



Know Your River - Clwyd

Salmon & Sea Trout Catchment Summary

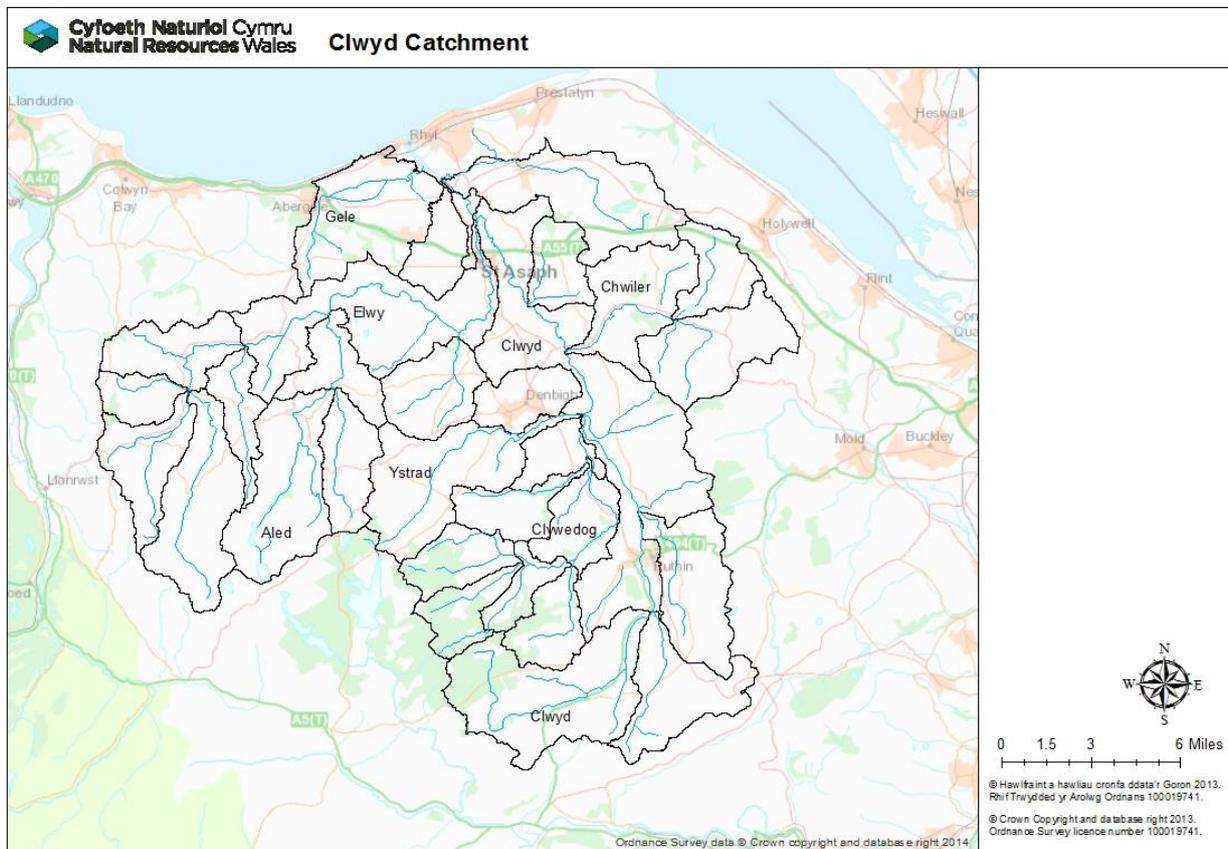
Introduction

This report describes the status of the salmon and sea trout populations in the Clwyd catchment. Bringing together data from rod catches, adult 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 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 Clwyd catchment can be split into two sub-catchments, the Clwyd and the Elwy. The Clwyd drains from the Clocaenog Forest and is slow moving and meandering for part of its length. The Elwy, which has its source to the West of the Denbigh Moors above Gwytherin, is an extremely flashy river having high run-off during times of heavy rain and suffers extreme low flows during dry periods.

Agriculture is the predominant land use with intensive arable and dairy farming in the fertile lowlands of the Vale of Clwyd, and mixed sheep and beef farming in the less fertile upland reaches of the catchment to the west. There are a number of afforested areas, the largest being the Clocaenog Forest at the headwaters. There is some industrial development consisting primarily of quarrying activities and there are a few fish farms.

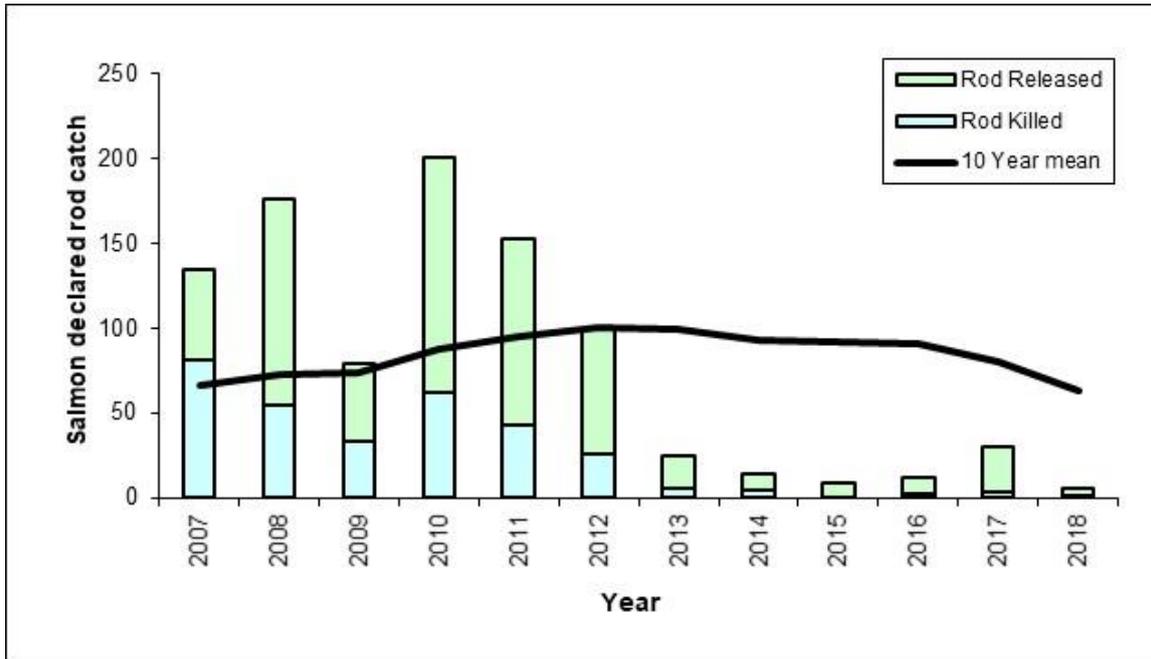
Acidification occurs in the naturally peaty uplands of the Clwyd, Clywedog and Aled systems. However, the abundance of Carboniferous limestone provides adequate buffering which progressively reduces the effects downstream.

Abstraction for public water supply has developed across the area to meet the rising demands over the last 100 years or so. For the most part water is supplied from high level sources e.g. Llyn Aled, Llyn Aled Isaf, Plas Uchaf and Dolwen. Rhyl and Prestatyn rely heavily on groundwater resources. Rhyl receives a significant proportion of its water supply from boreholes adjacent to Afon Clwyd at Llannerch Park. The Afon Clwyd is supported, at times of naturally low flows by pumped groundwater. This scheme began in the 1970s and is known as the 'Clwyd Augmentation Scheme'.

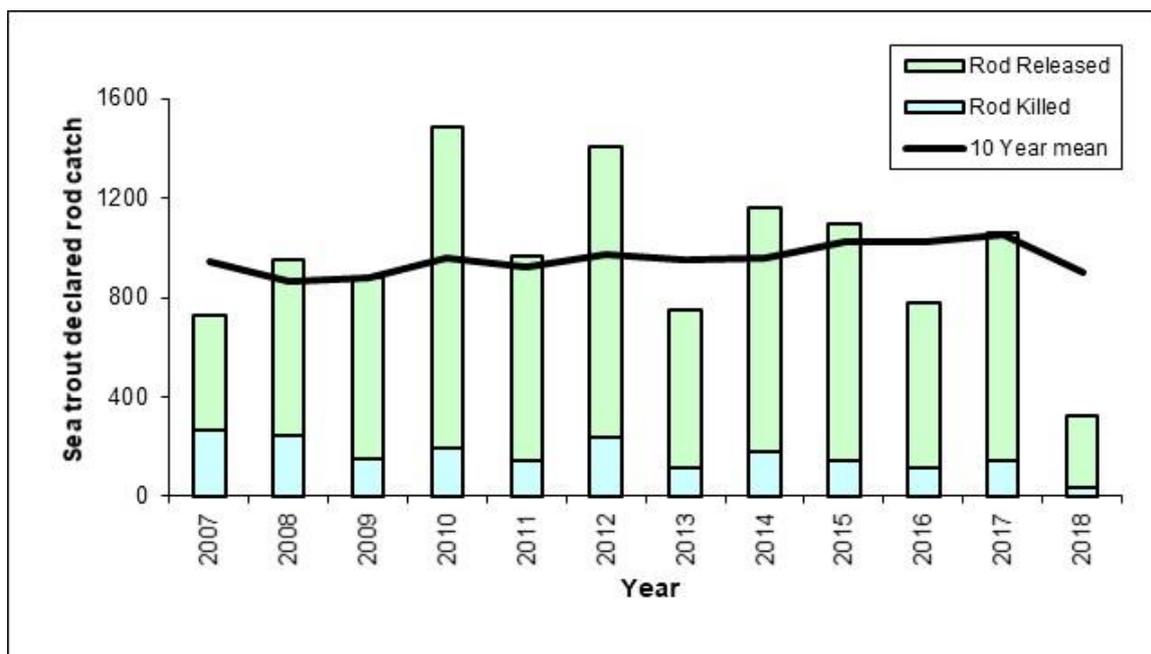
Rod catches

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

Salmon rod catch – has been exceptionally poor for the last 6 years. The release rate in 2018 was 80%. With stocks at such low levels on this catchment it is essential that all salmon are returned.



Sea trout rod catch – was exceptionally poor in 2018, this may have been influenced by low flows due to the extreme weather conditions. The release rate in 2018 was 90%. This is excellent and will hopefully continue.

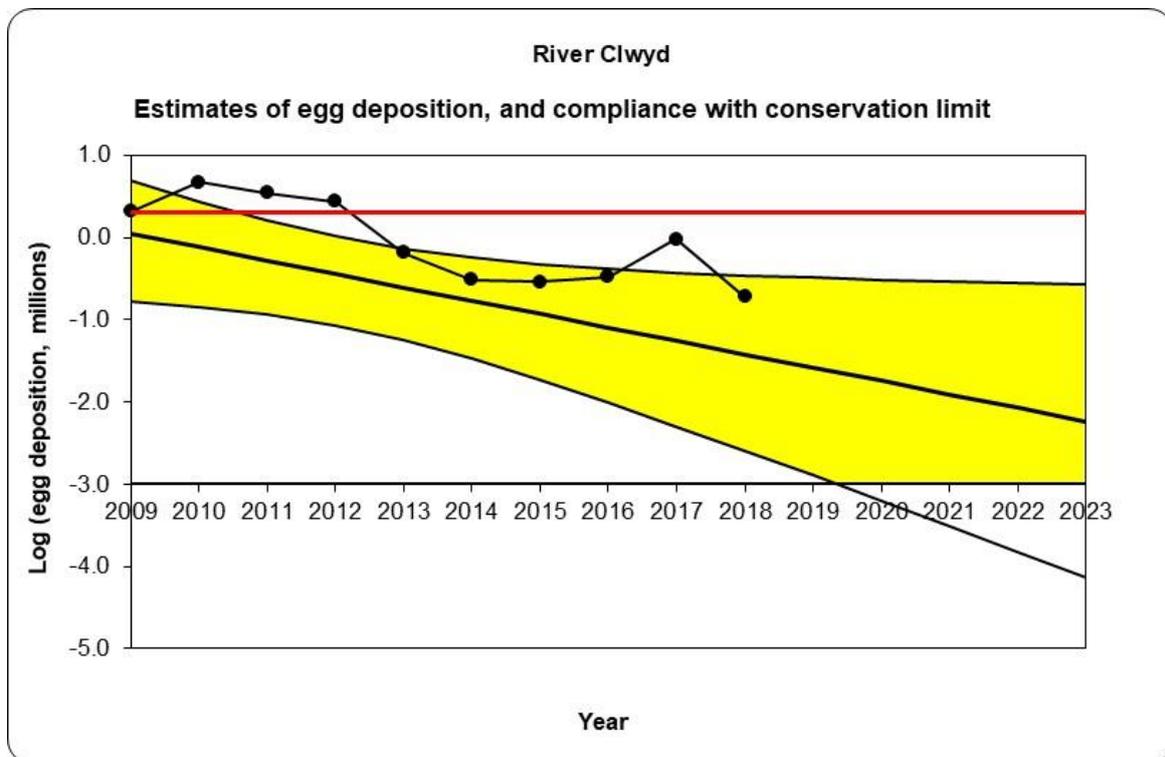


Stock status

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 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).

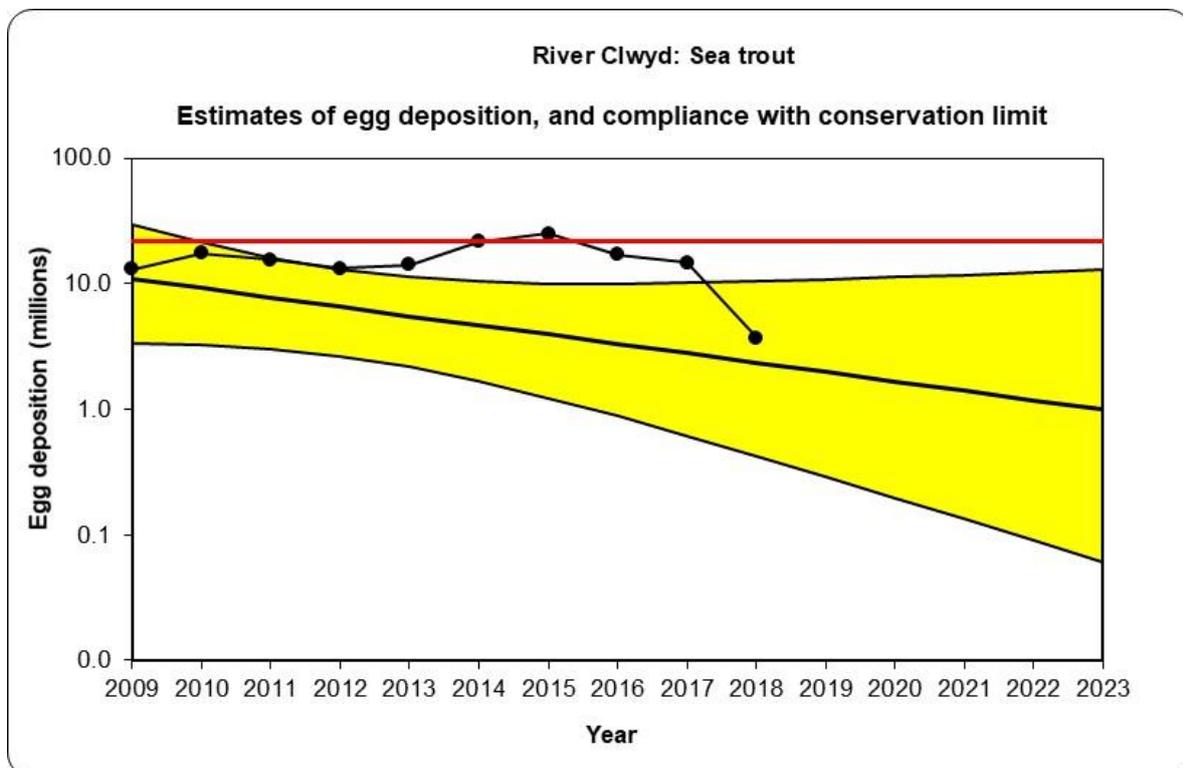
- Current number of eggs being deposited puts stocks **at risk**
- In 5 years' time the predicted status of salmon stocks will be **at risk**
- Based on current data, and the projection of the graph, the stocks of salmon on the Clwyd will continue to **decline (downward trend)**

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



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

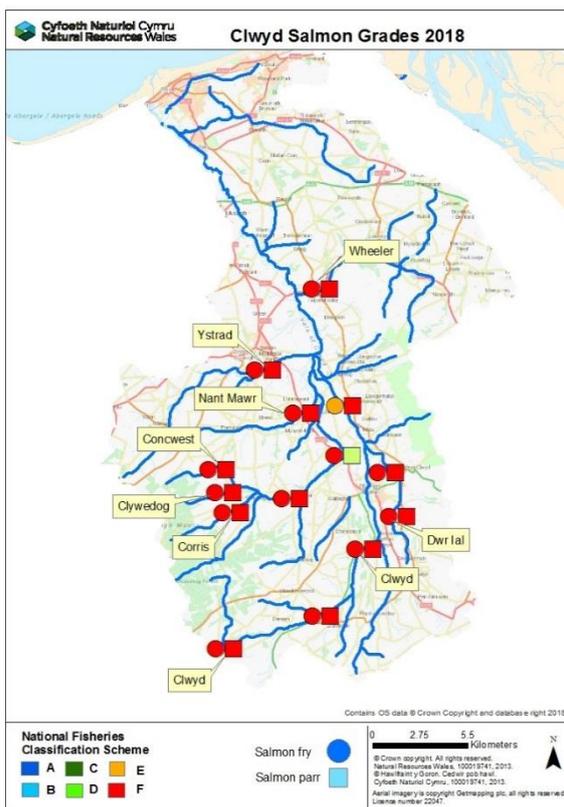
The red line represents the number of eggs required to be deposited to sustain a healthy sea trout stock. The black trend line and its confidence limits (the yellow band) is fitted to the most recent 10-year series of egg deposition estimates (2009-2018).

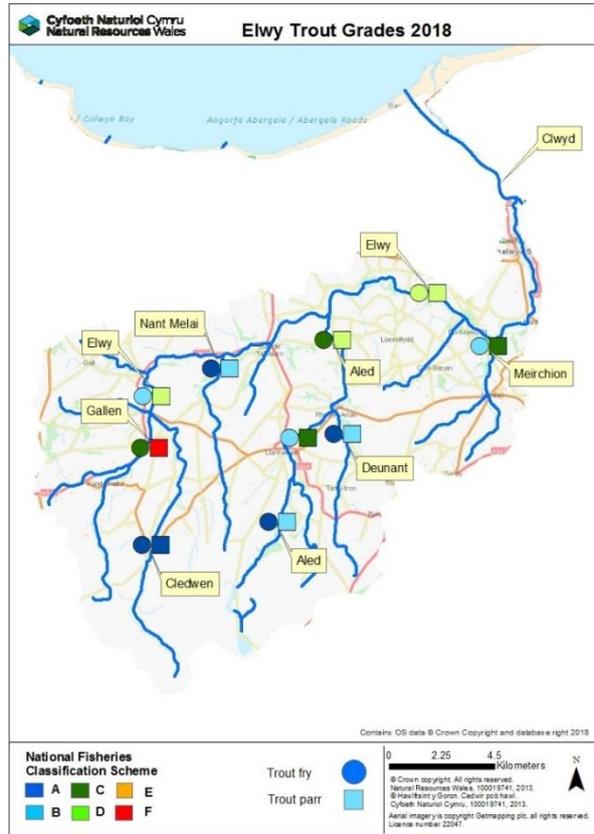
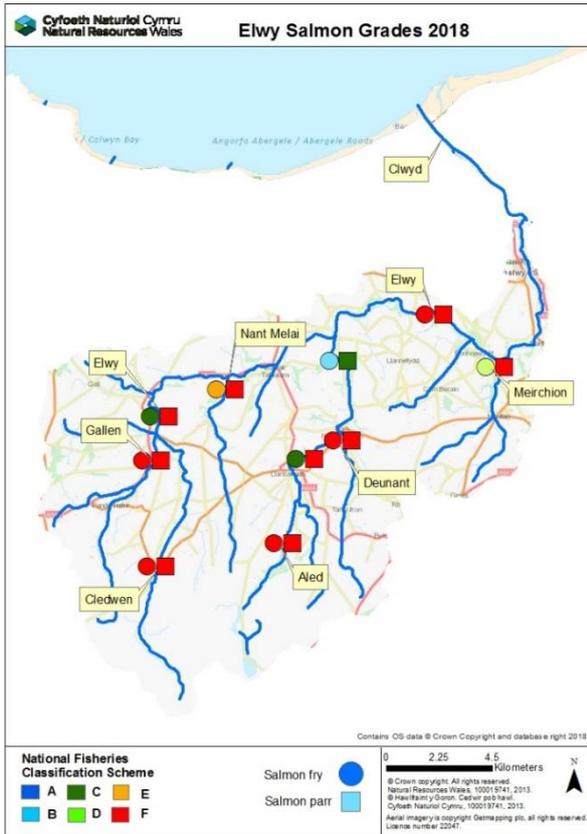
- Current number of eggs being deposited puts stocks **at risk**
- In 5 years' time the predicted status of salmon stocks will be **at risk**
- Based on current data, and the projection of the graph, the stocks of sea trout on the Clwyd will continue to **decline (uncertain trend)**

Juvenile Monitoring

The following map shows the results of the 2018 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





Five minute fry surveys 2018

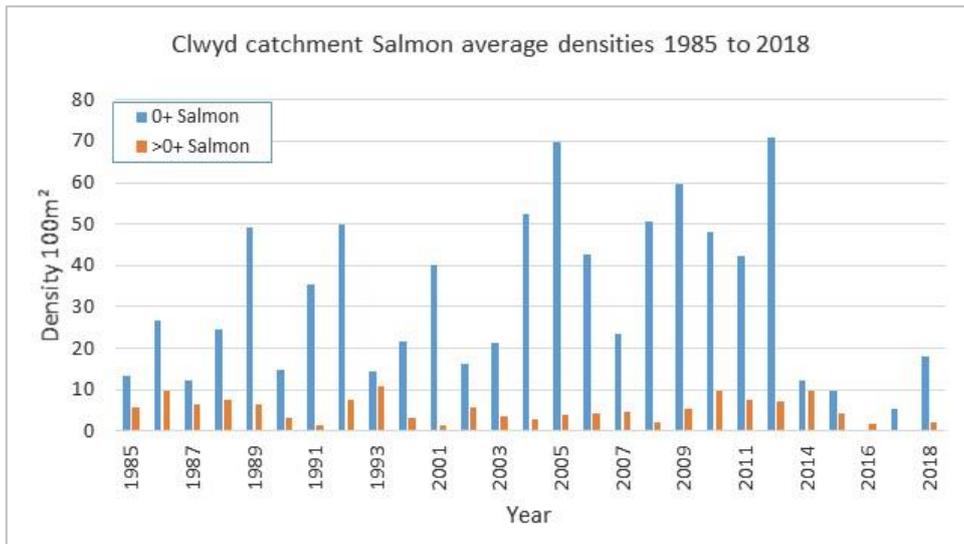
These surveys are carried out on riffles with the prime target being salmon fry. Fishing is timed for 5 minutes. The sites are generally on the main river and are too large for a normal survey.



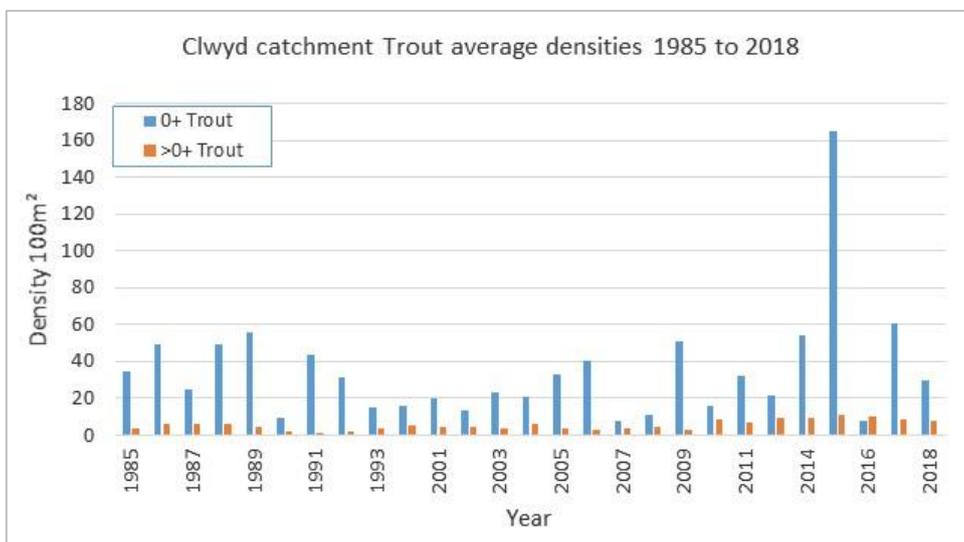
Catchment Population Trends

The graphs below show a simple comparison of average salmon and trout densities across the temporal sites on the Clwyd catchment since surveying began in 1985. NB – the data shown here are from Quantitative and Semi Quantitative surveys, not every site in the programme was done annually, and no surveys were done from 1994 to 1996, 1998 to 2000, and 2012. Historic catch efficiency data allows semi quantitative results to be comparable with quantitative.

Salmon fry and parr densities have fluctuated since monitoring began but there appeared to be an improving trend up until 2013. From 2014 onwards there has been a decline that is in-line with the rod catch. The improvement in 2018 is also in-line with the rod catch improvements in 2017.



Brown trout fry and parr densities on the Clwyd catchment have remained consistent over the years up until 2015, when there were exceptionally high densities of trout fry. This improvement was followed by one of the lowest trout fry densities on record in 2016, believed to be due to weather conditions. Results for trout fry in 2018 are consistent with the historic average. Trout parr densities have remained consistent.



The following table shows a simple comparison of the catchment average density of juvenile salmon and trout from 2018, and compares this against 2017, and the 5-year average. NB - The five year average has been set from 2010 to 2014 as 2016 was a poor year for both species, and 2015 was an exceptionally good year for trout fry.

	0+ Salmon	>0+ Salmon	0+ Trout	>0+ Trout
2018 average density	18.1	2.0	29.8	7.5
2017 average density	5.3	0.0	60.4	8.4
Percentage difference to 2017	244%	+	-51%	-10%
5-yr average (2010-14)	43.4	8.5	31.1	8.4
Percentage difference to 5-yr average	-58%	-76%	-4%	-11%

Having had poor salmon fry results since 2014 it is positive to see the improvement above, although compared to the five-year average the densities are still low. The improvement directly reflects the rod catch which has improved from about 12 salmon per season between 2014 and 2017, to 30 salmon in 2017. However, the 10-year average rod catch between 2003 and 2012 was 100 salmon per season. Poor salmon parr densities relate directly to the low salmon fry densities since 2016.

Trout fry density declined compared to 2017, however it is consistent with the historic average. We would have expected an improvement in 2018 as the rod catch in 2017 had increased compared to 2016 (Rod catch 2016 – 777, 2017 – 1063). The decline is unexpected as the winter of 2017/18 was quite settled, and very cold which should have benefitted fry survival/fitness. Trout parr densities are consistent with 2017 and the historic average.