

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 Colwyn.

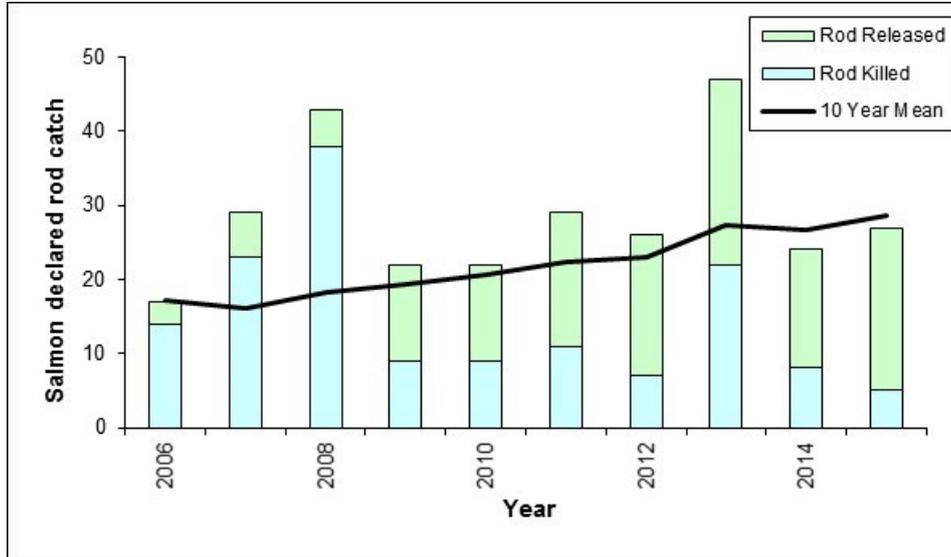
The soils are glacial in origin and are generally thin, poor, peaty and acidic, but are enriched in places by mineral ores from underlying rocks. The evidence of small scale mineral working of copper and zinc is widespread throughout the Glaslyn catchment, however there are no active metal mines at present.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

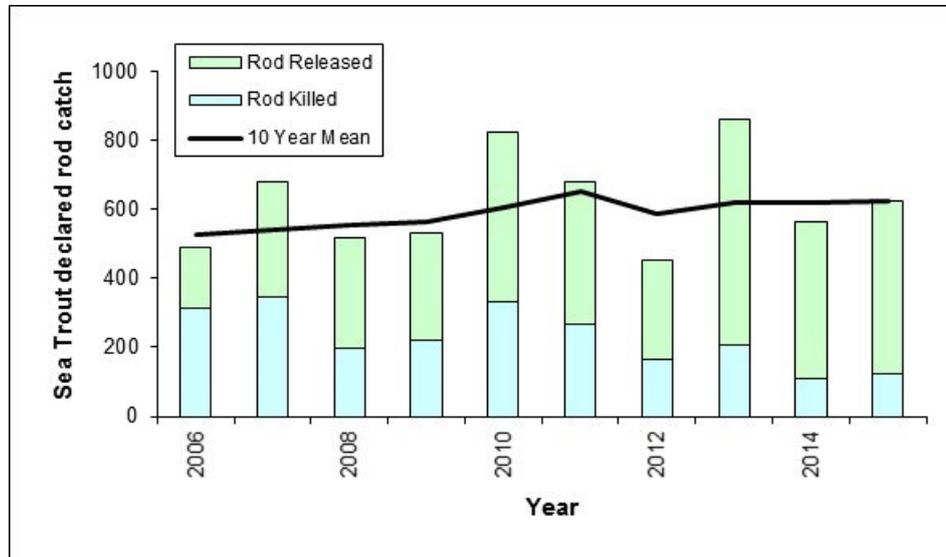
Rod catches

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

Salmon rod catch – has continued to improve. The release rate in 2015 was 81%. This is excellent and must continue to conserve stocks. The North Wales average is 65%.



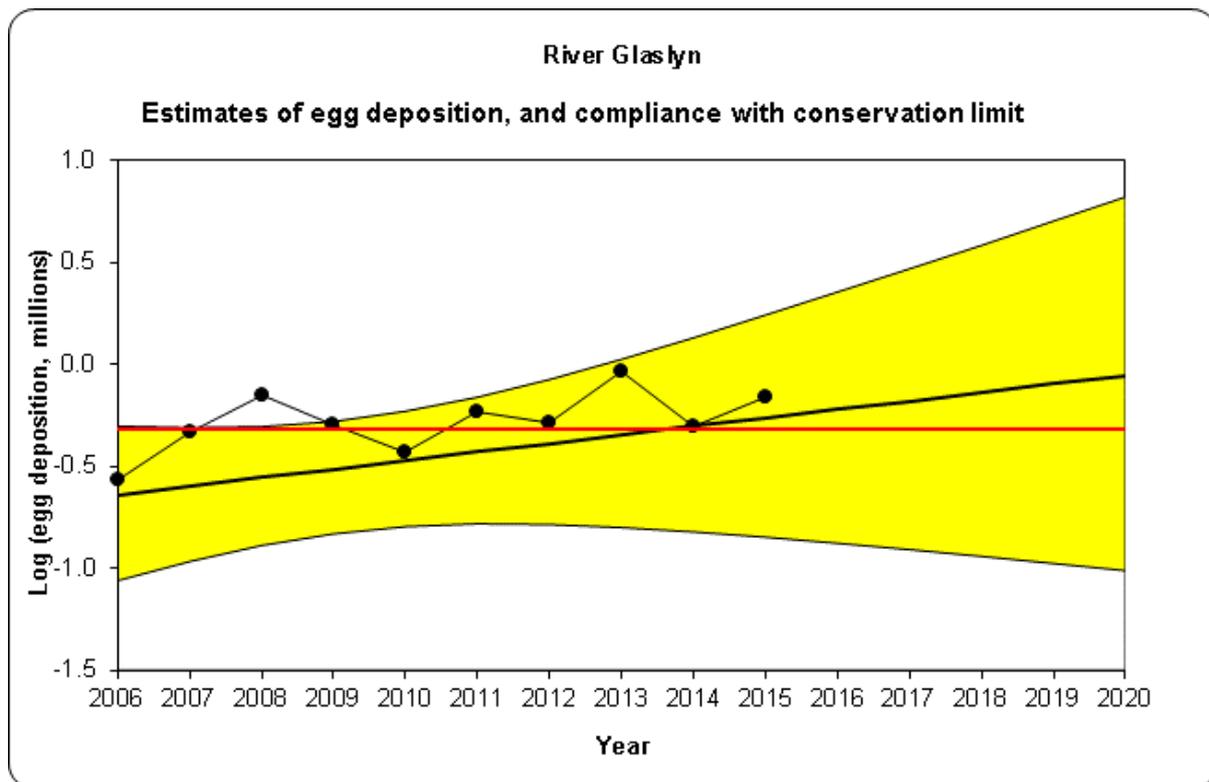
Sea trout rod catch – has remained consistent. The release rate in 2015 was 80%. This is excellent. The North Wales average is 72%.



Stock status

Conservation of Salmon

Salmon stock status is assessed through the use of 'Conservation Limits' which provide an objective reference point against which to assess the status of salmon stocks in individual rivers. 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. This is why, 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 CL 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?

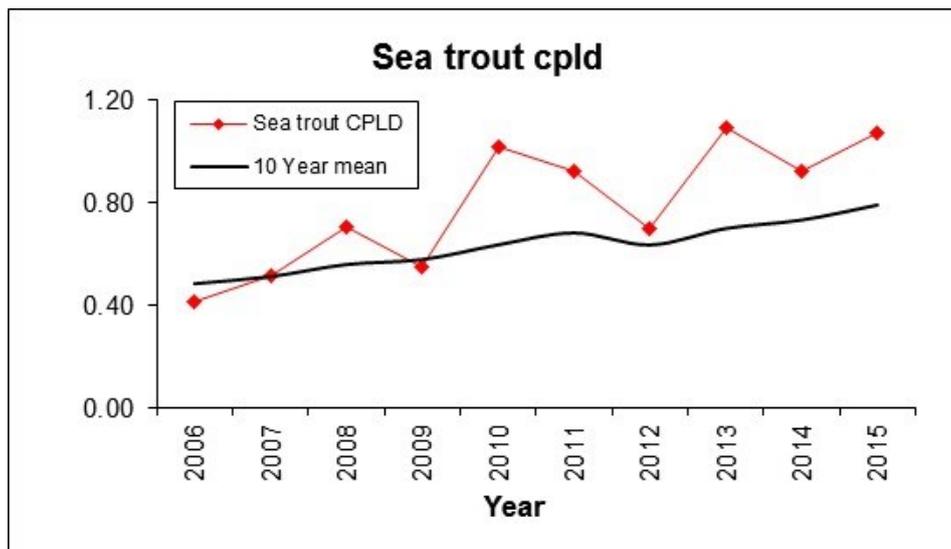
The red line represents the number of eggs required to be deposited to sustain a healthy salmon stock.

- Current number of eggs being deposited puts stocks **probably not at risk**
- In 5 years' time the predicted status of salmon stocks will be **probably not at risk**
- Based on current and future trends the stocks of salmon will continue to **improve**

Conservation of Sea Trout

Our approach to assessing sea trout stock performance is still under development. It is based on catch trends in the last three years compared with those in the previous ten. The assessment gives an early warning about potential problems and assists with considering whether any further management actions are required. It provides an indication of changes in fishery performance, though this is not always a reflection of stock performance.

Catch Per License Day (CPLD) is the average number of fish caught for each day fished on the river and as such accounts for the variability in the amount of fishing effort between years. These statistics can be a better guide than simply looking at the total catch.



- The latest 10-year trend in CPLD on the Glaslyn is **improving** and this is a statistically significant trend
- Average CPLD for the most recent 3-year period is in the **upper >80%** of the range of CPLD figures reported in the previous 10-years
- Combining the above measures, the Glaslyn is classified as **“not at risk”**; i.e. the fishery appears to be performing reasonably well with no immediate concerns about the status of the adult stock

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

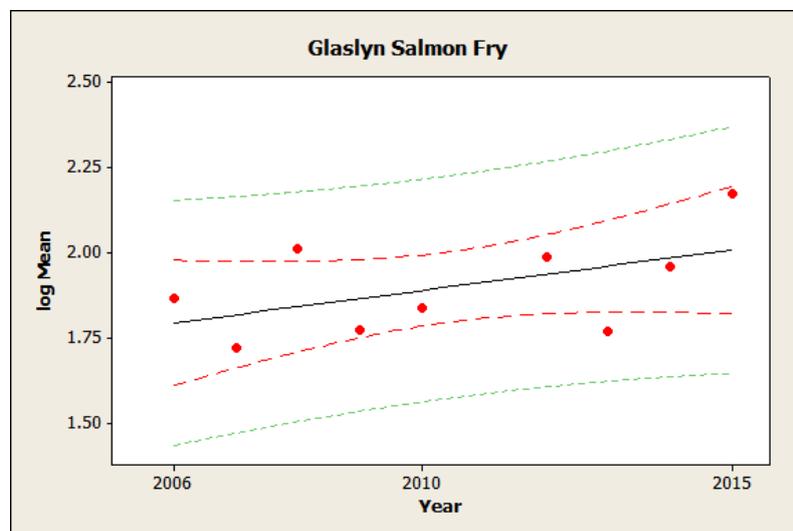


Juvenile Trend Analysis

Trends in the population data for juvenile salmon and trout were assessed using a Bayesian statistical model. The data was analysed using a linear model which fits a straight line to the data in order to determine whether a trend (upwards or downwards) is present in fish numbers over the timeframe. The statistical significance of the trend is denoted by the P value, $P > 0.975$ indicates a statistically significant upward trend, and $P < 0.025$ indicates a statistically significant downwards trend. This can also be considered as percentage chance, e.g. a 97.5% chance of an upward trend, or just a 2.5% chance of an upward trend (which is a statistically significant downwards trend).

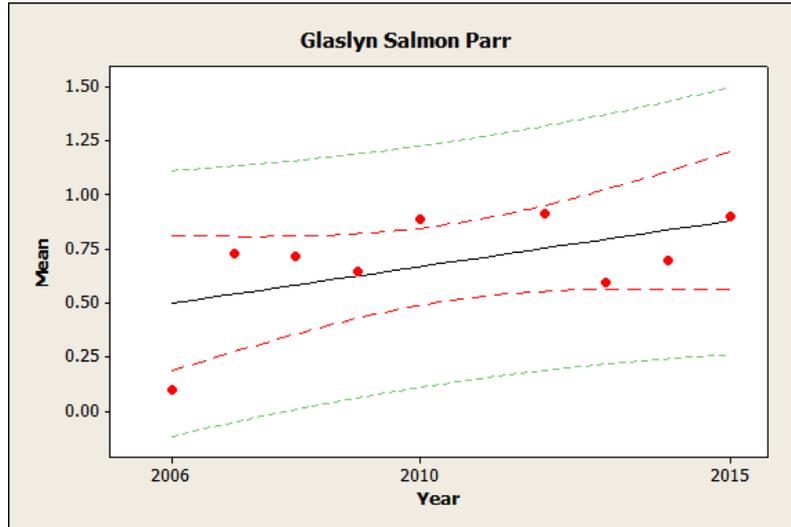
Data was analysed for the period 2006 to 2015 for comparison against Salmon/Sea Trout conservation data. The figures below display trends in juvenile fish numbers over this period (note log scale).

Salmon Fry



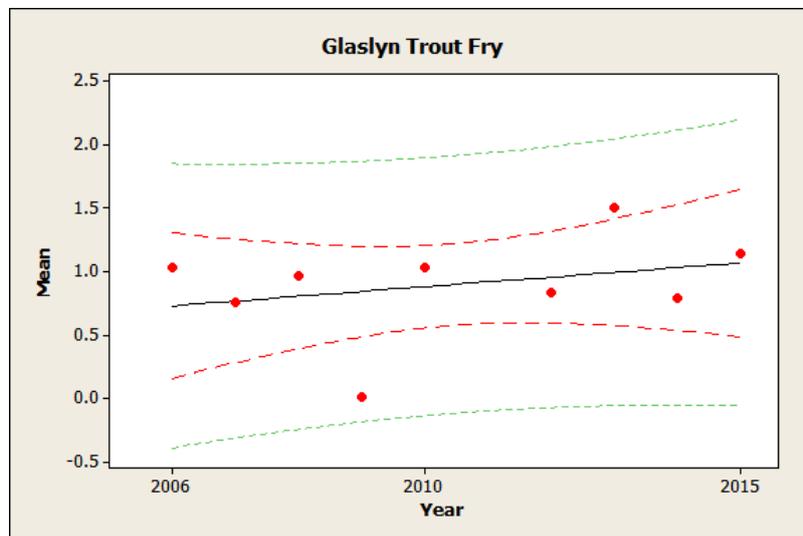
- Salmon fry densities on the Glaslyn have **improved** since 2006.
- This trend is **not statistically significant (P = 0.143)**.
- The Glaslyn is the only catchment in North Wales that has continued to improve in 2015. Rod catch and salmon fry densities on the Glaslyn do not follow the UK trend. The 2014 season produced some of the poorest salmon runs on record across the UK. This is believed to be due to sea survival. Poor feeding grounds have led to a large decline in the grilse run. The majority of returning salmon are now multi-sea winter fish. The Glaslyn may be slightly different due to its spring salmon run that is not seen on other North Wales Rivers.

Salmon Parr



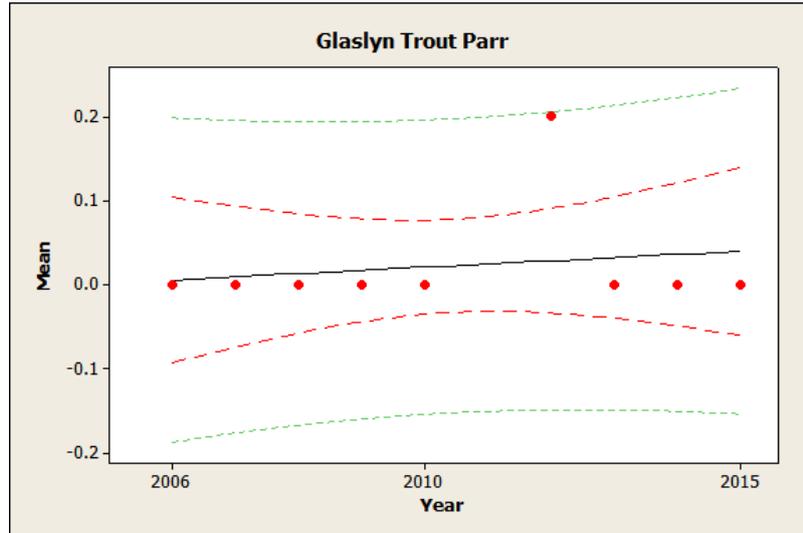
- Salmon parr densities on the Glaslyn have **improved** since 2006.
- This trend is **not statistically significant (P = 0.13)**.
- The number of Salmon Parr caught at the Glaslyn site has always been quite low so this does not give us a good picture of what is occurring across the Glaslyn catchment. The site is quite large so the catch efficiency of parr is lower than usual.

Trout Fry



- Trout fry densities on the Glaslyn have **improved** since 2006.
- This trend is **not statistically significant (P = 0.43)**.
- The Glaslyn site is predominantly salmon habitat so is not fully representative of Trout on the Glaslyn. There has been a small improvement in trout fry at the site. The improved Sea Trout runs seen on many North Wales Rivers have not occurred on the Glaslyn; it has remained consistent

Trout Parr



- Trout parr densities on the Glaslyn have **improved** since 2006.
- This trend is **not statistically significant (P = 0.64)**.
- The number of Trout Parr caught at the Glaslyn site has always been very low so this does not give us a good picture of what is occurring across the Glaslyn catchment. The site is quite large so the catch efficiency of parr is lower than usual.

Fisheries Actions – Glaslyn

Site	Action	Benefits	Lead	Partner(s)	Timescales for delivery
Glaslyn	Habitat improvements: 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
	Water Framework Directive 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"> • Waterbodies protected and improved • WFD waterbodies achieving Good Status/Potential 	NRW	NRW Wildlife Trusts Local Authorities Landowners DCWW SNPA	Ongoing
	Enforcement: 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