

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.

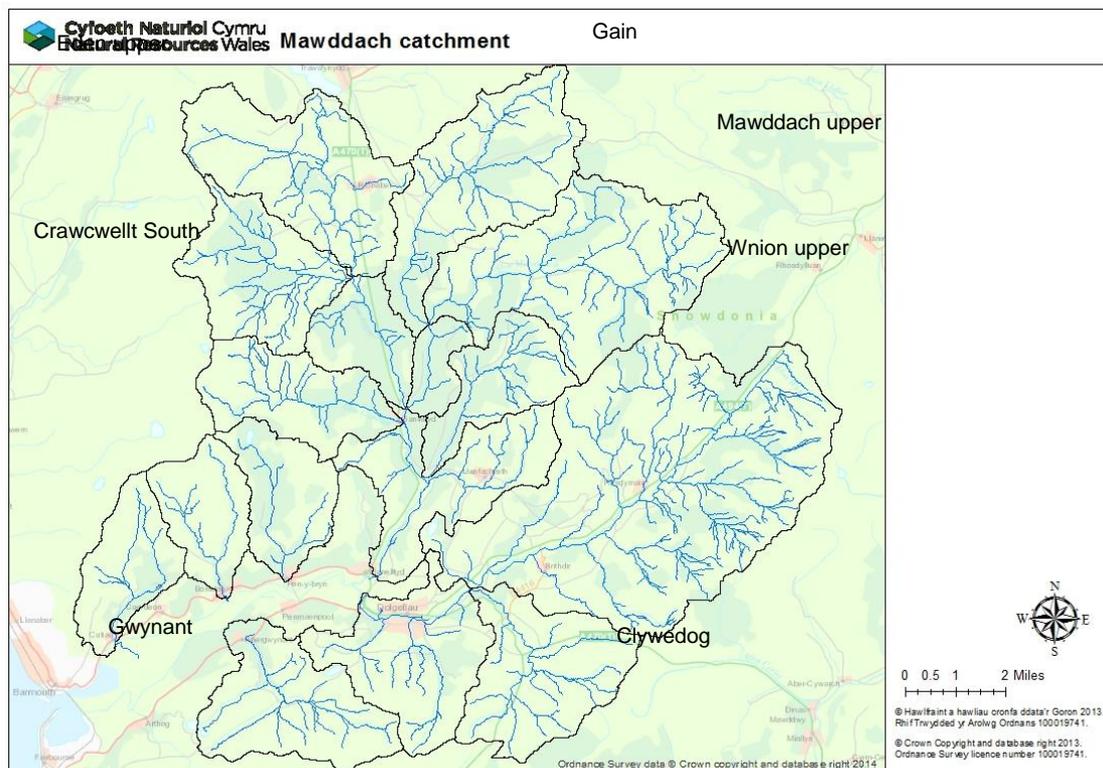
Action tables set out habitat improvements to restore freshwater productivity of salmon and sea trout populations. These tables also include some work which will be carried out by our partner organisations, not just Natural Resources Wales (NRW).

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.

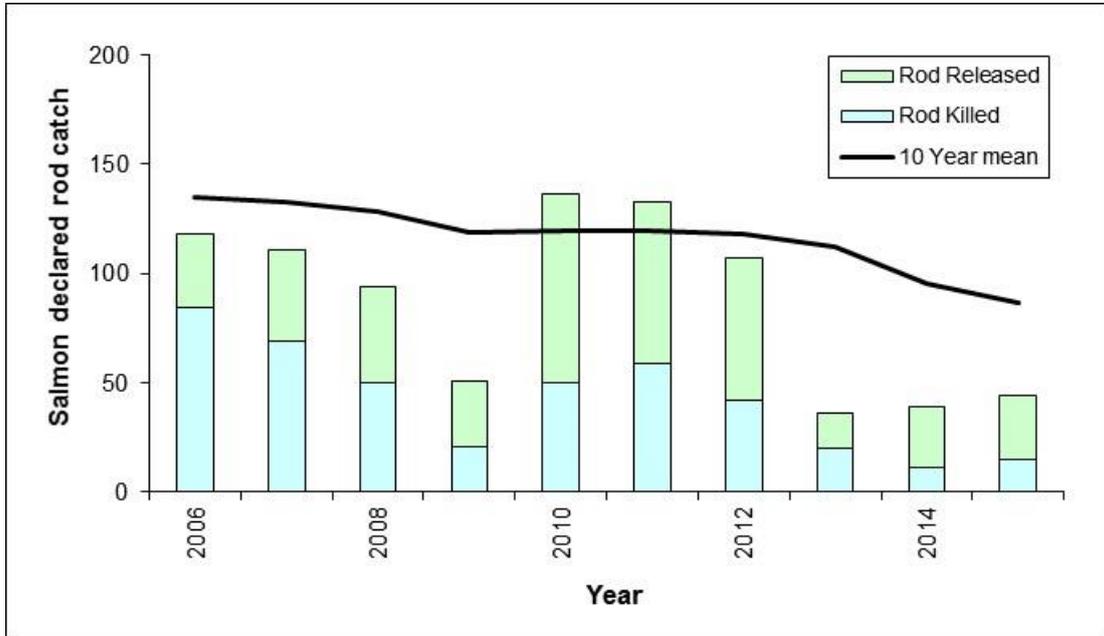
There are acidification problems on both subcatchments, exacerbated by coniferous afforestation. There are heavy metal problems in the Mawddach subcatchment, particularly on the Mawddach, Wen and Gain, where an abandoned munitions disposal site is thought to be responsible for poor fish populations.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

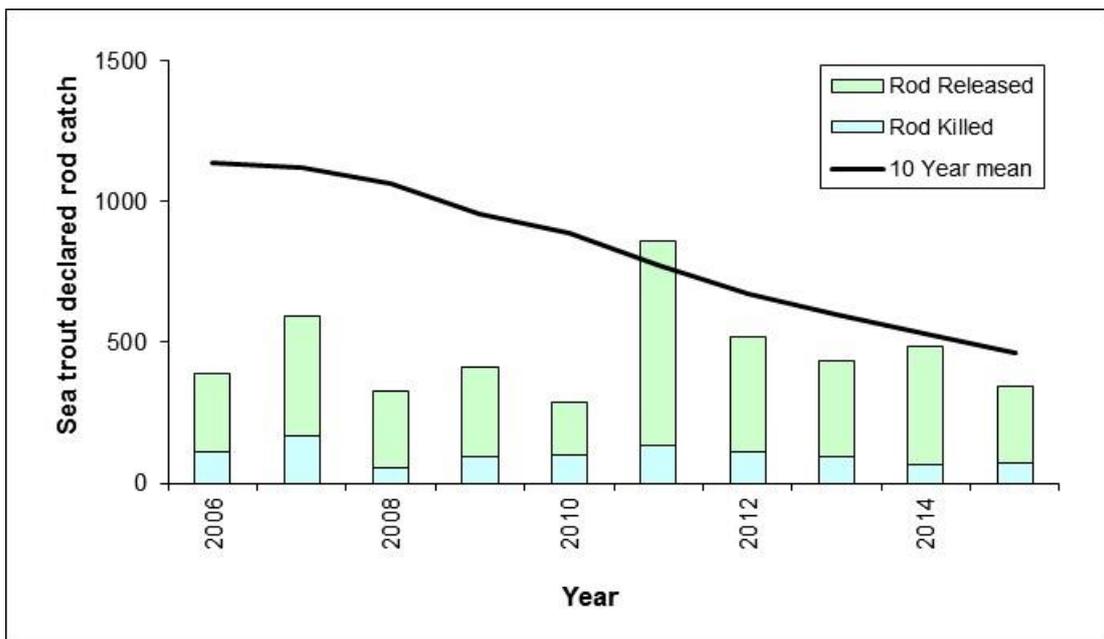
Rod catches

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

Salmon rod catch – has declined since 2012. The release rate in 2015 was 66%. This has declined and needs to improve to conserve stocks. The North Wales average is 65%.



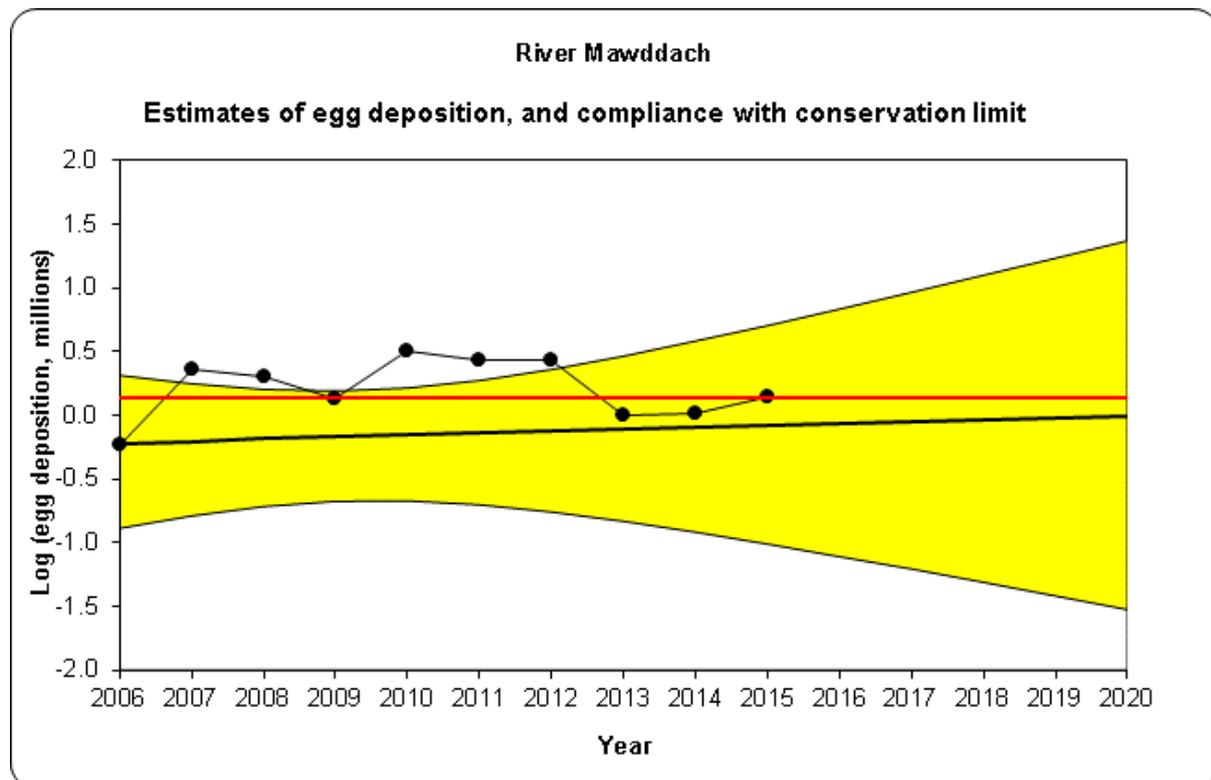
Sea trout rod catch – has remained poor in comparison to historic data over the past ten years. The release rate in 2015 was 78%. This is good and needs to improve to conserve stocks. The North Wales average is 72%.



Stock status

Conservation of Salmon

Salmon stock status is assessed through the use of 'Conservation Limits' which provide an objective reference point against which to assess the status of salmon stocks in individual rivers. 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. This is why, 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 CL 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?

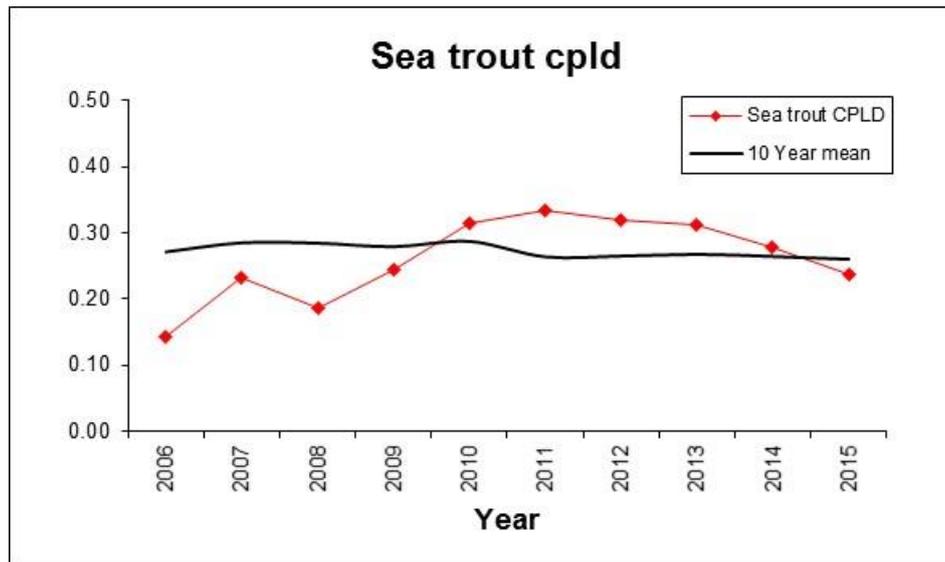
The red line represents the number of eggs required to be deposited to sustain a healthy salmon stock.

- 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 and future trends the stocks of salmon will continue to **improve**

Conservation of Sea Trout

Our approach to assessing sea trout stock performance is still under development. It is based on catch trends in the last three years compared with those in the previous ten. The assessment gives an early warning about potential problems and assists with considering whether any further management actions are required. It provides an indication of changes in fishery performance, though this is not always a reflection of stock performance.

Catch Per License Day (CPLD) is the average number of fish caught for each day fished on the river and as such accounts for the variability in the amount of fishing effort between years. These statistics can be a better guide than simply looking at the total catch.

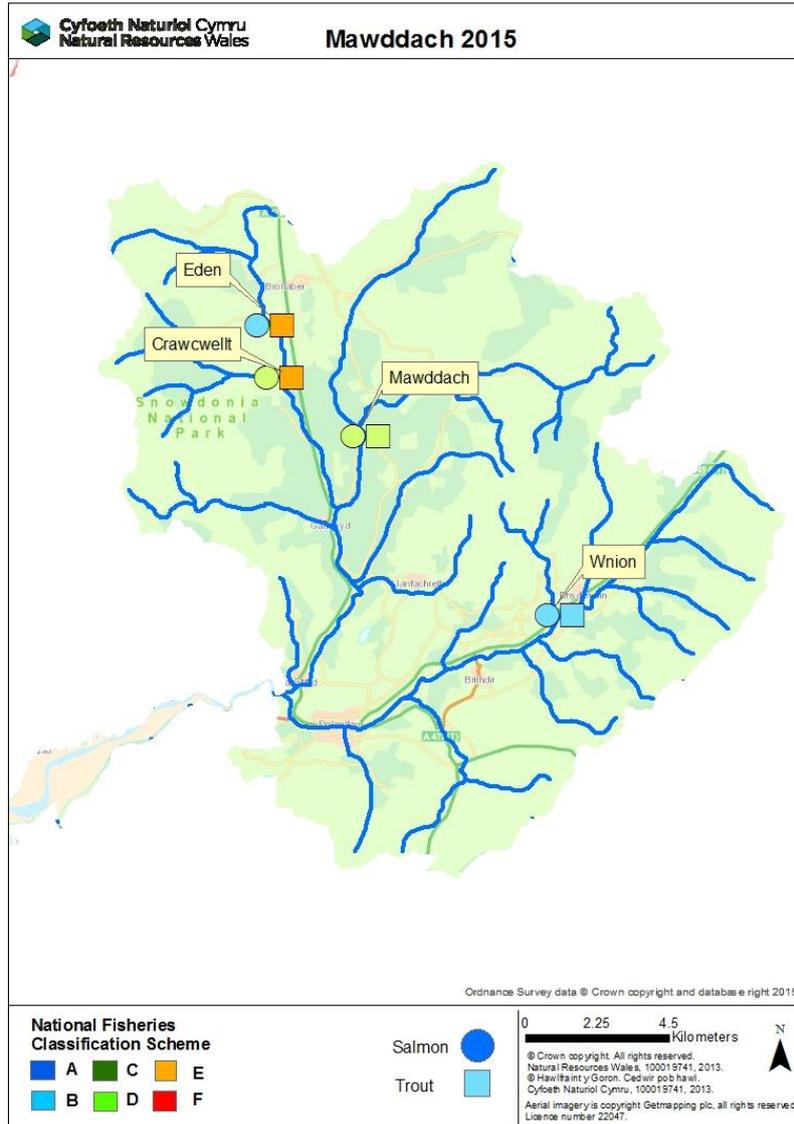


- The latest 10-year trend in CPLD on the Mawddach is **stable**
- Average CPLD for the most recent 3-year period is in the **middle/lower (20<50%)** of the range of CPLD figures reported in the previous 10-years
- Combining the above measures, the Mawddach is classified as **“probably at risk”**: i.e. the fishery appears to be underperforming – giving rise to some concerns about the status of the adult stock

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



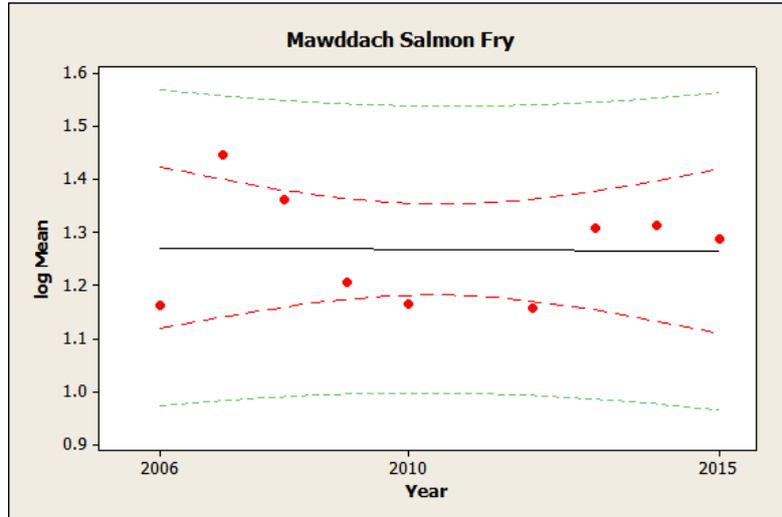
Juvenile Analysis

Trend

Trends in the population data for juvenile salmon and trout were assessed using a Bayesian statistical model. The data was analysed using a linear model which fits a straight line to the data in order to determine whether a trend (upwards or downwards) is present in fish numbers over the timeframe. The statistical significance of the trend is denoted by the P value, $P > 0.975$ indicates a statistically significant upward trend, and $P < 0.025$ indicates a statistically significant downwards trend. This can also be considered as percentage chance, e.g. a 97.5% chance of an upward trend, or just a 2.5% chance of an upward trend (which is a statistically significant downwards trend).

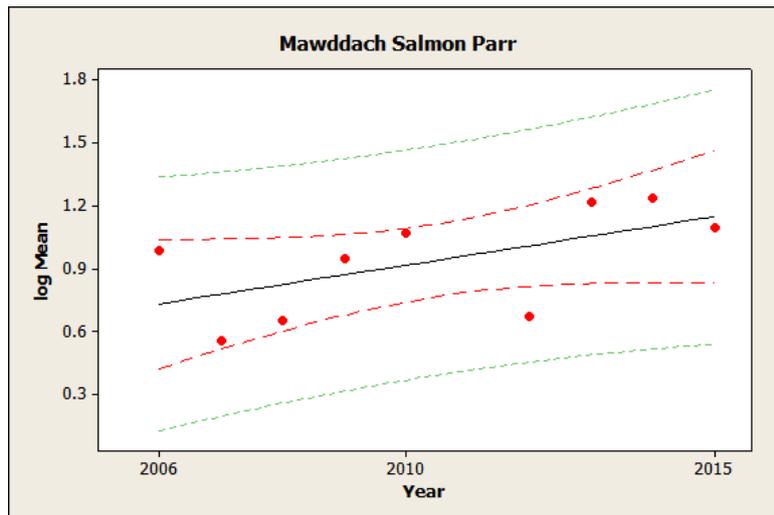
Data was analysed for the period 2006 to 2015 for comparison against Salmon/Sea Trout conservation data. The figures below display trends in juvenile fish numbers over this period (note log scale).

Salmon Fry



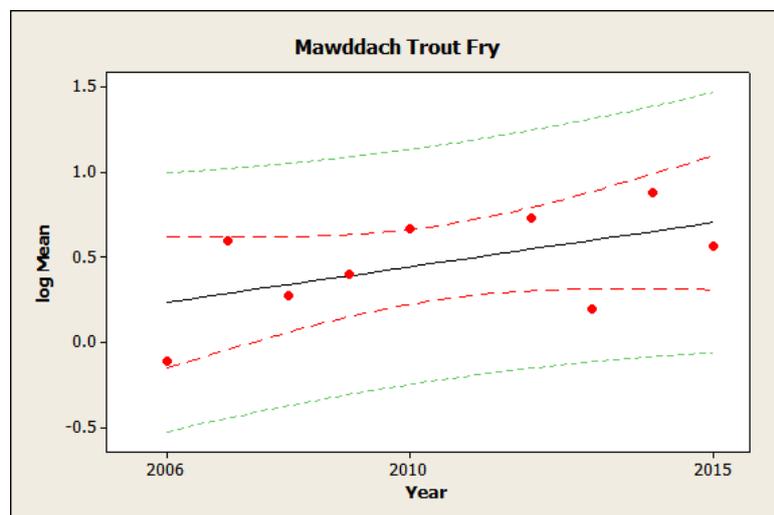
- Salmon fry densities on the Mawddach have shown a **slight decline** since 2006.
- This trend is **not statistically significant (P = 0.94)**.
- Annual data is provided from our sites on the Wnion and Eden. Salmon fry densities on the Wnion vary greatly year on year, whereas the Eden is consistent. This does not reflect the declining salmon rod catch on the Mawddach. The 2013/14 seasons have seen some of the poorest salmon runs on record across the UK. This is believed to be due to sea survival. Poor feeding grounds have led to a large decline in the grilse run. The majority of returning salmon are now multi-sea winter fish.

Salmon parr



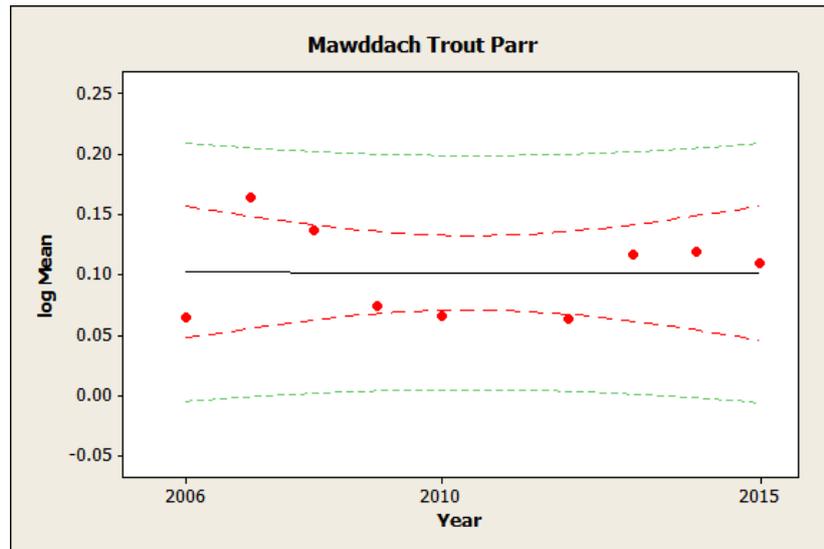
- Salmon parr densities on the Mawddach have **improved** since 2006.
- This trend is **not statistically significant (P = 0.1)**.
- Salmon parr densities on the Eden have remained consistent, whereas the Wnion has improved year on year. This does not reflect the declining salmon rod catch on the Mawddach. Both sites have good parr habitat.

Trout fry



- Trout fry densities on the Mawddach have **improved** since 2006.
- This trend is **not statistically significant (P = 0.13)**.
- Trout fry densities have remained consistently poor on the Eden, however there have been improvements on the Wnion. Improvements in trout fry densities have been seen in most North Wales River. Favourable local marine conditions are believed to be linked to these improvements.

Trout parr



- Trout parr densities on the Mawddach have shown a **slight decline** since 2006.
- This trend is **statistically significant (P = 0.99)**.
- The Wnion has seen an improvement in Trout parr since 2006, however poor results on the Eden have brought down the overall trend. The Eden is predominantly salmon.

Fisheries Action – Mawddach

Site	Action	Benefits	Lead	Partner(s)	Timescales for delivery
Mawddach	Barriers to be addressed: <ul style="list-style-type: none"> • Abergwynant (SH678171) - easement. Alternative mitigation action. • Llyn Delyn (SH749250) - easement. Alternative mitigation action. • Investigation of barriers on the catchment to improve fish passage 	<ul style="list-style-type: none"> • Improved knowledge of barriers to improve access for fish, including salmon and trout to spawning areas upstream. • Improved access to spawning areas and habitat upstream. • Improved fish numbers and increased diversity of fish populations - increased resilience. 	NRW	Angling clubs	2016/17 2016/17 Ongoing
	Habitat improvements: Financed by Alternative Mitigation funds and other fisheries funds (including rod licence) <ul style="list-style-type: none"> • In-stream habitat work – generating increased spawning areas • In-stream habitat work – maximising the available habitat for juvenile fish • Wen, Wnion, Eden 	More natural river system, reduced siltation, increased flow diversity, improved spawning gravels and juvenile habitat. Improved fish numbers.	NRW	Angling clubs	2016-2020
	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