Know Your River - Dwyryd

Salmon & Sea Trout Catchment Summary

Introduction

This report describes the status of the salmon and sea trout populations in the Dwyryd 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.

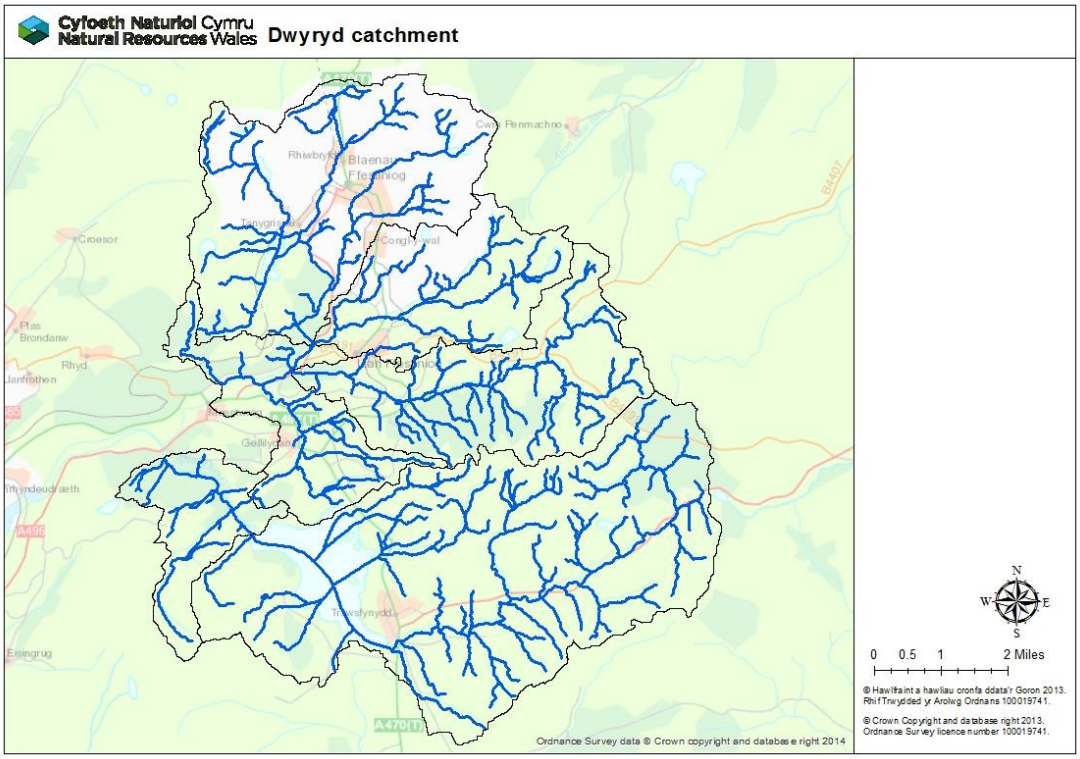
Action tables set out habitat improvements to restore freshwater productivity of salmon and sea trout populations. These tables also include some work which will be carried out by our partner organisations, not just Natural Resources Wales (NRW).

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 principal salmon rivers where, in the past, Salmon Action Plans have been produced, and/or, in SAC rivers, where condition assessments have been undertaken under the Habitats Directive. In addition, the status of various fish species in all our rivers is reported as part of Water Framework Directive (WFD) assessments. This report refers to these commitments. Its purpose is to provide, for our customers, an informative and useful summary of stock status and remedial work planned - specifically for anglers, fishery and land owners; as well as other partners.

Catchment

The Dwyryd is predominantly rural with agricultural activity being dominated by sheep farming



in the upper reaches of the catchments, gradually changing to mixed sheep and beef further down the valley. Industrial development is limited to Blaenau Ffestiniog. Blaenau Ffestiniog was once the largest slate quarrying town in the world and now has a legacy of derelict land covered in slate spoil. Slate quarrying continues at 4 main sites around the town. Both the

Barlwyd and Goedol have suffered from slate dust contamination in the past although remedial work at the quarries has reduced the occurrence of this source of intermittent pollution in recent years.

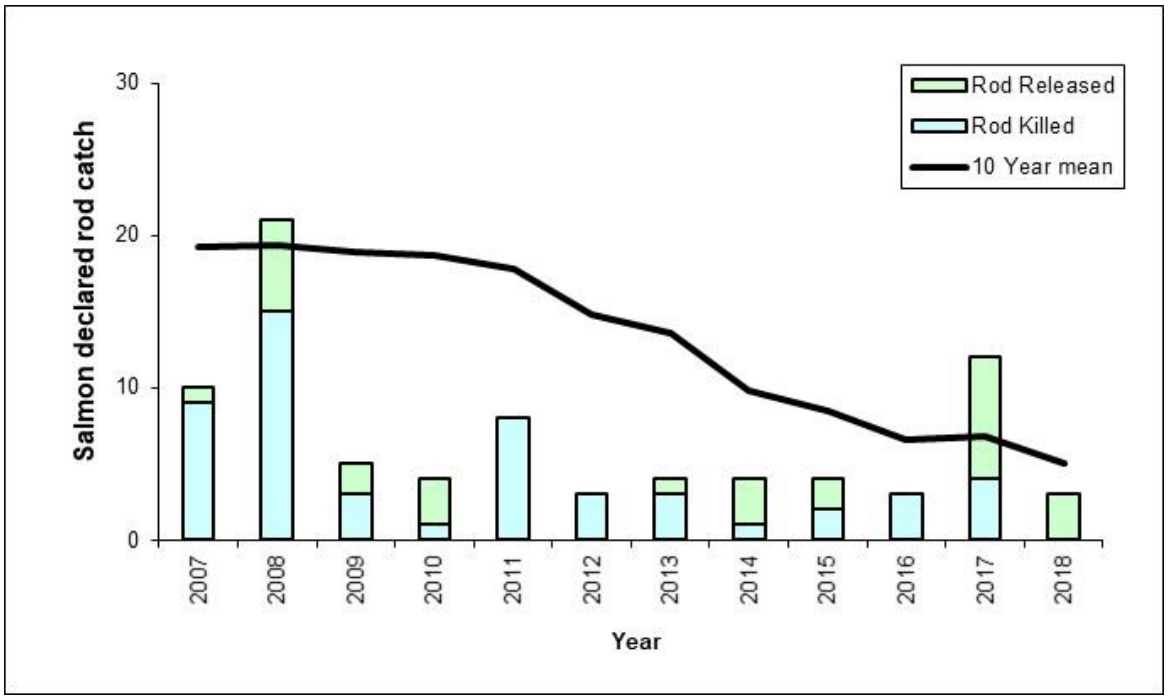
This mountainous area, directly open to the prevailing south westerly winds, receives heavy rainfall. Although the acidity of rainwater is not high, the volume of rain falling in the area gives rise to high annual acid deposition. In the absence of neutralising bases within the thin soils, these areas 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 Dwyryd catchment.

The terrain of this area, with its upland lakes and high rainfall, also makes it well suited to hydroelectric power (HEP) generation. In all there are 10 HEPs situated in the Dwyryd catchment. The major schemes at Tanygrisiau and Maentwrog (Dwyryd) have the potential to impact upon salmonid fish by causing fluctuations in natural flow and temperature regimes.

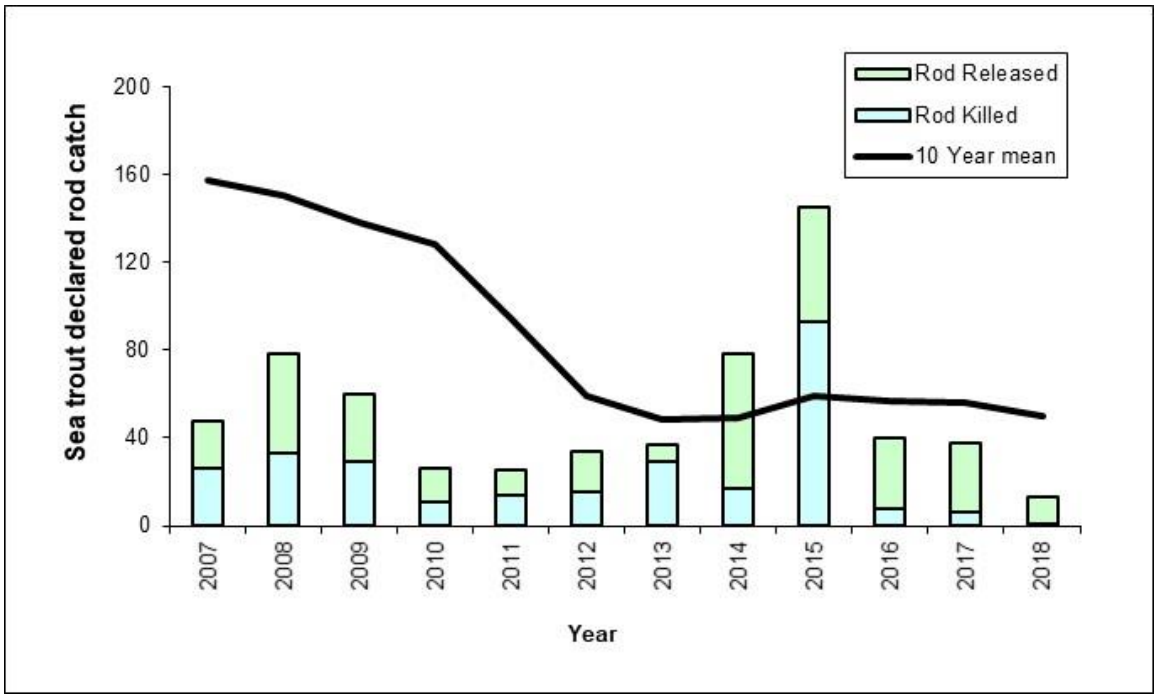
Rod catches

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

Salmon rod catch – is poor again on the Dwyryd in 2018, however the release rate is 100% and this needs to remain at this level whilst stocks are so poor.



Sea trout rod catch – was poor in 2018 and is way below the 10 year average. The release rate however was 92% in 2018 which is excellent and needs to continue to conserve stocks.



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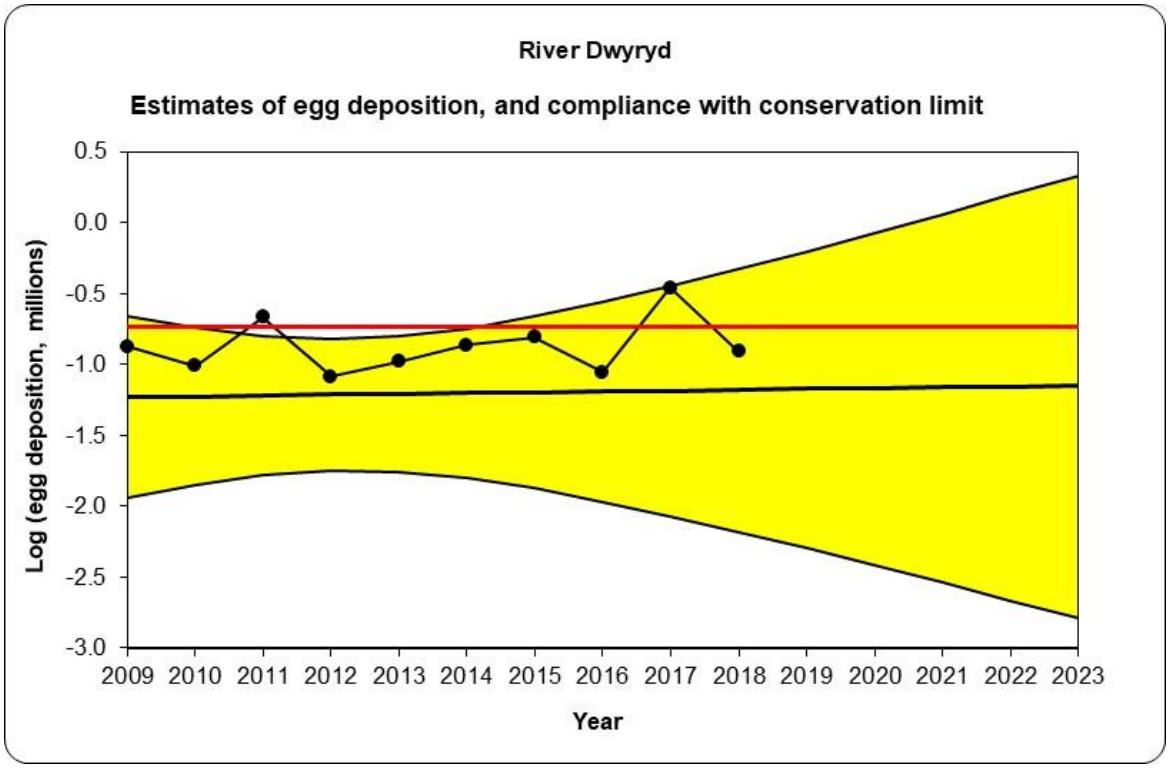
Stock status

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 (2009-2018).

- 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 Dwyryd will continue to **improve** **(uncertain trend)**

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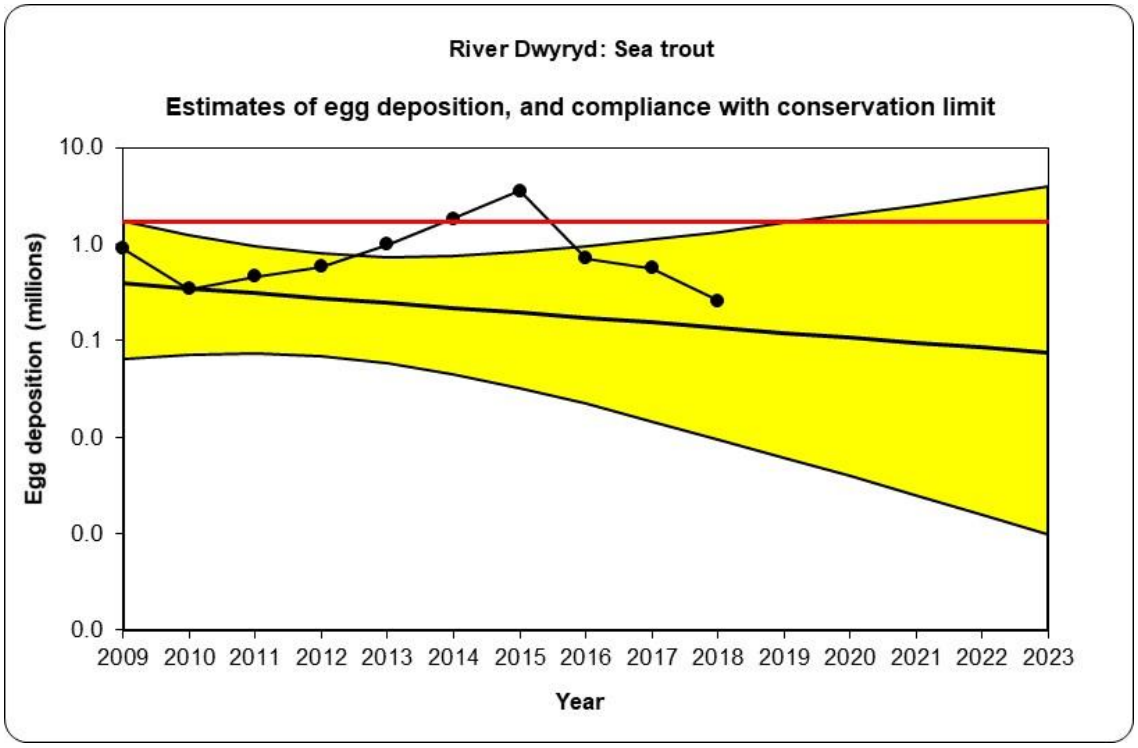
Conservation of Sea Trout

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 (2009-2018).

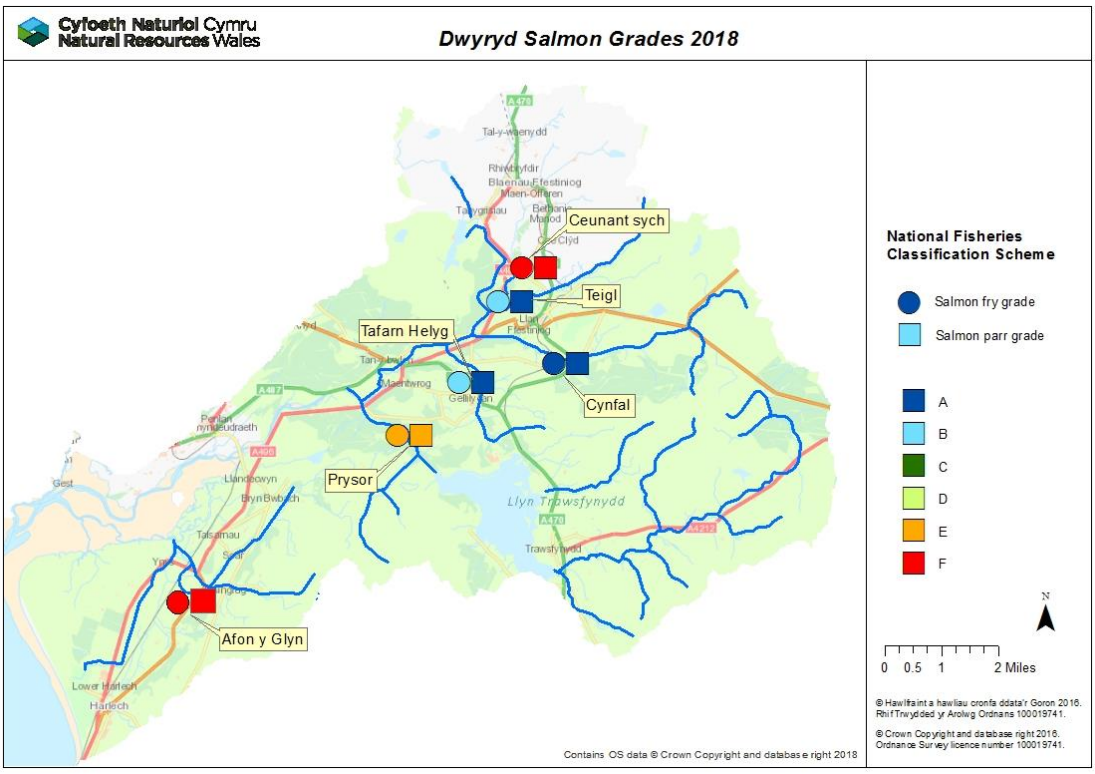
- Current number of eggs being deposited puts stocks **at risk**
- In 5 years' time the predicted status of salmon stocks will be **probably at risk**
- Based on current data, and the projection of the graph, the stocks of sea trout on the Dwyryd will continue to **decline** **(uncertain trend)**

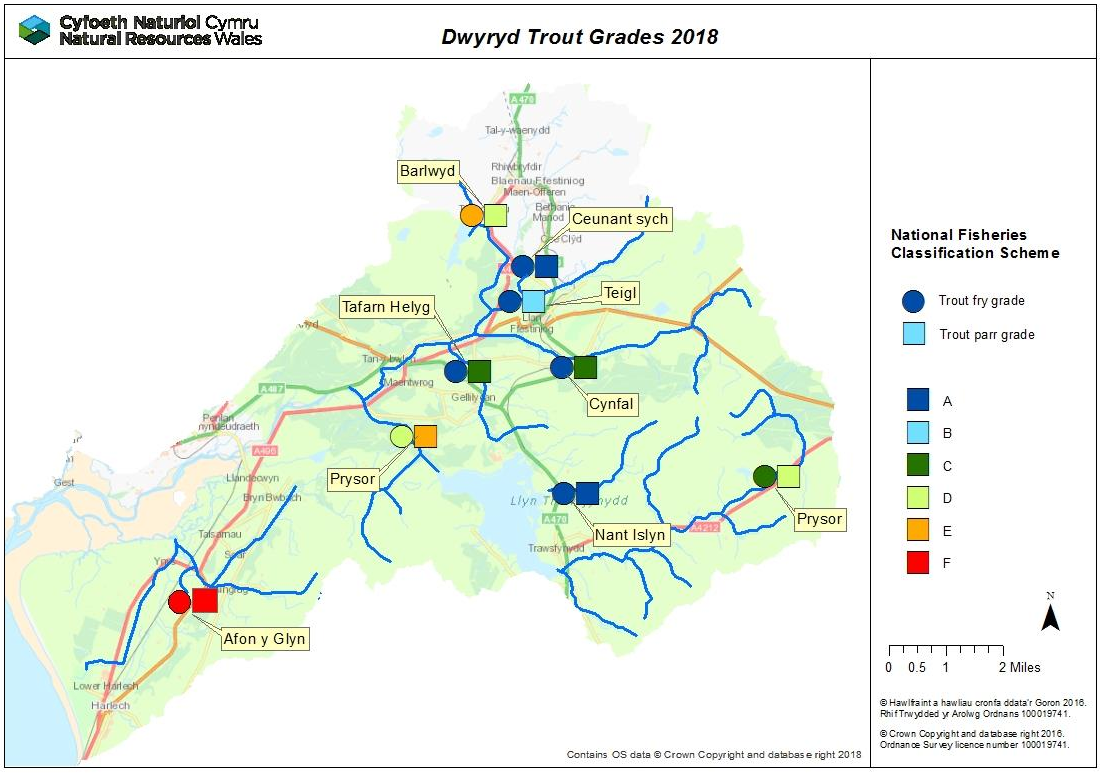
Salmon and Trout Classifications

The maps below show the results of the routine juvenile salmonid population surveys from 2018 on the Dwyryd.

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.

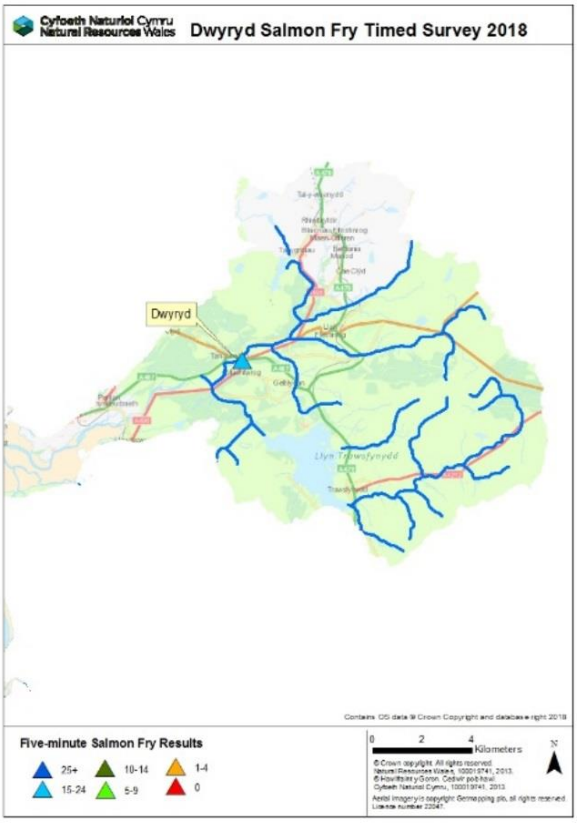
Grade	Descriptor	Interpretation
A	Excellent	In the top 20% for a fishery of this type
B	Good	In the top 40% for a fishery of this type
C	Fair	In the middle 20% for a fishery of this type
D	Fair	In the bottom 40% for a fishery of this type
E	Poor	In the bottom 20% for a fishery of this type
F	Fishless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





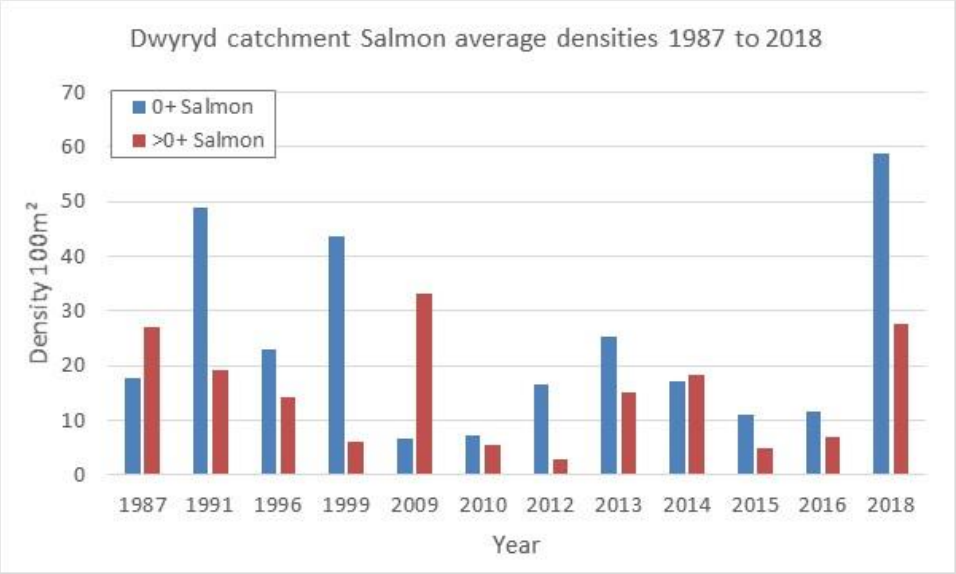
Five-minute fry surveys

One five-minute fry survey was carried out on the main river. The results are based on how many salmon fry were caught during the five-minute survey. The classification scheme is based on historic data from North Wales.

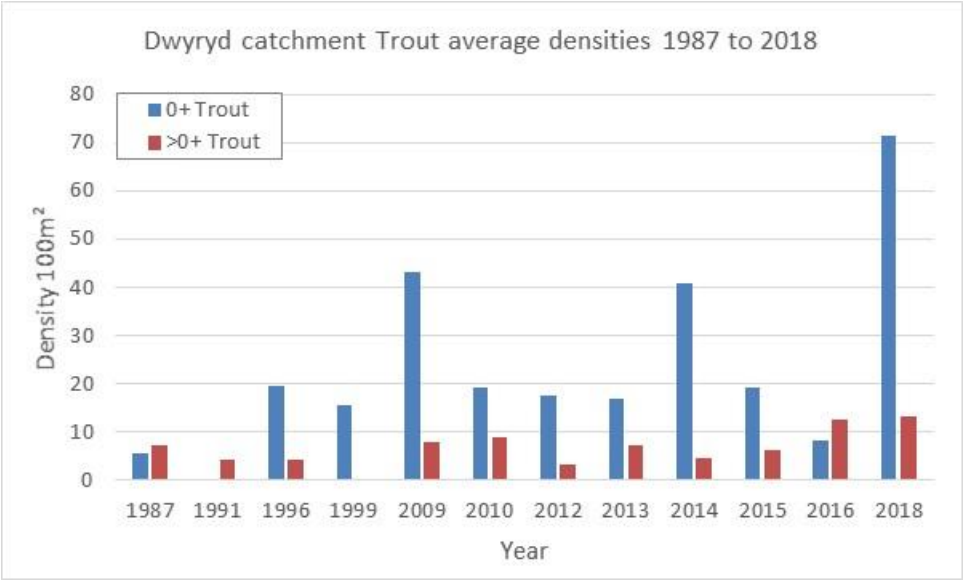


Catchment Population Trends

The graphs below show a simple comparison of average salmon and trout densities for the temporal site on the Dwyryd catchment (Teigl) since surveying began in 1987. NB – all results are from semi quantitative surveys which have been multiplied up using historic catch efficiencies to give population estimates. The site was not done every year, and no surveys were done from 1988 to 1990, 1992 to 1995 1997/98, 2000 to 2008, 2011, and 2017.



Salmon fry and parr densities were excellent in 2018, with the highest salmon fry densities on record and very good salmon parr densities. Salmon rod catch did improve slightly in 2017 linking to the improved fry densities. We believe catch efficiency was improved in these surveys due to lower flows and higher temperatures.



Brown trout fry and parr densities were excellent in 2018, with the highest densities on record. This does not follow the rod catch trend and will have been influenced by catch efficiency.

The following table shows a simple comparison of the temporal average density of juvenile salmon and trout for 2018 (Teigl), and compares it to 2016 (no survey was complete in 2017) and the 5-year average (not including 2016 as nationally a poor year for salmon).

	0+ Salmon	>0+ Salmon	0+ Trout	>0+ Trout
2018 average density	58.9	27.8	71.4	13.2
2016 average density	11.5	6.9	8.3	12.6
Percentage difference to 2016	**412%**	**304%**	**760%**	**4%**
5-yr average (2011-15)	17.5	10.2	23.6	5.4
Percentage difference to 5-yr average	**236%**	**171%**	**202%**	**145%**

As you can see from the above table the results on the Teigl this year were excellent, clearly exceeding the results from 2016 and the 5-year average for salmon and trout.

Salmon rod catch was up slightly in 2017, going from only 3 salmon in 2016 to 12 salmon in 2017. Effort has also slightly improved in 2017. The average days fished between 2009 and 2016 was 142 days, and this increased to 238 days in 2017. The catch per unit effort has therefore improved, suggesting that there were more salmon present in 2017 and therefore more spawning.

Sea trout rod catch was consistent between 2017 and 2016, so it was unexpected that the juvenile results were so good (Rod catch 2016 – 40, 2017 – 38).

As stated earlier we believe the results are influenced by the lower flows and therefore higher fishing efficiencies, however densities are so high there is no doubt that spawning was very successful in 2017.

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