Know Your River – Mawddach

Salmon & Sea Trout Catchment Summary

Introduction

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

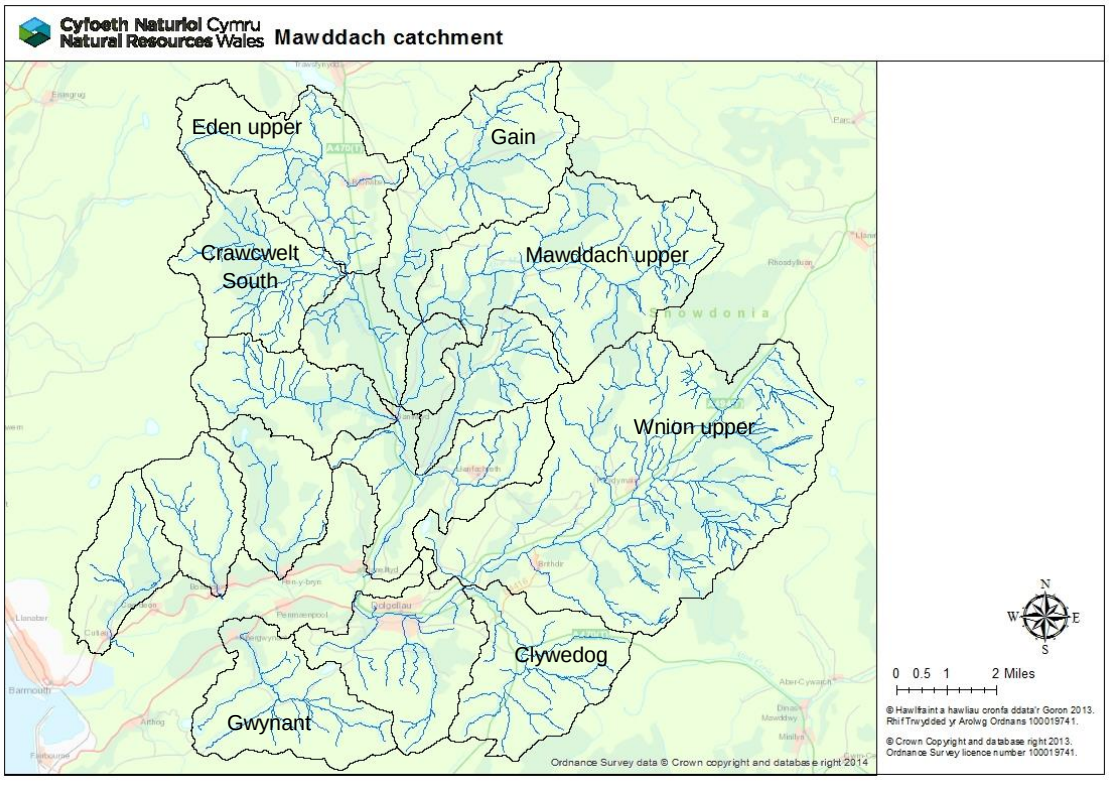
Action tables set out habitat improvements to restore freshwater productivity of salmon and sea trout populations. These tables also include some work which will be carried out by our partner organisations, not just Natural Resources Wales (NRW).

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 Mawddach catchment is broadly divided into two major subcatchments. The Mawddach subcatchment lies to the north and drains upland moorland which has been extensively



afforested. Migratory salmonid access is limited by natural waterfalls on the main Mawddach, Gain & Wen. The Wnion subcatchment drains the area south and south-east of the Mawddach and enters the Mawddach Estuary approximately 1km downstream of the upper tidal influence on the Mawddach. Again, access too many of the tributaries is limited by waterfalls.

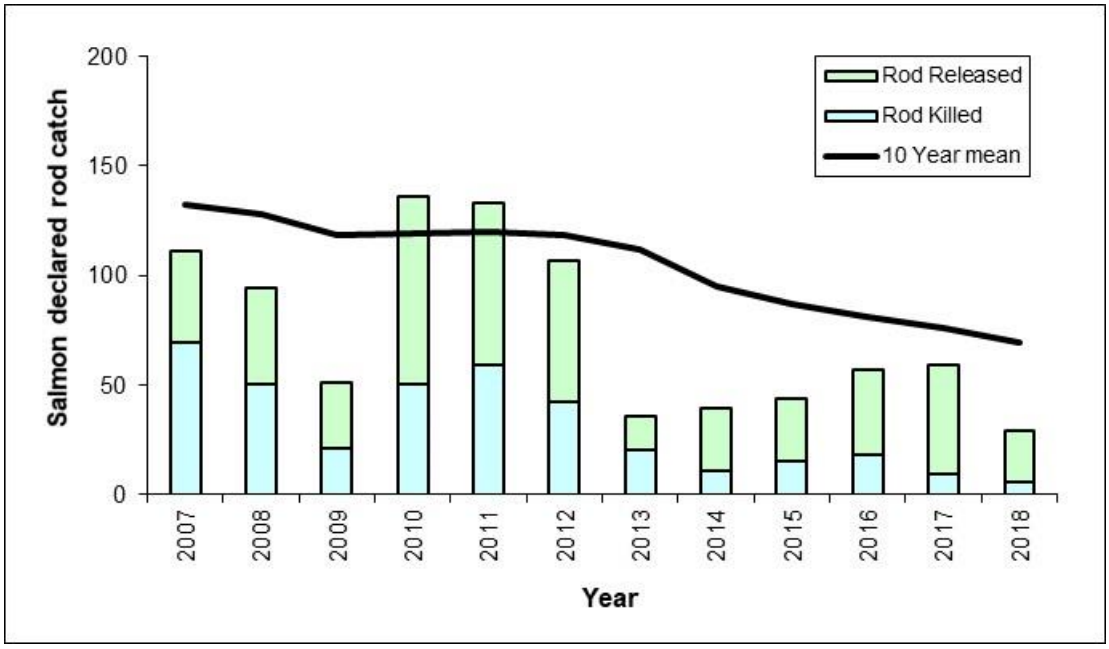
There are acidification problems on both subcatchments, exacerbated by coniferous afforestation. There are heavy metal problems in the Mawddach subcatchment, particularly on the Mawddach, Wen and Gain, where an abandoned munitions disposal site is thought to be responsible for poor fish populations. Water from the western tributaries of the Eden are diverted via the Ardudwy Leat into Llyn Trawsfynydd.

In 1984 a major pollution incident on the Mawddach killed thousands of juvenile salmonids and over 2000 adult salmon and seatrout. Since 1987 a remedial stocking programme has operated on the Mawddach which is due to end in 2021. In 2015 salmonid stocking was terminated due to a policy change by Natural Resources Wales (NRW). Any mitigation stocking was to be delivered through opening additional habitat & habitat works. As the Mawddach anglers have a contract till 2021 the option is with them whether to continue stocking or move to habitat works.

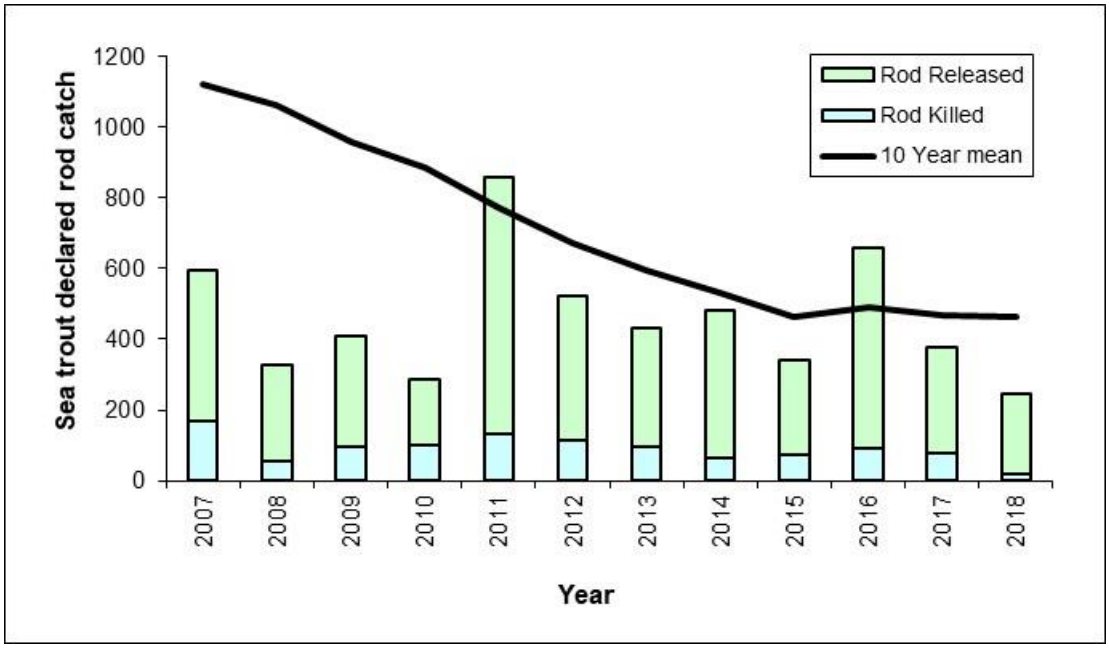
Rod catches

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

Salmon rod catch – has been poor since 2013, and 2018 rod catch is the worst we have on record. This will no doubt have been influenced by the extreme summer weather conditions. The release rate in 2018 was 79%. This has declined compared to 2017, and this needs to improve with stocks being so poor.



Sea trout rod catch – once again declined in 2018, and this is also the worst rod catch we have on record. We again believe this was due to the extreme weather conditions. The release rate in 2018 was 92% and needs to continue.

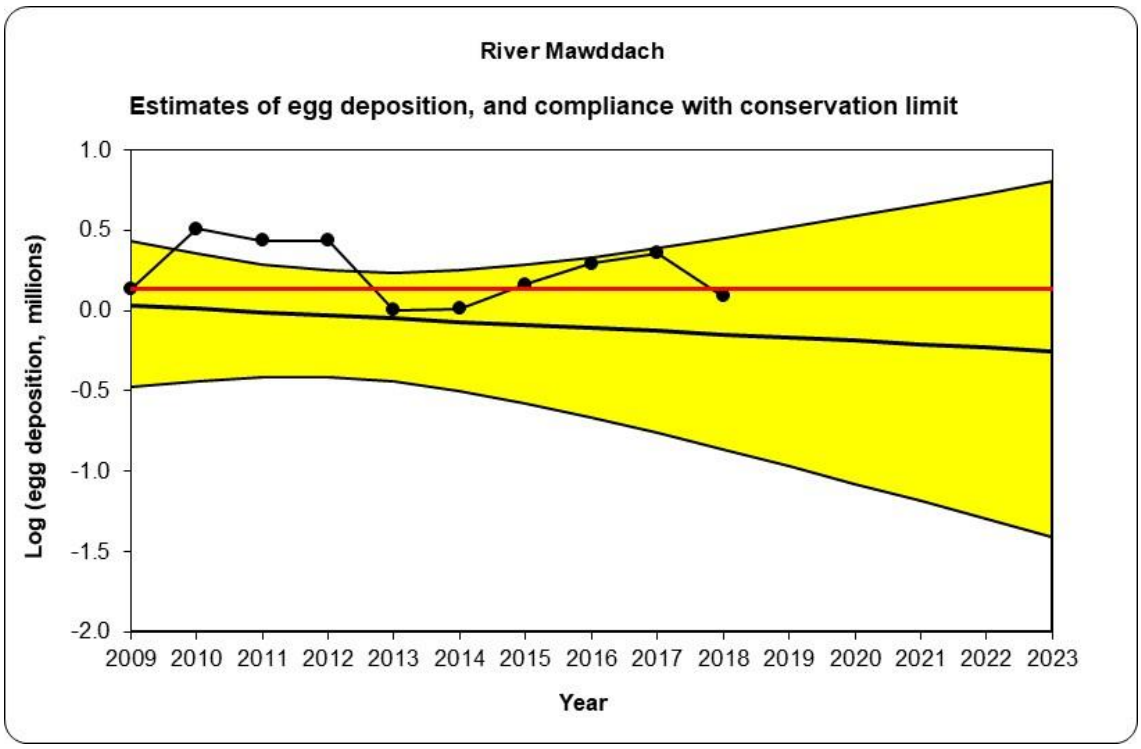


Stock status

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).

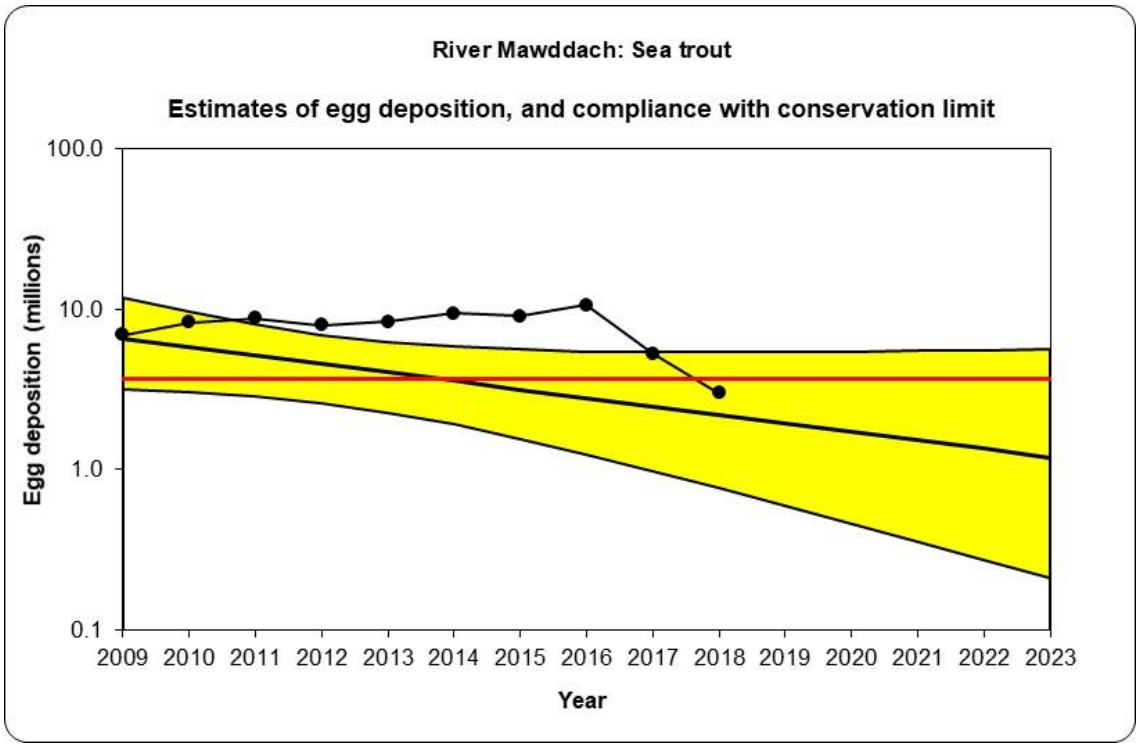
- Current number of eggs being deposited puts stocks **probably at risk**
- In 5 years' time the predicted status of salmon stocks will be **probably at risk**
- Based on current data, and the projection of the graph, the stocks of salmon on the Mawddach will continue to **decline** **(uncertain trend)**

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 at risk**
- In 5 years' time the predicted status of salmon stocks will **probably at risk**
- Based on current data, and the projection of the graph, the stocks of sea trout on the Mawddach will continue to **decline** **(uncertain trend)**

Juvenile Monitoring

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

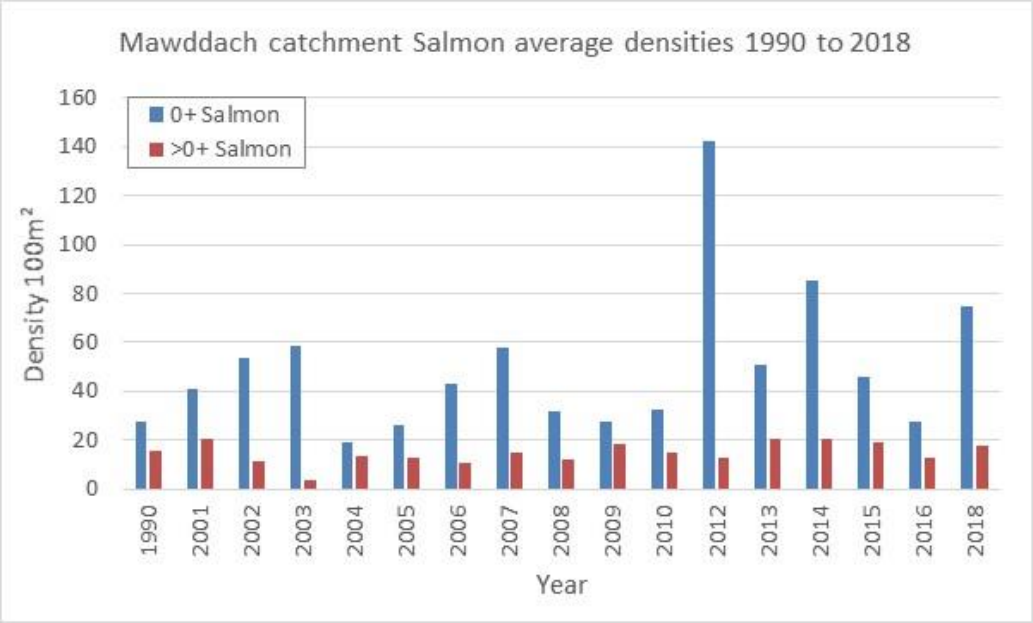
The symbols display the National Fish Classification Scheme (NFCS) grades which have been developed to evaluate and compare the results of fish population surveys in a consistent manner. The NFCS ranks survey data by comparing fish abundance at the survey sites with sites across Wales and England where 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

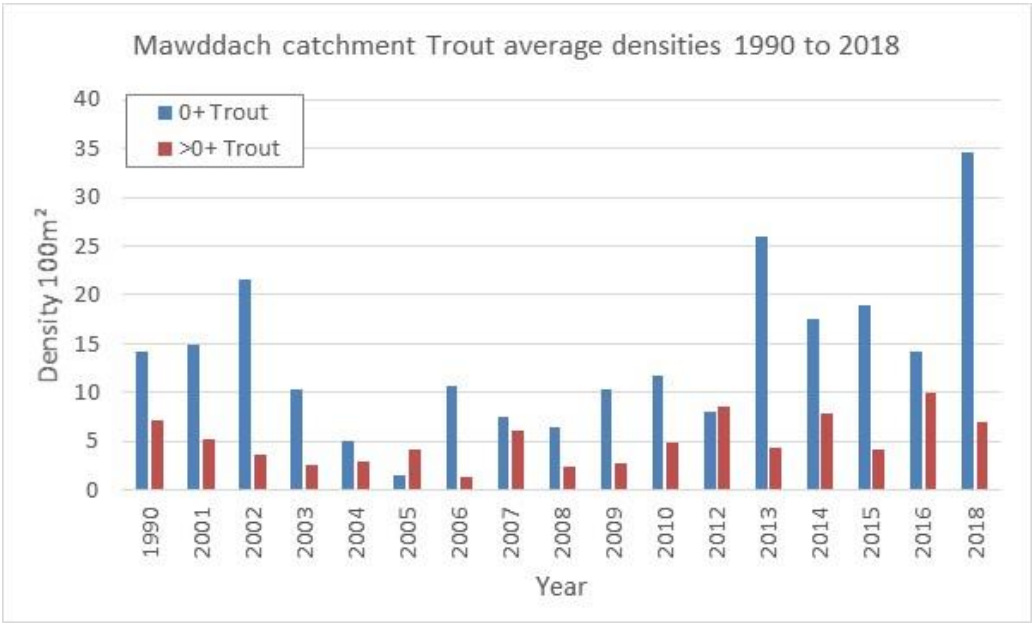
Catchment Population Trends

The graphs below show a simple comparison of average salmon and trout densities on the Mawddach catchment since surveying began in 1990. NB – the data shown here is from Quantitative and Semi Quantitative surveys, the site was not done every year, and no surveys were done from 1991 to 2000, 2011, and 2017. Historic catch efficiency data allows the semi quantitative figures to be comparable with quantitative data. Data from the Mawddach site is not included due historic low catch efficiency.

Salmon fry and parr densities have varied since 1990. The densities for salmon fry are good in 2018. This is mainly due to the excellent results on the Wnion. Salmon parr have remained consistent.



Brown trout fry densities on the Mawddach have improved since 1990 and are excellent in 2018. Brown 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 to 2016 and the 5-year average (2016 is not included in the 5 year average as it was a poor across the UK).

	0+ Salmon	>0+ Salmon	0+ Trout	>0+ Trout
2018 average density	74.6	17.5	34.6	7.0
2016 average density	27.8	12.8	14.2	10.1
Percentage difference to 2016	**168%**	**36%**	**144%**	**-31%**
5-yr average (2011-15)	80.9	18.3	17.6	6.2
Percentage difference to 5-yr average	**-8%**	**-4%**	**97%**	**12%**

Salmon fry and parr densities are much improved compared to 2016 and are nearly equal to the 5-year average. This is excellent news and is linked to the increase in rod catch during 2017(44 salmon 2015 – 59 salmon 2017), and the improved catch and release rate (66% released 2015 – 85% released 2017).

The trout fry density is much improved against 2016 and the 5-year average. Trout parr densities are fluctuating around a similar figure year on year, and this will be due to available habitat at the sites we fish. Sea trout rod catch has declined from 858 in 2011 to 377 in 2017, however effort has also declined dramatically. Looking at the catch per unit effort between 2011 and 2017 this has remained relatively stable, insinuating that the stocks are stable. The improvement in juvenile trout densities is therefore very positive.

Catch and release rates have remained consistent at about 80% for sea trout since 2008.