	25	27	53	0.06
2012	26	7	19	23	73	0.04
2011	29	11	18	22	62	0.04
2010	22	9	13	21	59	0.03
2009	22	9	13	19	59	0.03

**Sea Trout Rod Catch** – declined slightly compared to 2017, and is still well below the ten-year average. Catches may also have been influenced by the weather conditions mentioned above. The release rate in 2018 was 82%. This is good and needs to be improved to maintain stocks.

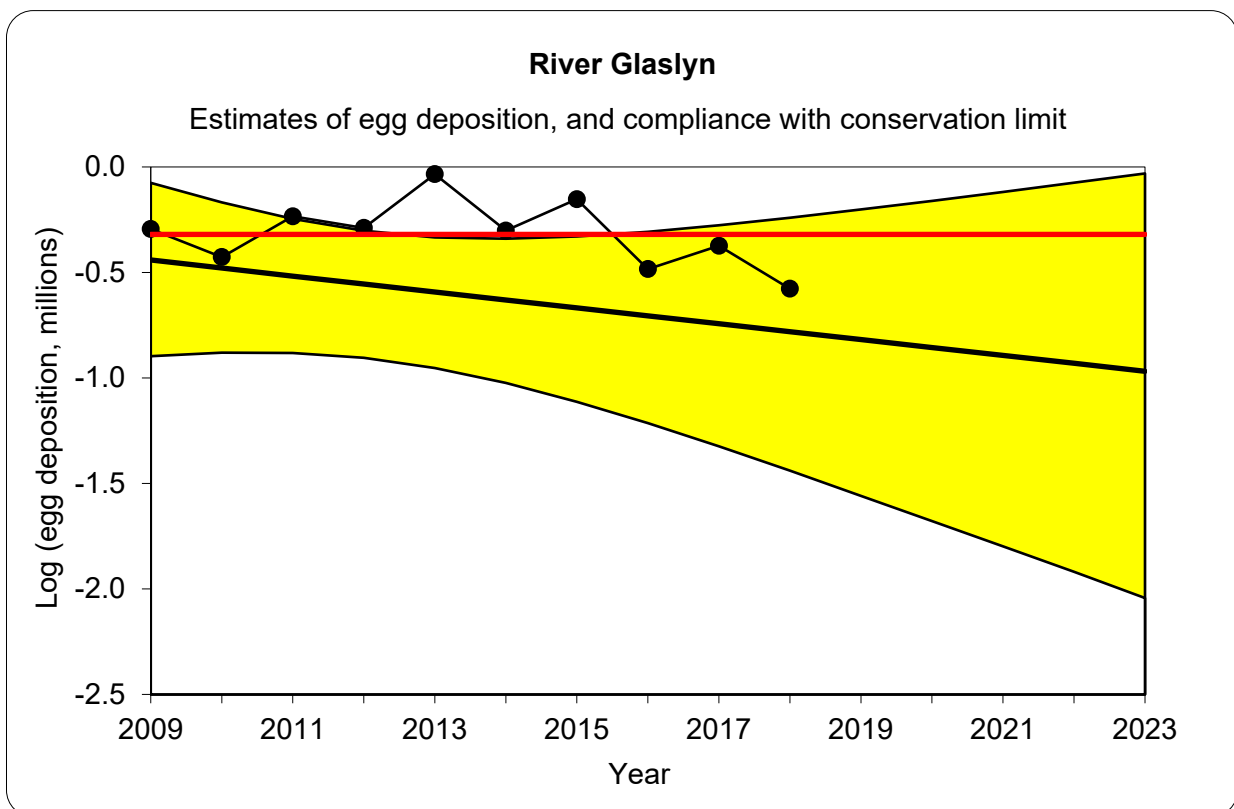
Year	Caught	Rod Killed	Rod Released	10 Year mean	Percentage released	Catch per license day
2018	402	71	331	571	82	1.10
2017	463	88	375	583	81	0.87
2016	307	89	218	605	71	0.62
2015	623	123	500	623	80	1.07
2014	562	108	454	620	81	0.93
2013	863	208	655	621	76	1.09
2012	455	167	288	588	63	0.70
2011	680	267	413	652	61	0.92
2010	826	332	494	608	60	1.02
2009	533	222	311	564	58	0.55

## Stock Status

### Conservation of Salmon

Salmon stock status is assessed using 'Conservation Limits' which provide an objective reference point against which to assess the status of salmon stocks in individual rivers.

This is calculated by applying assumed angling exploitation rates to catch data to derive run estimates; adopting standard sex ratios and weight-fecundity relationships to generate egg deposition figures. The numbers of salmon a river can produce (and consequently the catches that the stocks support) are a function of the quality and quantity of accessible spawning and rearing area. Therefore, in general, big rivers have larger catches and have correspondingly bigger total spawning requirements than small rivers. Thus, for any given rivers there should be an optimum level of stock which the conservation limit seeks to protect. The conservation limit represents the number of eggs that must be deposited each year within a given catchment in order to conserve salmon stocks in the future.



Are enough salmon eggs being deposited to conserve salmon stocks in the catchment?

The red line represents the number of eggs required to be deposited to sustain a healthy salmon stock. The black trend line and its confidence limits (the yellow band) is fitted to the most recent ten-year series of egg deposition estimates (2009-2018).

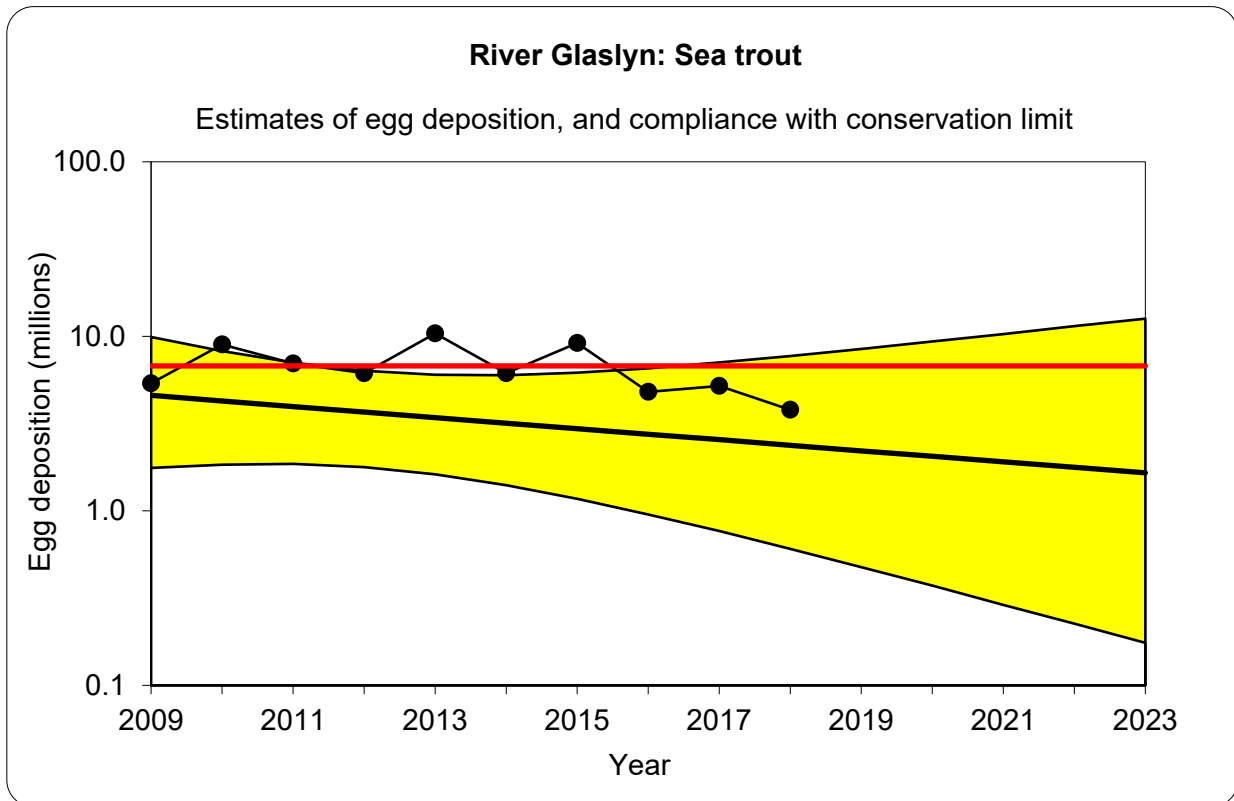
- Current number of eggs being deposited puts stocks **probably at risk**
- In five years' time the predicted status of salmon stocks will be **probably at risk**
- Based on current data, and the projection of the graph, the stocks of salmon on the Glaslyn will continue to **decline (uncertain trend)**

### Conservation of Sea Trout

In contrast to salmon, no established methods of setting Conservation Limits or similar have been available for sea trout. In the absence of such analysis, NRW and the Environment Agency have, for several years, routinely applied a fishery based assessment to the principal sea trout rivers. This method – used previously in this report - utilises time-series' of angling catch per unit effort (CPUE) data ('catch per day') to examine sea trout performance on a river-by-river basis.

Recently an alternative stock-based assessment method has been developed by NRW and is applied here. This utilises angling catch data to derive run and egg deposition estimates for sea trout in much the same way that similar data sets are used in Conservation Limit compliance procedures for salmon assessment.

Further details on this method are given in the recent Technical Case supporting net and rod fishery byelaw proposals on all rivers in Wales and the cross-border rivers Wye and Dee (see: [Technical case for fishing controls to protect salmon and sea trout](#)).



Are enough sea trout eggs being deposited to conserve stocks in the catchment?

The red line represents the number of eggs required to be deposited to sustain a healthy sea trout stock. The black trend line and its confidence limits (the yellow band) is fitted to the most recent ten-year series of egg deposition estimates (2009-2018).

- Current number of eggs being deposited puts stocks **probably at risk**
- In five years' time the predicted status of salmon stocks will be **probably at risk**
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### Juvenile Salmonid Monitoring Programme

In 2019 the temporal (annual) programme consists of one site on the Glaslyn. The temporal data is used to look at trends in juvenile salmon and trout densities giving an indication of how successful spawning has been across the whole catchment.

### Salmon and Trout Classifications

The following table shows the results of the routine juvenile salmonid population surveys from 2019 on the Glaslyn.

The symbols display the National Fish Classification Scheme (NFCS) grades which have been developed to evaluate and compare the results of fish population surveys in a consistent manner. The NFCS ranks survey data by comparing fish abundance at the survey sites with sites across Wales and England where juvenile salmonids are present. Sites are classified into categories A to F, depending on densities of juvenile salmonids at the site. The following table shows the values and classification of NFCS.

Grade	Descriptor	Interpretation
<b>A</b>	Excellent	In the top 20% for a fishery of this type
<b>B</b>	Good	In the top 40% for a fishery of this type
<b>C</b>	Fair	In the middle 20% for a fishery of this type
<b>D</b>	Fair	In the bottom 40% for a fishery of this type
<b>E</b>	Poor	In the bottom 20% for a fishery of this type
<b>F</b>	Fishless	No fish of this type present

Catchment	Site code	Year	Salmon fry grade	Salmon parr grade	Trout fry grade	Trout parr grade
Glaslyn	6	2019	<b>B</b>	<b>E</b>	<b>D</b>	<b>E</b>

## Catchment Population Trends

The table below show a simple comparison of average salmon and trout densities on the temporal site on the Glaslyn catchment since 2010. NB – no surveys were carried out in 2011 due to an alteration in the programme, and the survey was not completed in 2017 due to high flows.

Year	Salmon fry density	Salmon parr density	Trout fry density	Trout parr density
2019	65.1	2.8	6.1	2.0
2018	68.5	3.5	23.2	0.0
2016	95.2	9.1	10.0	1.6
2015	149.2	7.9	14.0	0.0
2014	91.0	4.9	6.1	0.0
2013	58.7	3.9	31.9	0.0
2012	97.0	8.2	6.9	1.6
2010	68.7	7.7	10.8	0.0

Salmon fry and parr densities have declined slightly in 2019 compared to the past five years.

Trout fry and parr densities were poor in 2019, but the habitat is more suited to salmon.

The following table shows a simple comparison of the catchment average density of juvenile salmon and trout at the temporal site from 2019, and compares this to 2018 and the five-year average. Where densities have improved from zero, not allowing the calculation of a percentage improvement, they will be coded with a P (positive).

	0+ Salmon	>0+ Salmon	0+ Trout	>0+ Trout
2019 average density	65.1	2.8	6.1	2.0
2018 average density	68.5	3.5	23.2	0.0
<b>Percentage difference to 2018</b>	<b>-5%</b>	<b>-20%</b>	<b>-74%</b>	<b>P</b>
5-yr average (2014-18)	101.0	6.4	13.3	0.4
<b>Percentage difference to 5-yr average</b>	<b>-35%</b>	<b>-57%</b>	<b>-55%</b>	<b>394%</b>

Juvenile salmon densities across Wales in 2019 have been mixed. The results in 2019 are similar to 2018 on the Glaslyn, but are well below the five-year average. Salmon rod catch has declined since 2015, which is mirrored by the juvenile data. Salmon parr densities have declined annually in recent times which links to the lower fry densities.

Poor trout fry densities in 2019 are more in-line with the historic data. This follows an exceptionally good year in 2018, where low flows created habitat for trout fry at a site which is more suited to salmon. Trout parr densities have always been low at this site and this is due to a lack of suitable habitat.

### Fisheries Action Plan

Site	Planned actions	Benefits	Lead	Partner(s)	Timescale for delivery
Glaslyn	<b>Habitat improvements:</b> We will investigate where there is opportunity to improve habitat for fish through improving access over barriers, restoration of riparian and instream habitat, including control of invasive species.	More natural river system, reduced siltation, increased flow diversity, improved spawning gravels and juvenile habitat. Improved fish numbers.	NRW		On-going
	<b>Water Framework Directive:</b> We will continue to work to ensure no deterioration, monitor the status of the environment and investigate the causes of failures. Together with our partners we will look to put in place measures that protect and improve the status of the water environment.	Waterbodies protected and improved WFD waterbodies achieving Good Status/Potential.	NRW	NRW Wildlife trusts Local authorities Landowner DCWW	On-going
	<b>Enforcement:</b> Action to reduce illegal activity on information provided and investigations.	Reduce illegal activity, more fish remain in the system.	NRW	Stakeholders North Wales Police	On-going