

# 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.



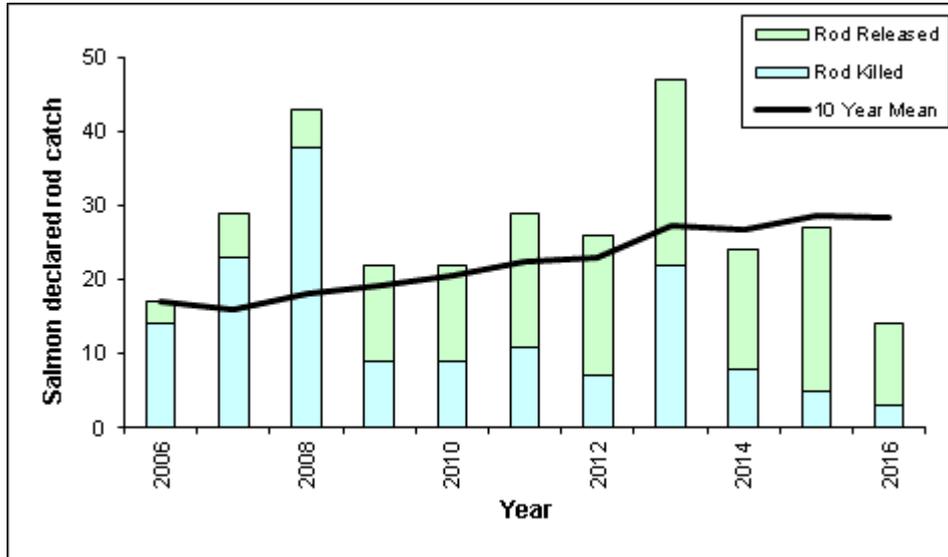
The soils are glacial in origin and are generally thin, poor, peaty and acidic, but are enriched in places by mineral ores from underlying rocks. The evidence of small scale mineral working of copper and zinc is widespread throughout the Glaslyn catchment, however there are no active metal mines at present.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

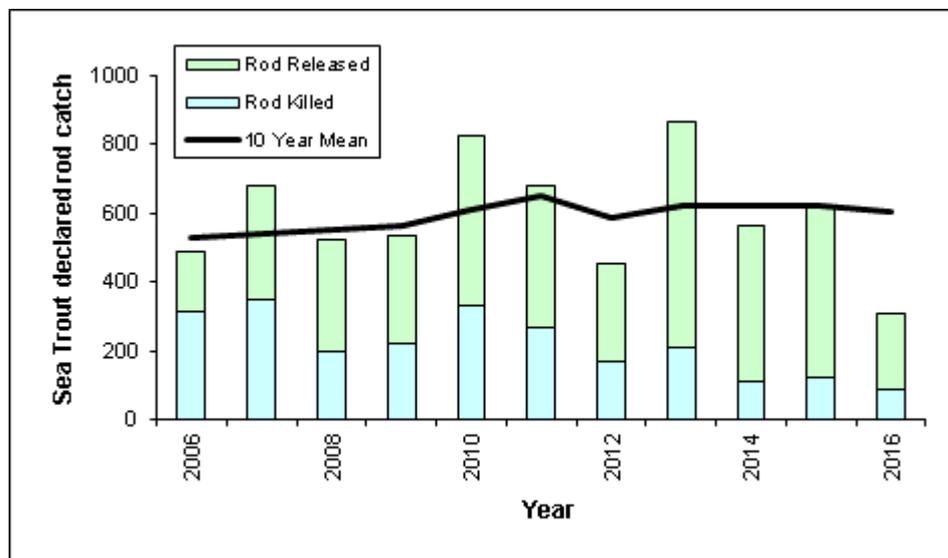
### Rod catches

The following graphs show the total declared rod catches of salmon and sea trout on the Glaslyn.

**Salmon rod catch** – The salmon rod catch in 2016 was the lowest it's been in ten years. The release rate in 2016 was 79%, which is excellent and must continue to conserve stocks. The North Wales average is 62%.



**Sea trout rod catch** – was the lowest it's been on the Glaslyn in the last ten years. The release rate in 2016 was 71%. This needs to improve, the North Wales average is 79%.

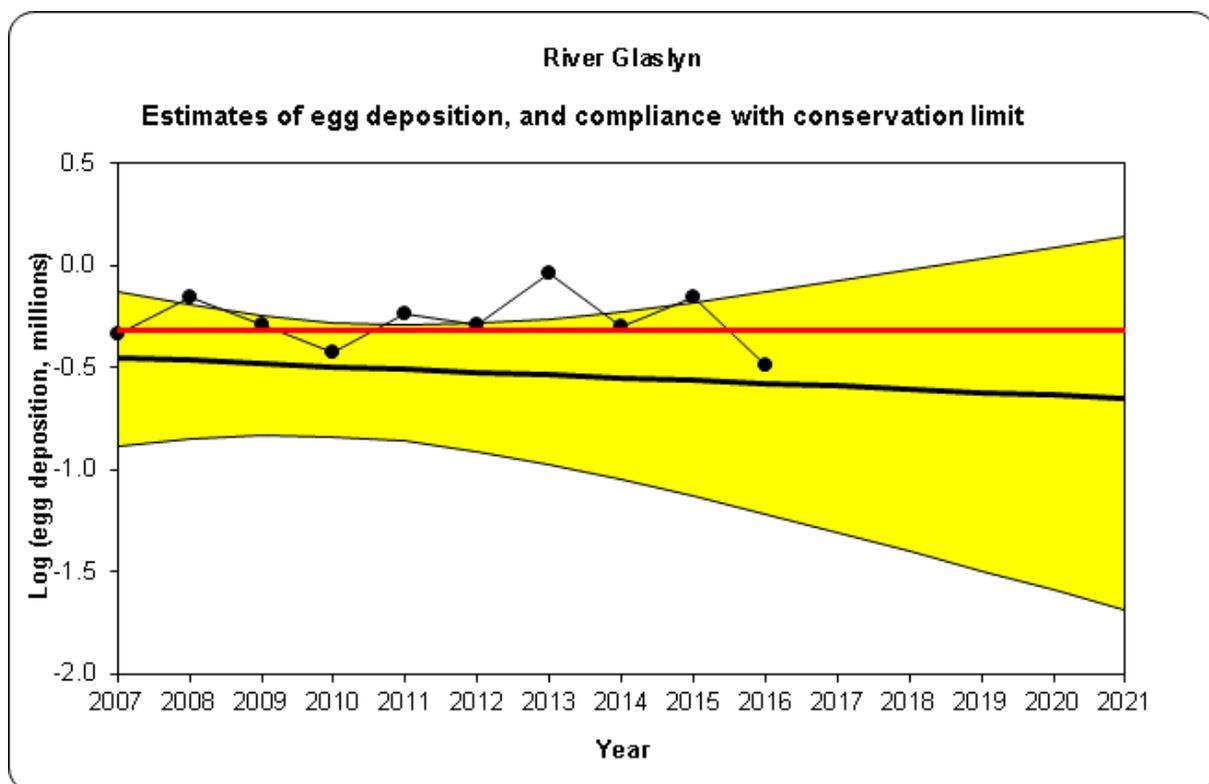


## Stock status

### 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 10-year series of egg deposition estimates (2007-2016).

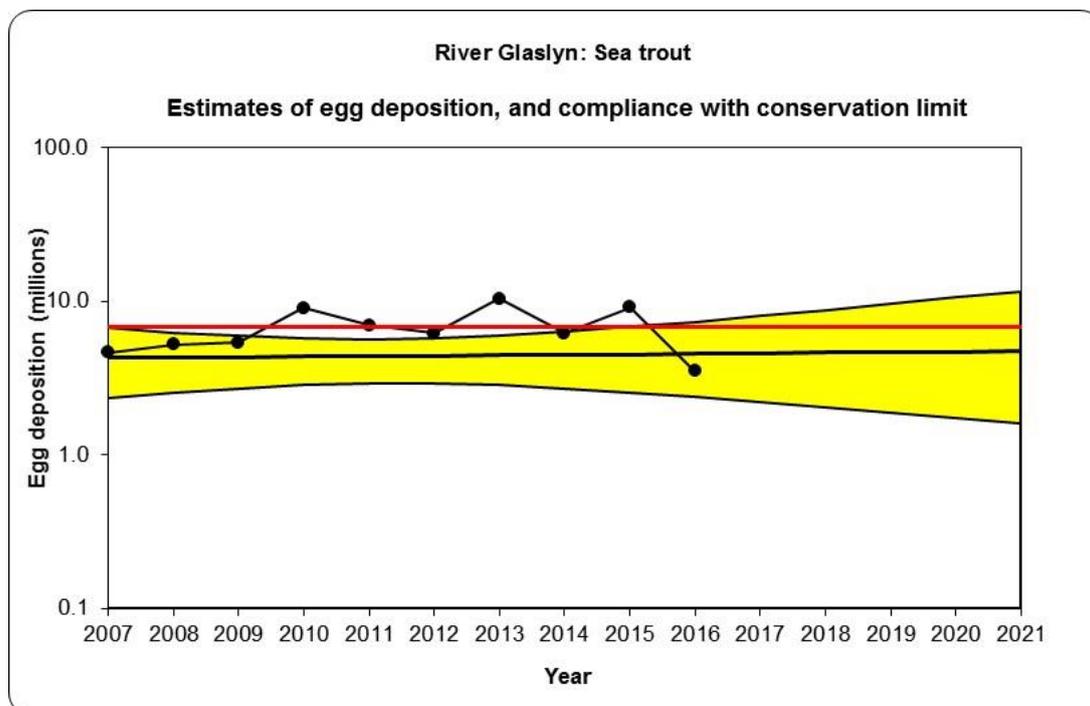
- Current number of eggs being deposited puts stocks **probably at risk**
- In 5 years' time the predicted status of salmon stocks will be **probably at risk**
- Based on current data, and the projection of the graph, the stocks of salmon on the Glaslyn will continue to to **decline (uncertain)**

### 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: <http://naturalresourceswales.gov.uk/media/682258/technical-case-structure-final.pdf>)



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 10-year series of egg deposition estimates (2007-2016).

- Current number of eggs being deposited puts stocks **probably at risk**
- In 5 years' time the predicted status of salmon stocks will be **probably at risk**
- Based on current data, and the projection of the graph, sea trout stocks will continue to **improve (uncertain)** on the Glaslyn

### Juvenile Monitoring

The following map shows the results of the 2015 juvenile salmonid population surveys. They display the National Fish Classification (NFC) grades which have been developed to evaluate and compare the results of fish population surveys in a consistent manner. The NFC ranks survey data by comparing fish abundance at the survey sites with sites nationally 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 NFC.

GRADE	Description	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

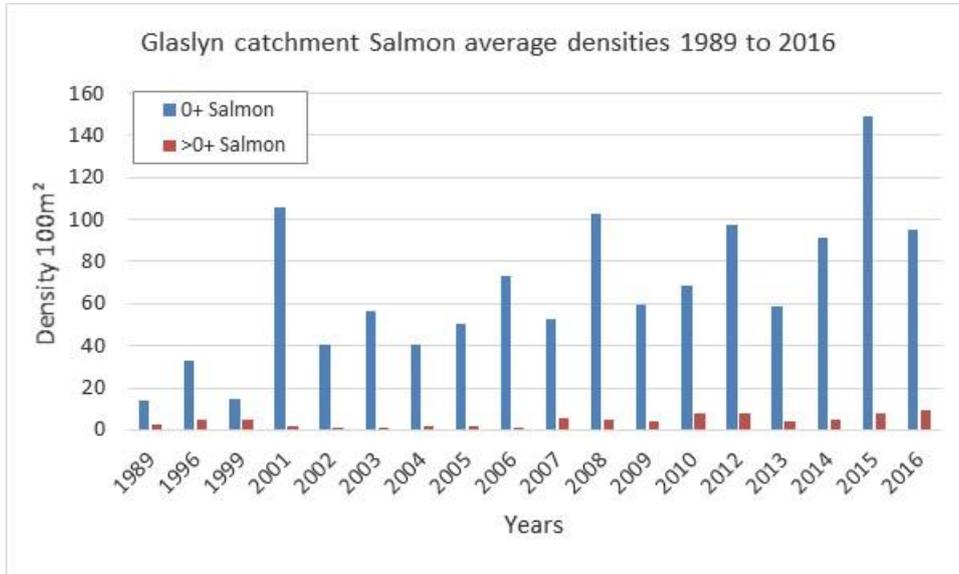




### Juvenile Trend Analysis

Statistical analysis of the juvenile monitoring programme is currently being reviewed. The graphs below are catchment averages for salmon and trout from 1989 to 2016.

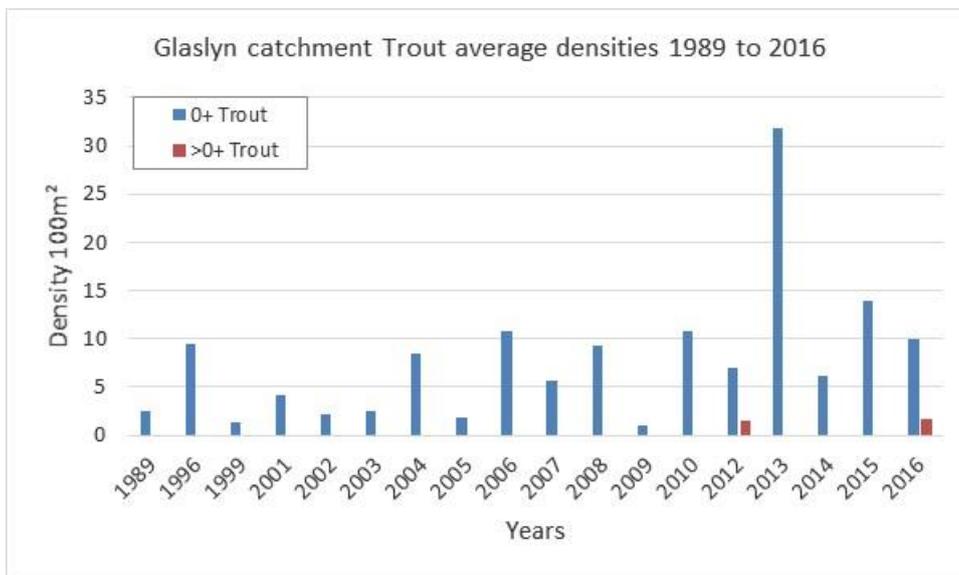
#### Salmon



Salmon fry densities appear to have improved since monitoring began on the Glaslyn in 1989. The site that is fished does not have good parr habitat so the low densities are to be expected. Salmon rod catch has remained consistent up until 2016.

Juvenile salmon densities across Wales in 2016 have been poor, with some catchments showing significant absences of salmon fry. Though declining spawning stock will have lowered recruitment, it was felt that the extremely high flows and unseasonably warm temperatures throughout Nov/Dec/Jan will have adversely affected spawning. This does not appear to be the case on the Glaslyn.

#### Trout



The annual monitoring site is predominantly salmon habitat, so the trout densities do not represent the entire catchment. Fry densities have fluctuated since records began and this does not correlate with the rod catch that was consistently good up until 2015. This will be due to the lack of trout habitat at the site. The improvements in trout parr are negligible as they were not caught historically.

### Fisheries Actions – Glaslyn

Site	Action	Benefits	Lead	Partner(s)	Timescales 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	CCGRT	Ongoing
	<b>Water Framework Directive</b> We will continue work to ensure no deterioration, monitor the status of the environment and investigate 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.	<ul style="list-style-type: none"> <li>• Waterbodies protected and improved</li> <li>• WFD waterbodies achieving Good Status/Potential</li> </ul>	NRW	NRW Wildlife Trusts Local Authorities Landowners DCWW SNPA	Ongoing
	<b>Enforcement:</b> Action to reduce illegal activity on information provided and investigations	Reduced illegal activity, more fish remain in the system.	NRW	Stakeholders North Wales Police	Ongoing

#### Abbreviations

NRW – Natural Resources Wales

DCWW – Dwr Cymru Welsh Water

SNPA – Snowdonia National Park Association

CCGRT – Clwyd, Conwy & Gwynedd Rivers Trust