

Know Your River – Conwy

Salmon & Sea Trout Catchment Summary

Introduction

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

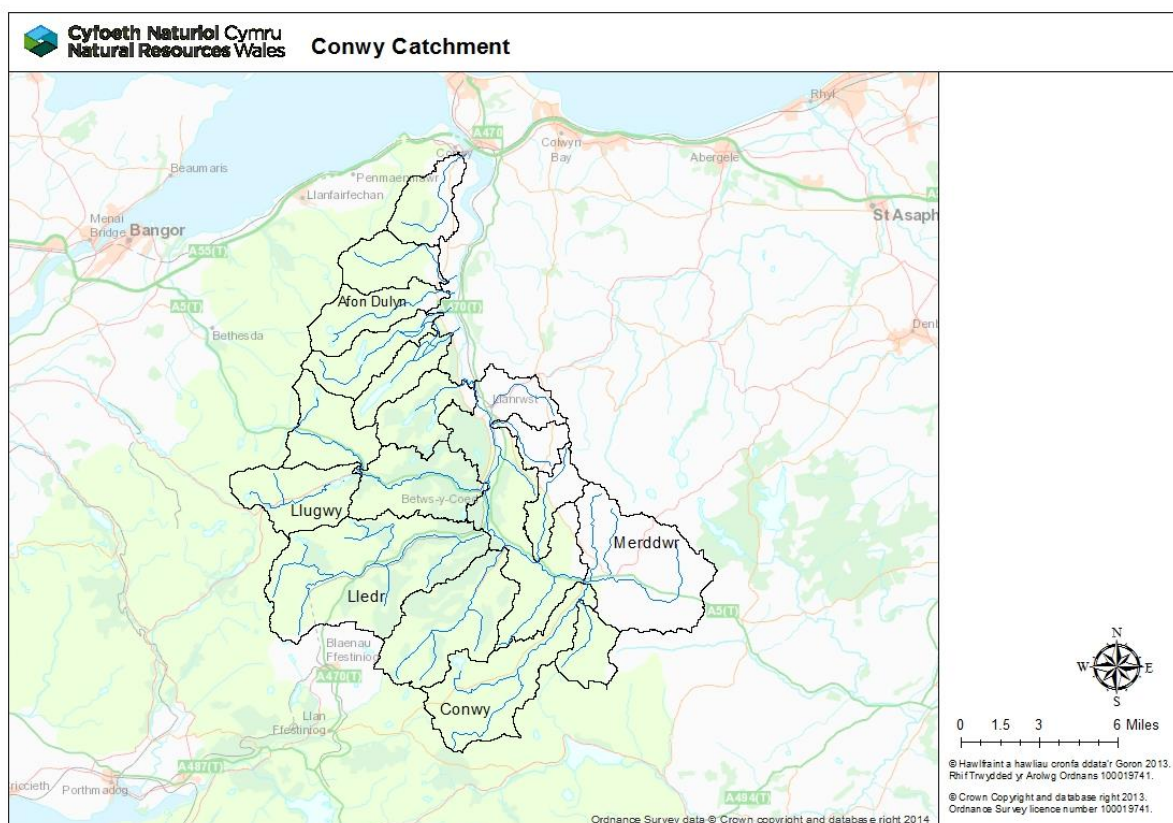
Action tables set out habitat improvements to restore freshwater productivity of salmon and sea trout populations. These tables also include some work which will be carried out by our partner organisations, not just Natural Resources Wales (NRW).

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 Afon Conwy rises from Llyn Conwy in the Migneint Moors in Snowdonia and drains a predominantly upland catchment discharging into Liverpool Bay at Conwy. The catchment is mainly rural with limited industrial development. Land use is dominated by agriculture (75%),



mainly sheep grazing with some dairy farming, and coniferous afforestation (12%). Tourism also plays an important role in the local economy.

The 'hard' Ordovician rocks in the south and west areas of the catchment have given rise to thin, poorly buffered soils that are susceptible to the effects of acidification. The weather resistance of these rocks has also given rise to steep slopes that have rendered most of the sub catchments in the south-western area inaccessible to migratory fish. In contrast, the geology of the north-eastern area of the catchment provides more buffering which reduces acid sensitivity.

Abandoned metal mine shafts, adits and spoil heaps act as point sources of metal contamination in parts of the Gwydyr forest just north of Betws y Coed. This contamination has a localised impact upon the Nant Gwydyr and minor tributaries of the lower Llugwy.

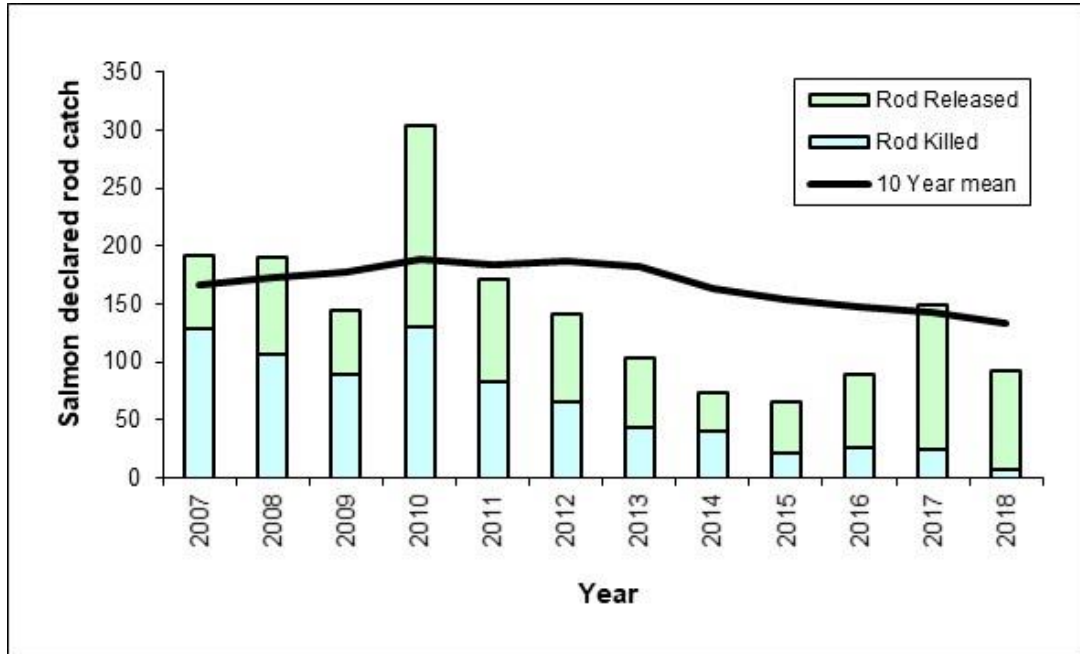
The Conwy falls fish pass was constructed in compensation for any disturbance to the Conwy's fisheries during the construction of the A55 expressway tunnel at Conwy. This was opened in 1994 and opened an additional 40% of spawning and nursery area within the catchment.



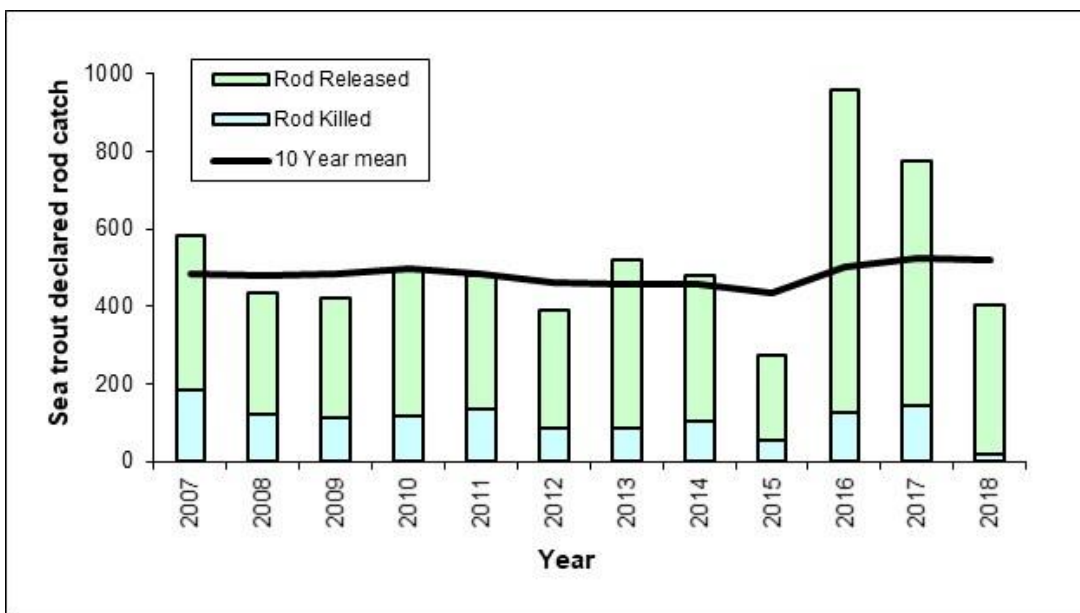
Rod catches

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

Salmon rod catch – declined in 2018, this may have been impacted by the extreme weather conditions causing low flows throughout the summer. The release rate in 2018 was 91%. This is an excellent improvement once again, and must continue to conserve stocks.



Sea trout rod catch – declined compared to 2016/17, however it is consistent with the historic trend. The release rate in 2018 was 95%. This is an excellent result and needs to be maintained.

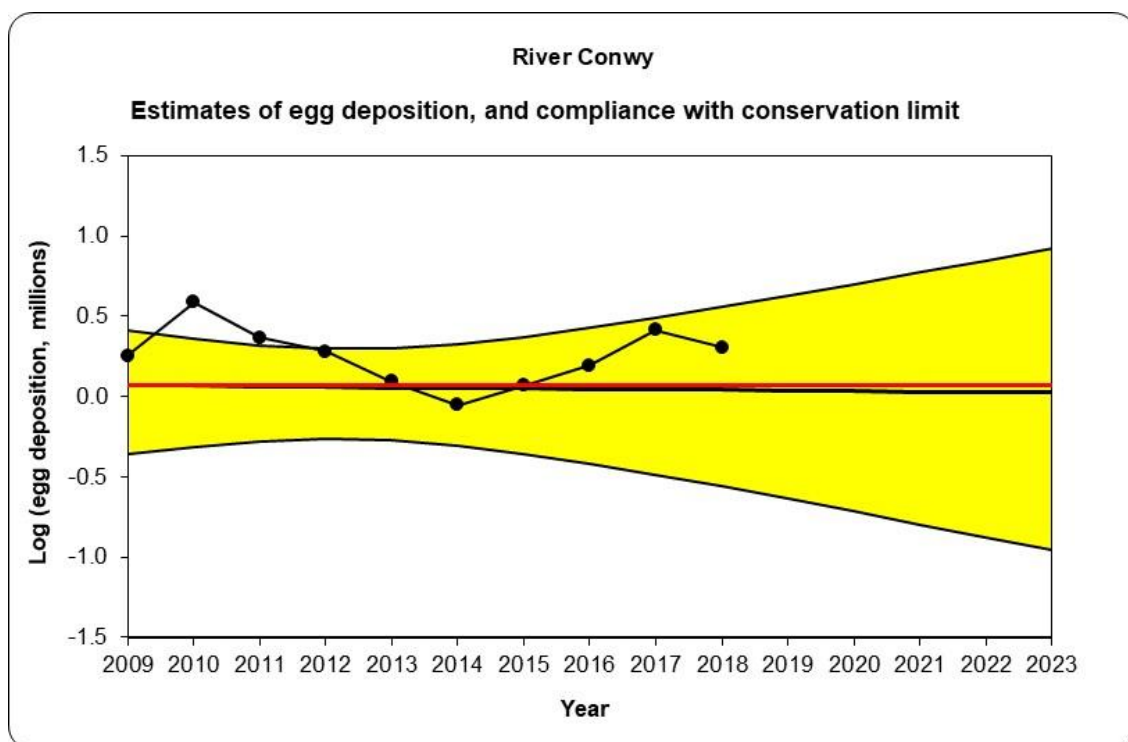


Stock status

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 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).

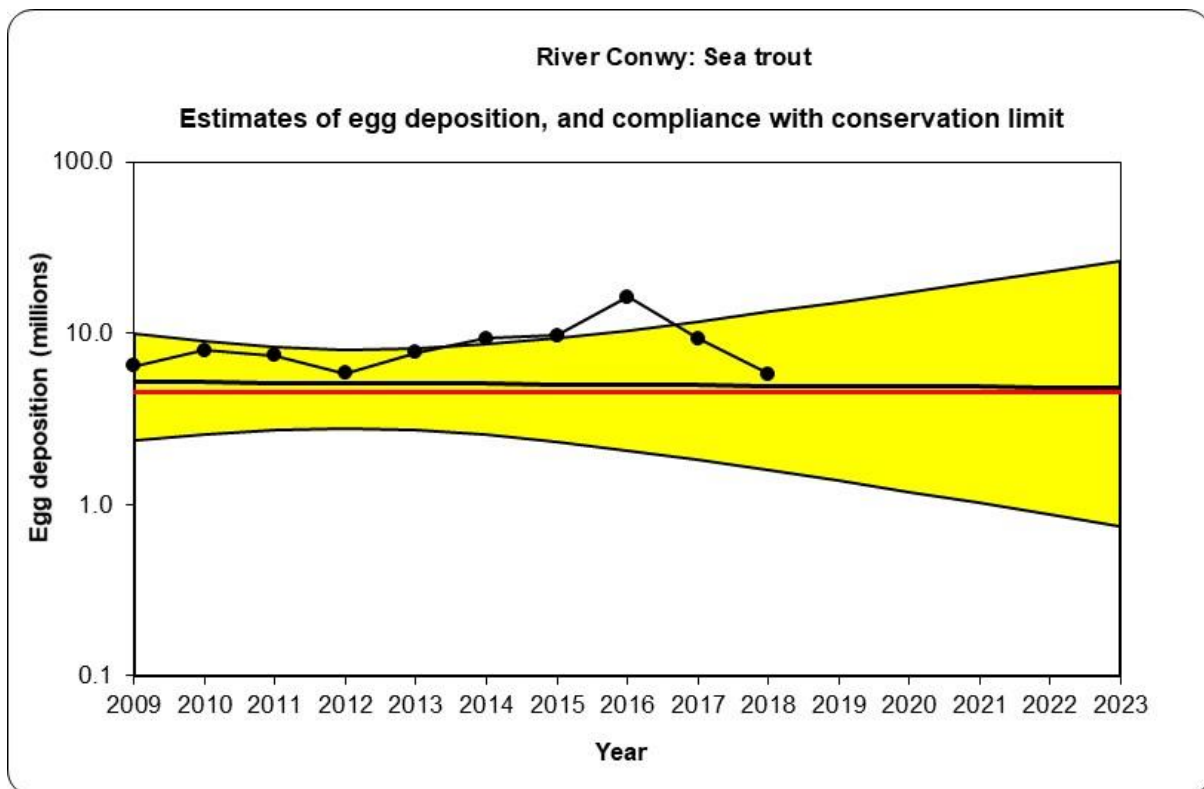
- Current number of eggs being deposited puts stocks **probably at risk**
- In 5 years' time the predicted status of salmon stocks will be **probably at risk**
- Based on current data, and the projection of the graph, the stocks of salmon on the Conwy will continue to **decline (uncertain trend)**

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 stocks in the catchment?

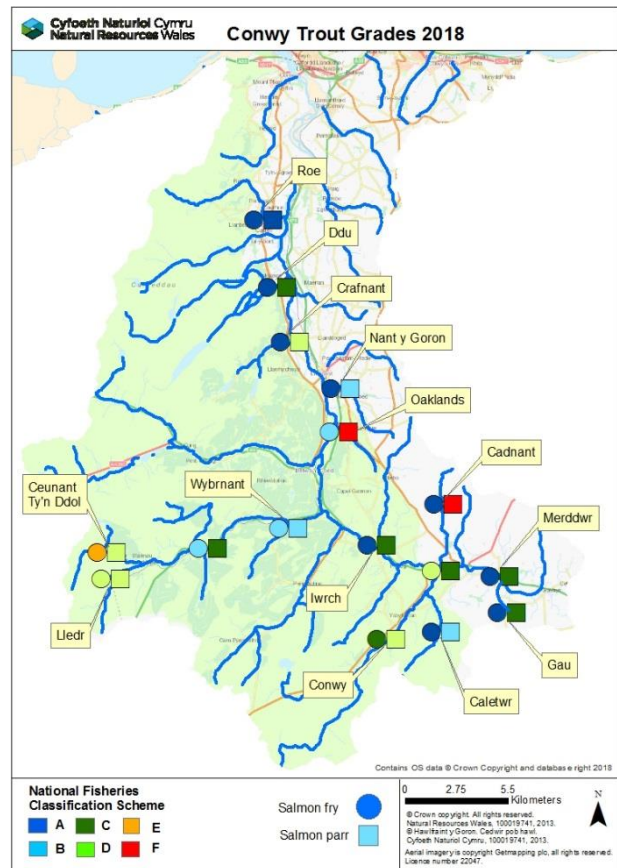
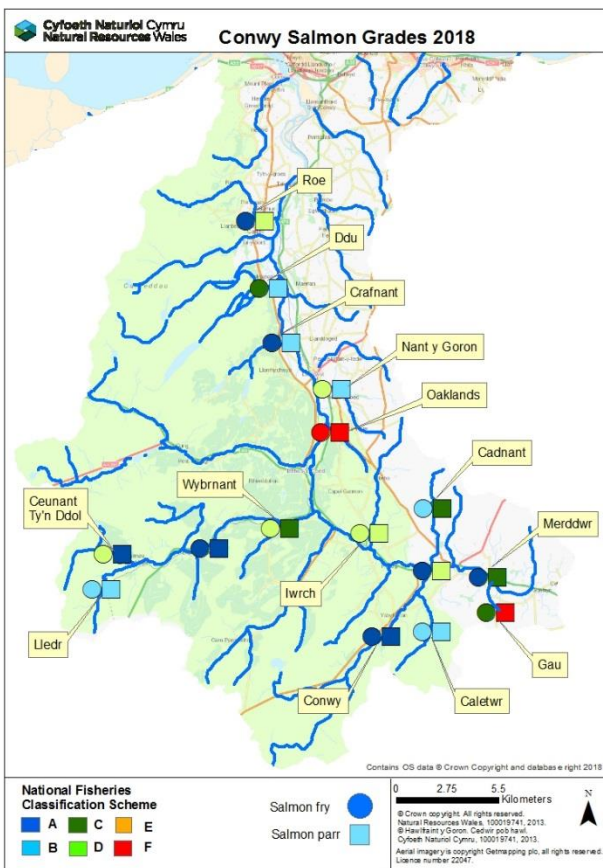
The red line represents the number of eggs required to be deposited to sustain a healthy sea trout stock. The black trend line and its confidence limits (the yellow band) is fitted to the most recent 10-year series of egg deposition estimates (2009-2018).

- Current number of eggs being deposited puts stocks **probably not at risk**
- In 5 years' time the predicted status of salmon stocks will be **probably not at risk**
- Based on current data, and the projection of the graph, the stocks of sea trout on the Conwy will continue to **decline (uncertain trend)**

Juvenile Monitoring

The following maps 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 additional timed surveys 2018

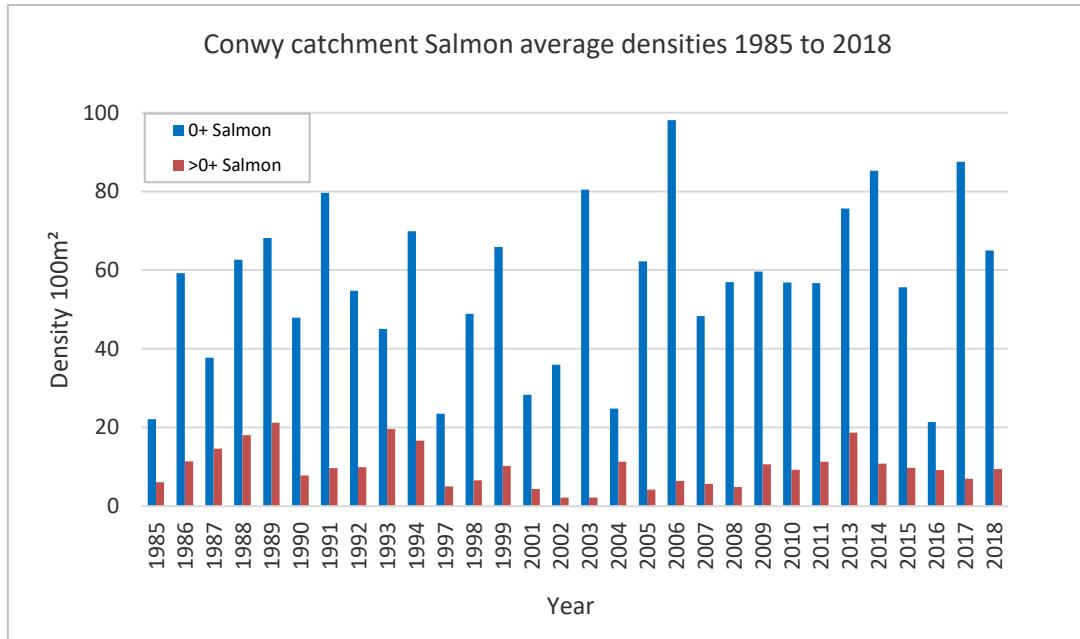
These surveys are carried out on riffles with the prime target being salmon fry. Fishing is timed for 5 minutes. The sites are generally on main river, which is too large to be surveyed



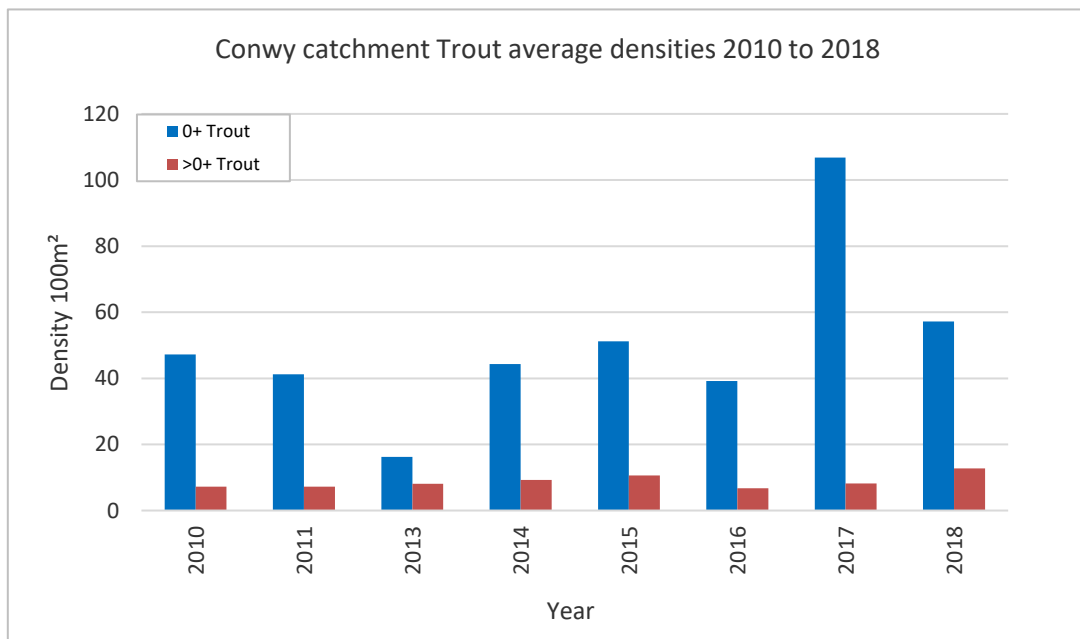
Catchment Population Trends

The graphs on the following page show a simple comparison of average salmon and trout densities across the Conwy 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 every year, and no surveys were done in 1995, 1996, 2000 & 2012. Historic catch efficiency data allows semi quantitative results to be comparable with quantitative. Trout data begins at 2010 due to a change in the programme.

Salmon fry densities are good in 2018 compared to the historic data, and they are excellent compared to the poor results in 2016, which were recorded nationwide. Parr densities have improved in 2018, and this correlates to the improved salmon fry densities in 2017. Salmon rod catch on the Conwy improved in 2017 with 150 fish caught, compared to 89 salmon in 2016. We would have expected improved salmon fry densities in 2018 but this did not occur.



Brown trout fry densities at the Conwy temporal sites were generally consistent in 2018. Only the Roe had high trout fry densities in 2018. In 2017 the sea trout rod catch declined compared to 2016 (2017 – 774, 2016 – 961), however the 2017 rod catch is still way above the five year average (5-year average – 524). Trout parr densities have remained consistent compared to the historic data.



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 2011 to 2015 as 2016 was a poor year.

	0+ Salmon	>0+ Salmon	0+ Trout	>0+ Trout
2018 average density	65.0	9.4	57.2	12.7
2017 average density	87.6	7.0	106.7	8.2
Percentage difference to 2017	-26%	35%	-46%	55%
5-yr average (2011-15)	68.3	12.7	38.2	8.8
Percentage difference to 5-yr average	-5%	-26%	50%	44%

The salmon fry densities in 2018 have declined compared to 2017, however they are only slightly below the 5-year average. We would have hoped for any improvement due to the increase in rod catch during 2017. The winter of 2017/18 was more unsettled compared to 2016/17 so this may have effected survival. Salmon parr densities have improved compared to 2017, but are still below the 5-year average. The improvement links directly to the improved fry densities in 2017. Trout fry densities have declined compared to 2017, however they are 50% above the 5-year average. The decline links directly to rod catch. Trout parr densities are good compared to 2017 and the 5-year average. This links directly to the excellent trout fry results in 2017.

Conwy fall fish pass

We have installed a camera within the Conwy falls fish pass in 2019. This has allowed us to realise that the counter is recording a number of false counts due to the gates opening. Historic data will need to be reviewed in the near future. We believe that 2016/17 results are an over estimate, however the improved juvenile data in the following summers provides supporting evidence of an increase in spawning success on the upper Conwy.

During 2016 and 2017 the Conwy falls fish pass recorded some of the best overall up counts on record. In 2018 early runs of fish on the Conwy were hindered due to the hot and dry summer. However once there was some rain there were reports from the Conwy anglers that good numbers of fish were present. When higher flows occurred in September and October we expected to see more fish using the pass, however this did not occur.

This year the number of fish through the Conwy falls fish pass has been exceptionally poor. Only 118 up counts were recorded compared to 433 in 2017. The reason for this is being investigated, however access to the counter itself is difficult due to health and safety requirements. The graph below highlights the variation of fish using the pass since it opened in 1994. NB – counter was broken in 2009/10/12. The counter broke in early September during 2011. In 2013 the counter was broken till mid-August.

