

Know Your River - Dwyryd

Salmon & Sea Trout Catchment Summary

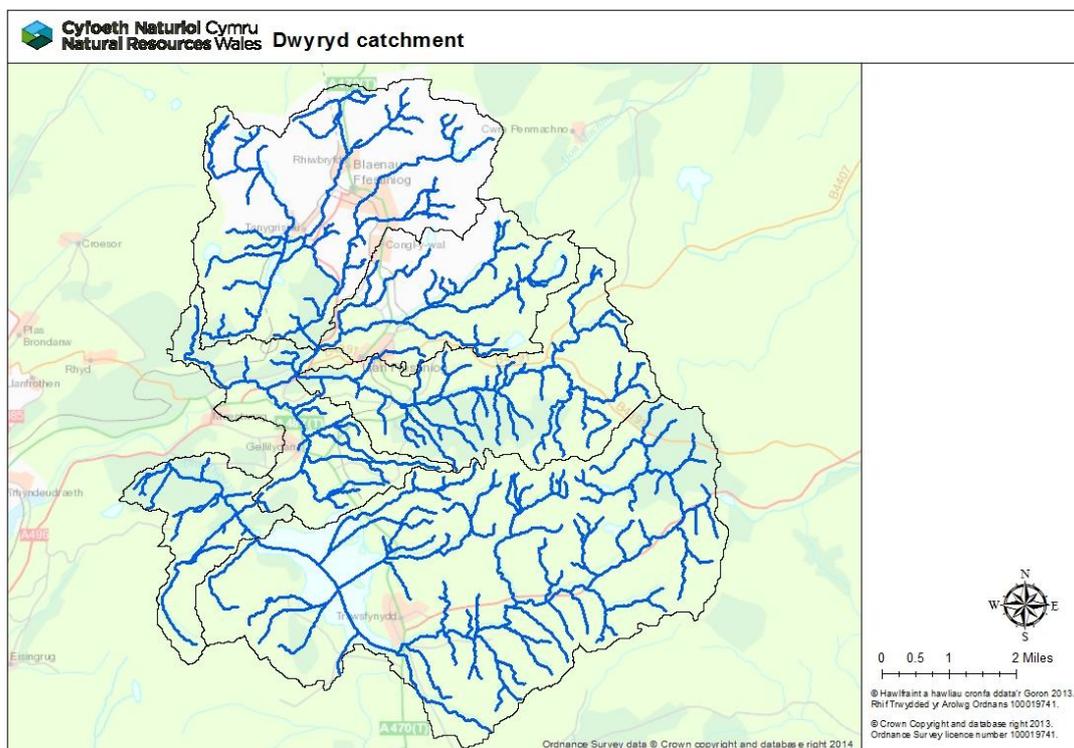
Introduction

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.

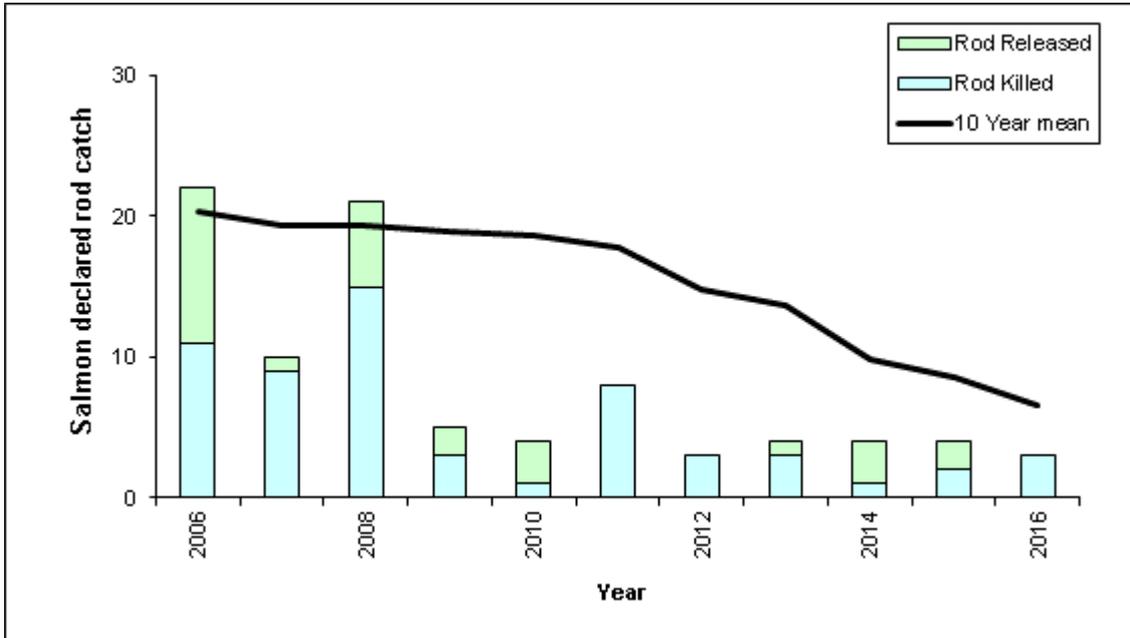
This mountainous area, directly open to the prevailing south westerly winds, receives heavy rainfall. Although the acidity of rainwater is not high, the volume of rain falling in the area gives rise to high annual acid deposition. In the absence of neutralising bases within the thin soils, these areas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

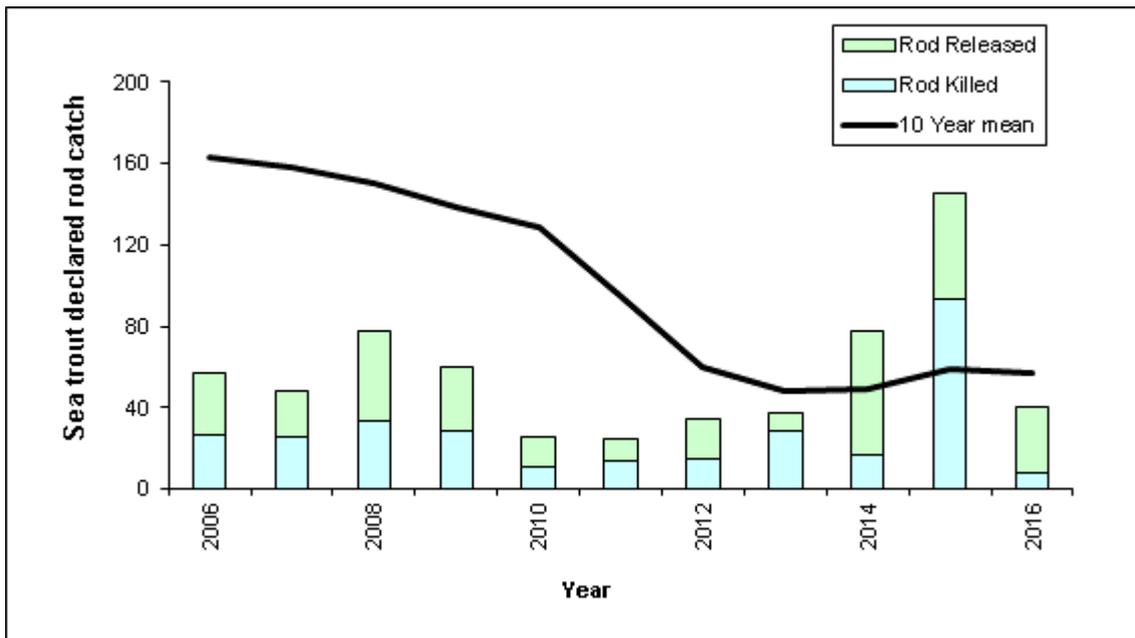
Rod catches

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

Salmon rod catch – has declined over the past 10 years, only 3 salmon were caught in 2016, and each one was killed. This is by far the worst release rate in North Wales at 0%, the average is 62%. The release rate needs to improve urgently to conserve the dwindling stock.



Sea trout rod catch – an improvement in catches was seen in 2014 and 2015, but in 2016 the numbers have declined again. The release rate in 2016 was 80%, which is a significant improvement, and is the best rate on the catchment in the last 11 years, this needs to be maintained. The North Wales average is 79%.

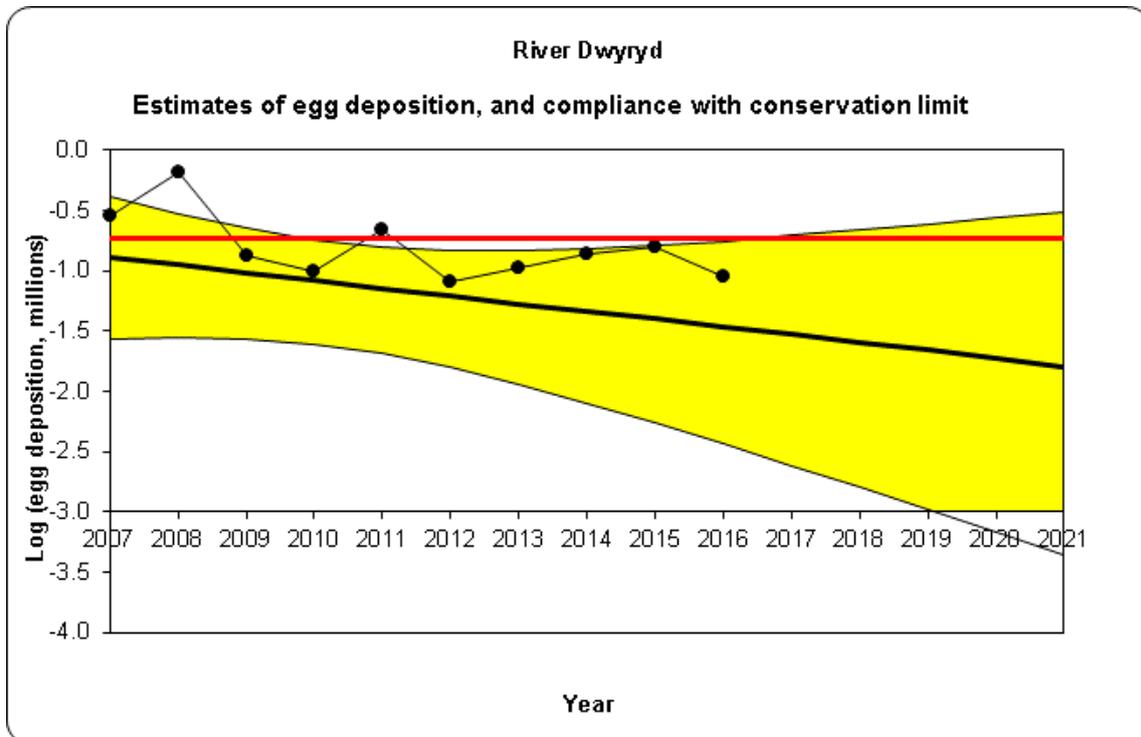


Stock status

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).

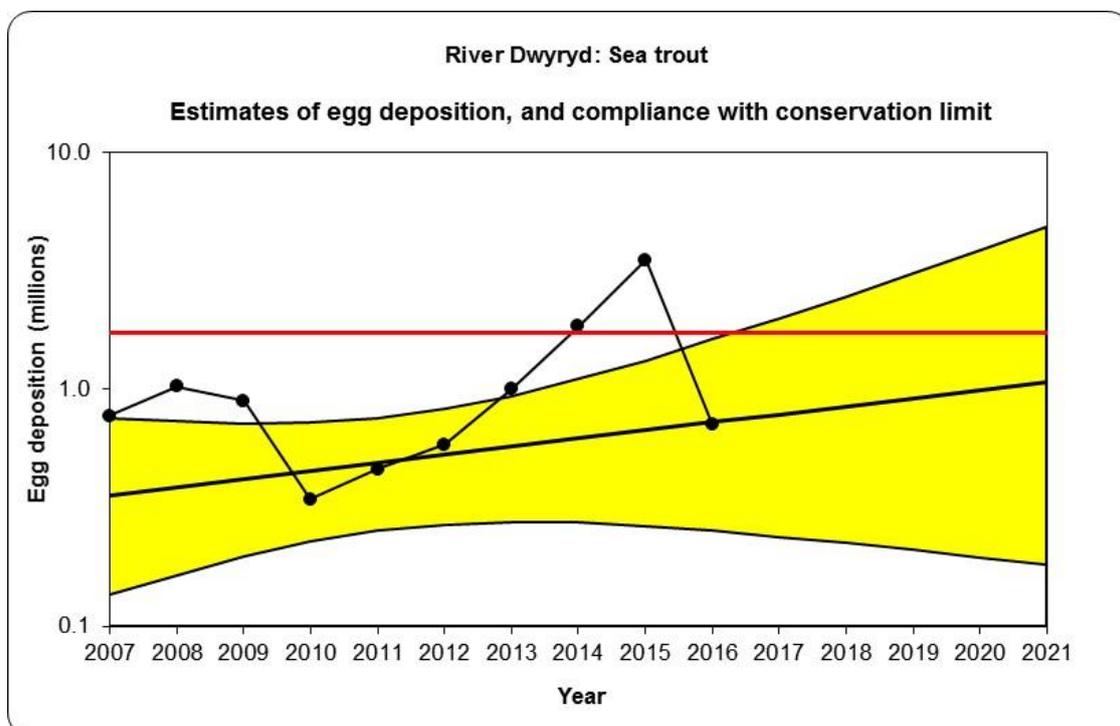
- Current number of eggs being deposited puts stocks **at risk**
- In 5 years' time the predicted status of salmon stocks will be **probably at risk**
- Based on current data, and the projection of the graph, the stocks of salmon on the Dwyryd will continue to **decline (uncertain)**

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?

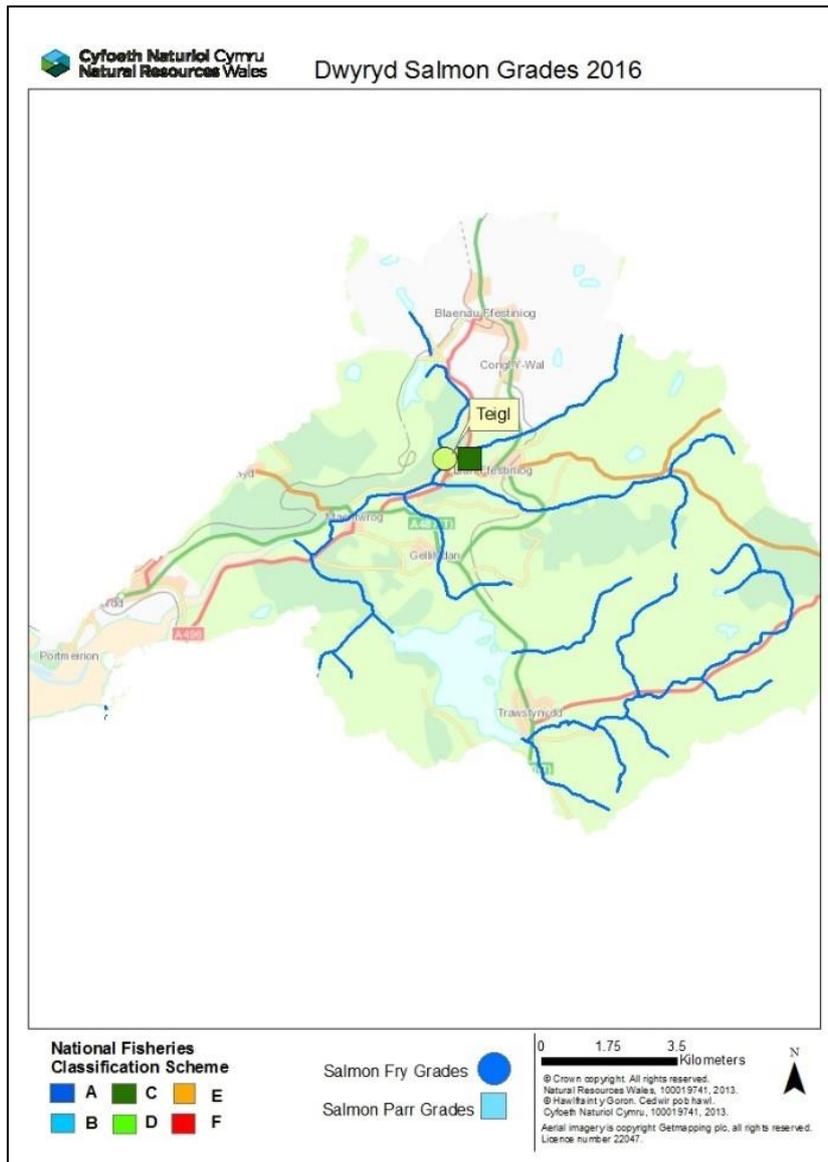
The red line represents the number of eggs required to be deposited to sustain a healthy sea trout stock. The black trend line and its confidence limits (the yellow band) is fitted to the most recent 10-year series of egg deposition estimates (2007-2016).

- Current number of eggs being deposited puts stocks **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 Dwyryd

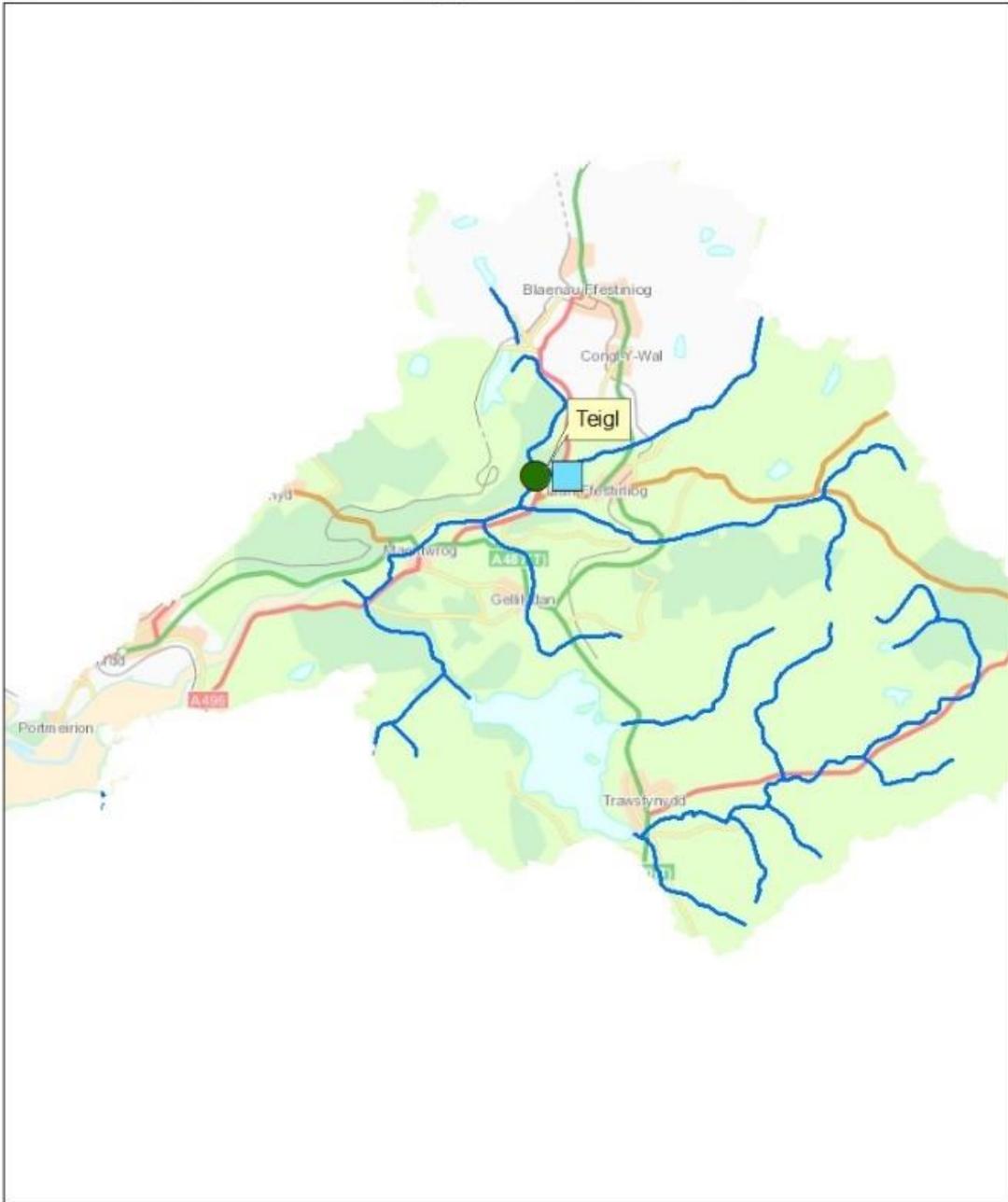
Juvenile Monitoring

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.

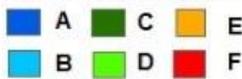
GRADE	Description	Interpretation
A	Excellent	In the top 20% for a fishery of this type
B	Good	In the top 40% for a fishery of this type
C	Fair	In the middle 20% for a fishery of this type
D	Fair	In the bottom 40% for a fishery of this type
E	Poor	In the bottom 20% for a fishery of this type
F	Fishless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



Dwryrd Trout Grades 2016



National Fisheries Classification Scheme



Trout Fry Grades



Trout Parr Grades



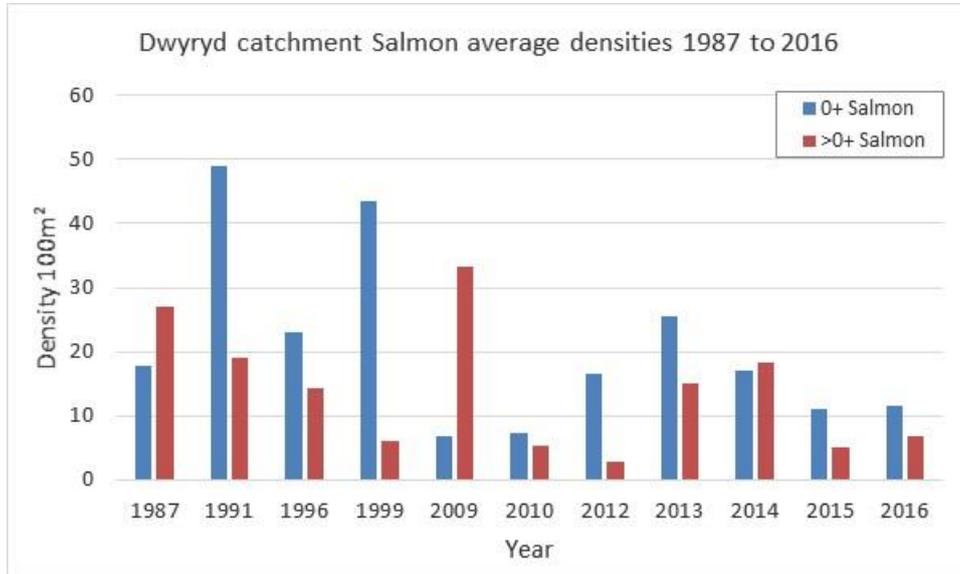
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Juvenile Trend Analysis

Statistical analysis of the juvenile monitoring programme is currently being reviewed. The graphs below are catchment averages for salmon and trout from 1987 to 2016.

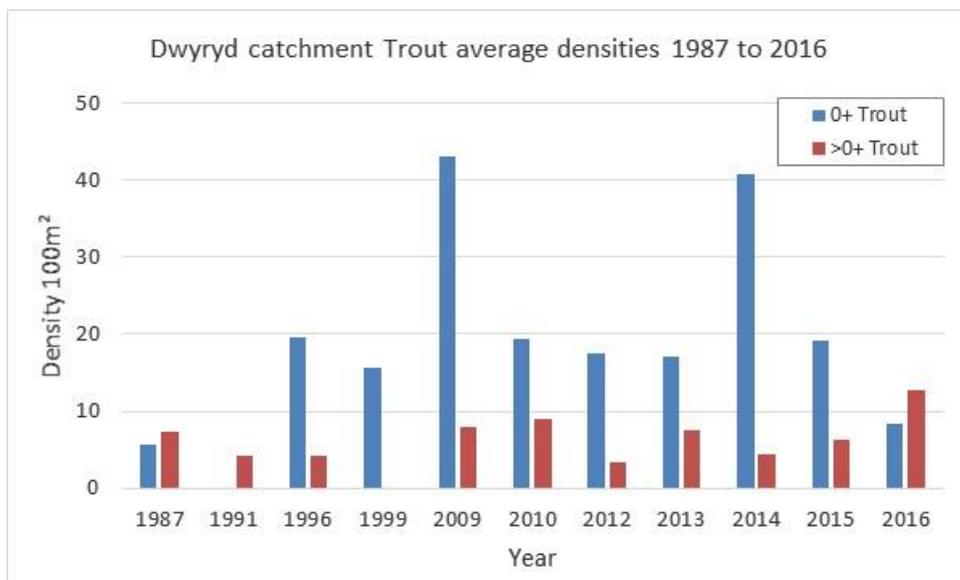
Salmon



Salmon fry and parr densities have fluctuated since monitoring began in 1987, however the general trend is declining. Salmon rod catches have been poor since 2008, however effort has also declined. Salmon fry/parr densities have remained consistent compared to 2015, the majority of the North Wales rivers have declined.

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.

Trout



Brown trout fry and parr densities on the Dwyrdd have fluctuated over the years, however 2016 is one of the poorer years for trout fry. Sea trout rod catch in 2015 was good so we would have expected an improvement. Trout parr densities however were the best on record.

Dwryrd catchment summary

Fisheries Action - Dwryrd

Site	Action	Benefits	Lead	Partner(s)	Timescales for delivery
Dwryrd	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		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