Know Your River - Seiont

Salmon & Sea Trout Catchment Summary

Introduction

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

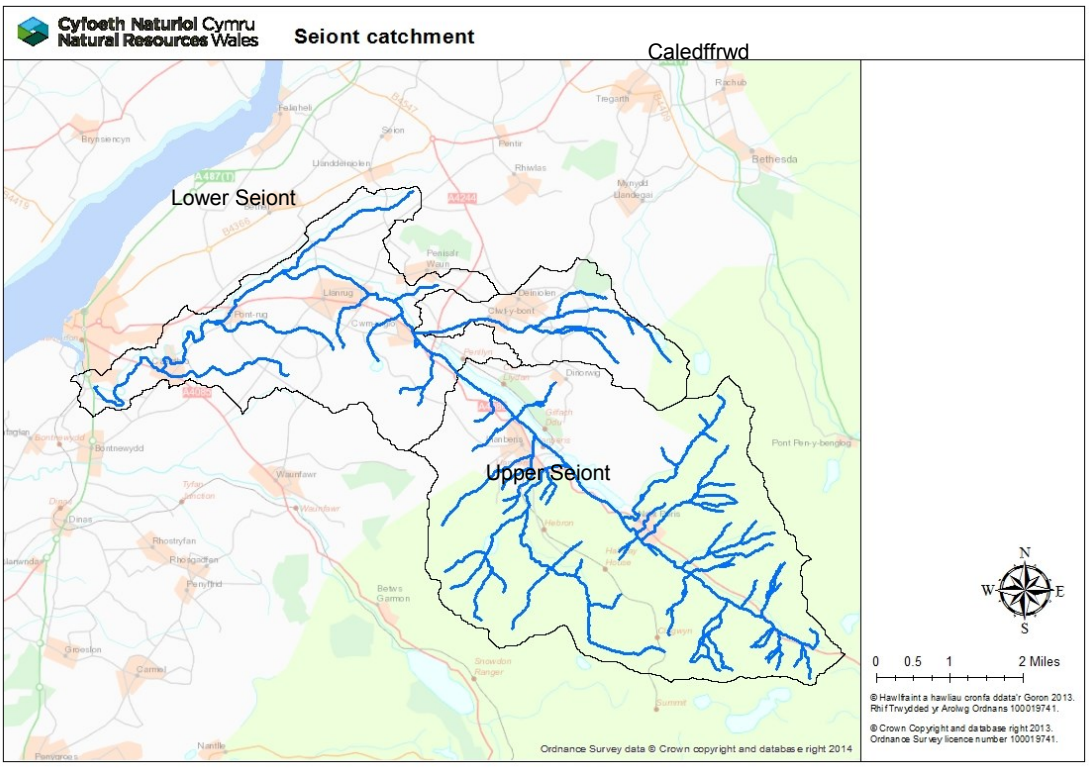
Action tables set out habitat improvements to restore freshwater productivity of salmon and sea trout populations. These tables also include some work which will be carried out by our partner organisations, not just Natural Resources Wales (NRW).

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 Seiont catchment, covering an area of 84.1 km^2, drains an extensively slate-mined upland area and lowland brown earth. Classed as a small spate river, the Afon Seiont rises at the head of the Llanberis Pass and is joined by many tributaries as it flows 7.8 km into Llyn Padarn (a 692 hectare lake, 3.2 km in length). From leaving this lake the river flows for 14.5 km before entering the Menai Straits by Caernarfon Castle.



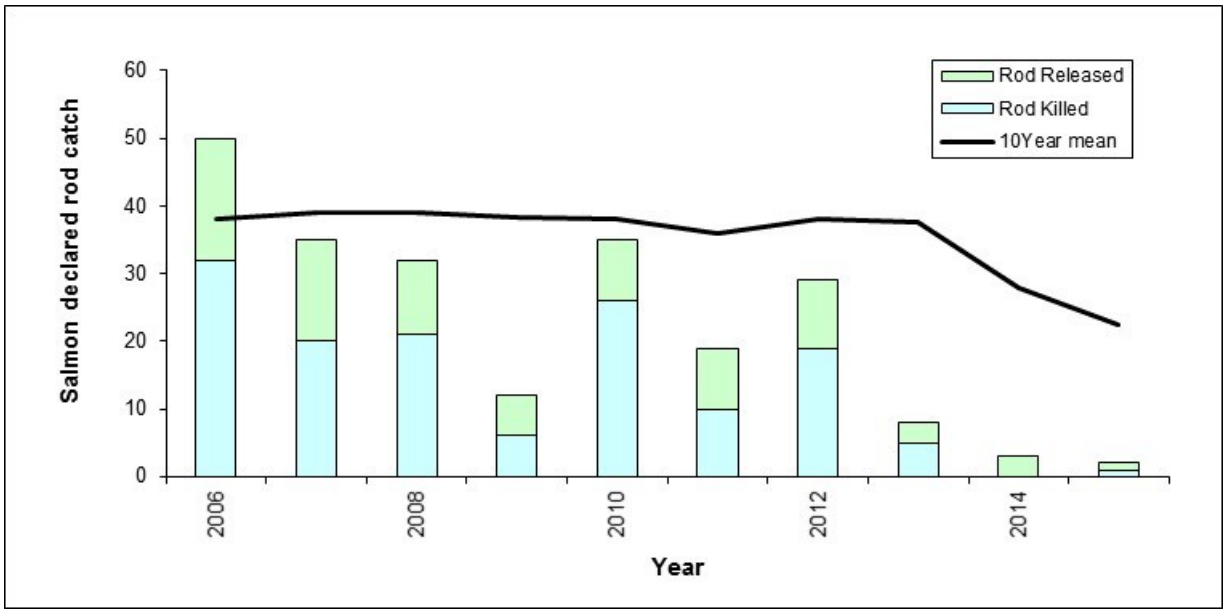
Built beneath the old Dinorwig slate quarry, a hydro-electric power station (HEP) utililises Llyn Peris and Llyn Marchlyn Mawr, supplying electricity to the national grid. The power station owned by First Hydro Limited began operating in February 1982, building up to full capacity in 1984. Adult salmon and sea trout swimming up the Afon Seiont are able to swim through Llyn Padarn but not Llyn Peris due to HEP operations. Access for migratory salmonids to the upper part of the Seiont catchment (Afon Nant Peris and associated tributaries), by-passing Llyn Peris, is via a 2 km unlit fish tunnel. Salmon and sea trout are known to successfully negotiate the tunnel. To mitigate the loss of spawning grounds and juvenile habitat in the upper Seiont catchment to migratory salmonids, a stocking programme began in 1979. The stocking of fry and parr took place in Llyn Dwythwch, Nant Peris and associated tributary streams. All stocking was stopped in 2015 due to a NRW policy change. To replace the stocking programme options are being reviewed to open additional areas to migratory salmonids.

Weirs and natural waterfalls limit access for migratory salmonids to most of the main and smaller tributaries. In addition to stocks of salmon and sea trout the Seiont system supports stocks of brown trout and eels and there are Arctic charr in Llyn Padarn.

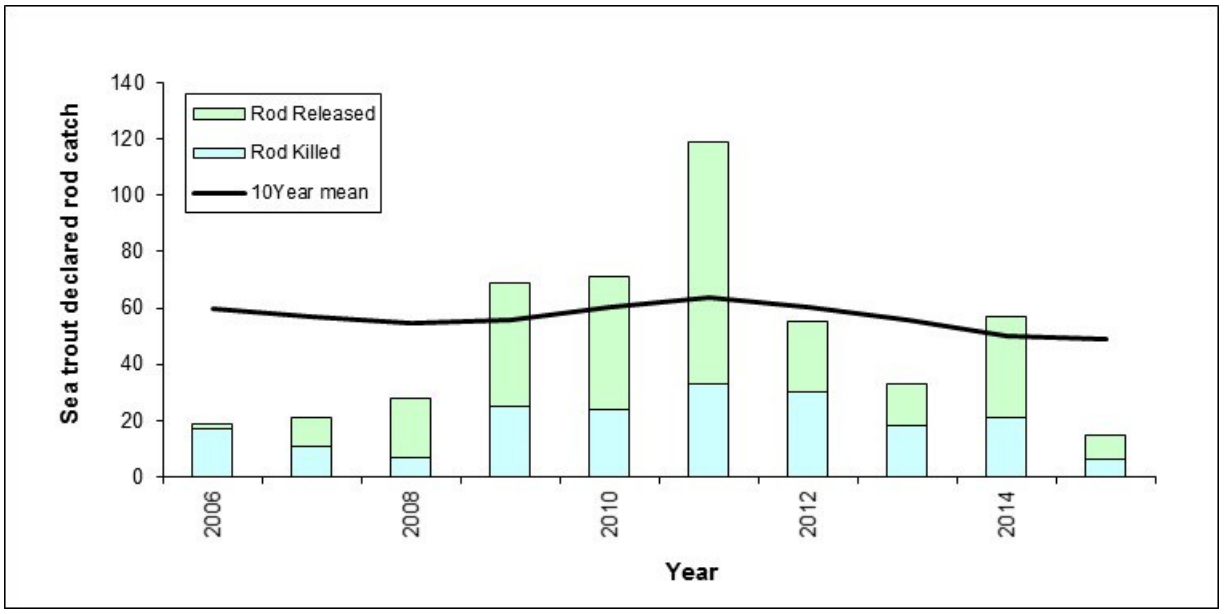
Rod catches

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

Salmon rod catch – has been exceptionally poor since 2012. The release rate in 2015 was 50%, however only 2 salmon were caught. The average North Wales release rate is 65%.



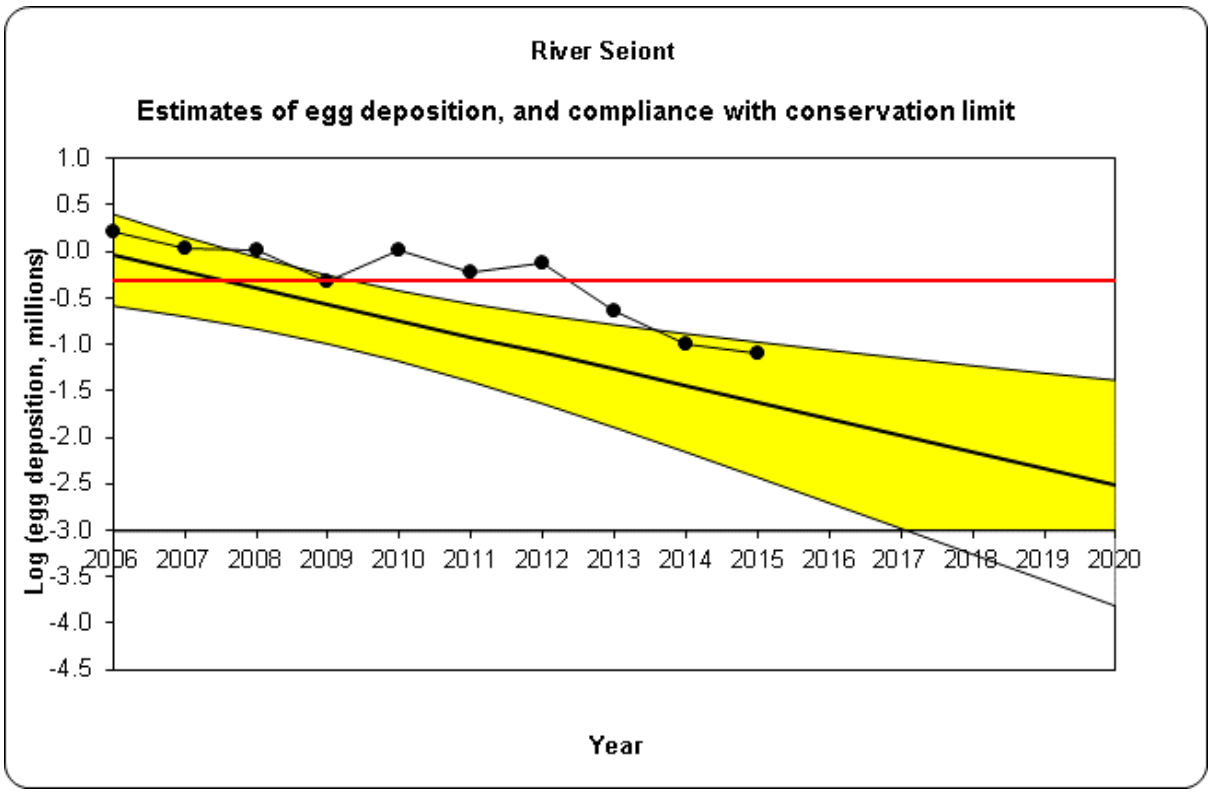
Sea trout rod catch – has declined in 2015. The release rate in 2015 was 60%. This is poor and needs to improve to conserve stocks. The North Wales average is 72%.



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?

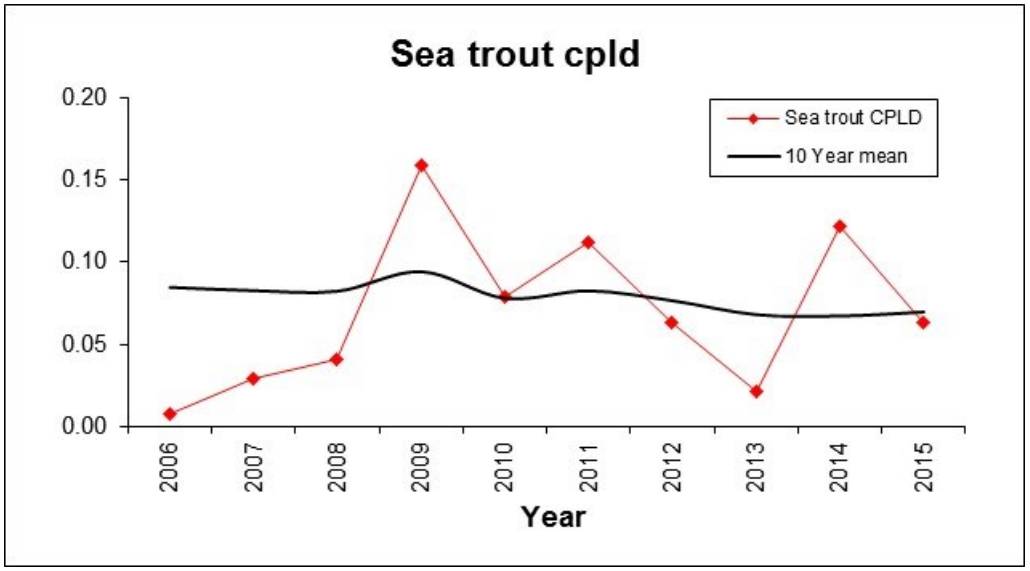
The red line represents the number of eggs required to be deposited to sustain a healthy salmon stock.

- Current number of eggs being deposited puts stocks **at risk**
- In 5 years' time the predicted status of salmon stocks will be **at risk**
- Based on current and future trends the stocks of salmon will continue to **declining**

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.

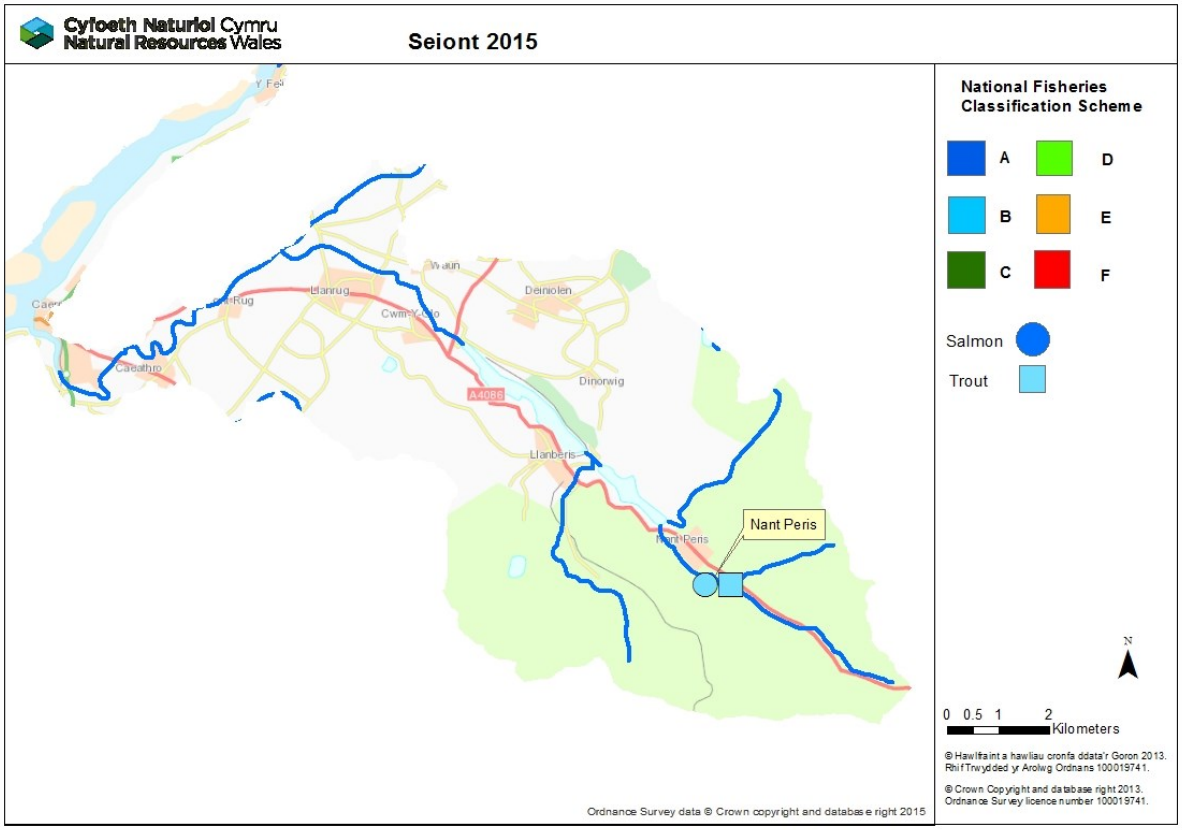


- The latest 10-year trend in CPLD on the Seiont is **stable**
- Average CPLD for the most recent 3-year period is in the **mid/lower (20<50%)** of the range of CPLD figures reported in the previous 10-years.
- Combining the above measures the Seiont is classified as **"probably at risk"**; i.e. the 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

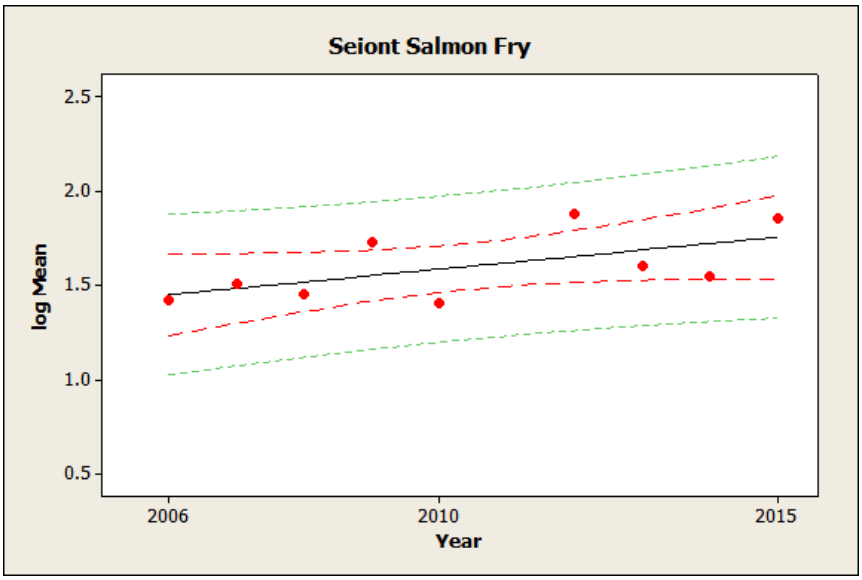


Juvenile Trend Analysis

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).

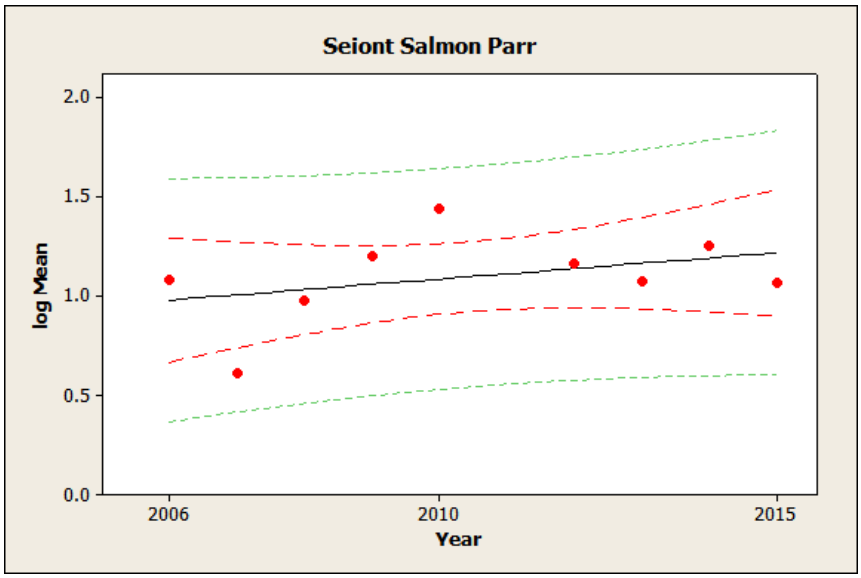
Data was analysed for the period 2006 to 2015 for comparison against Salmon/Sea Trout conservation data. The figures below display trends in juvenile fish numbers over this period (note log scale).

Salmon Fry



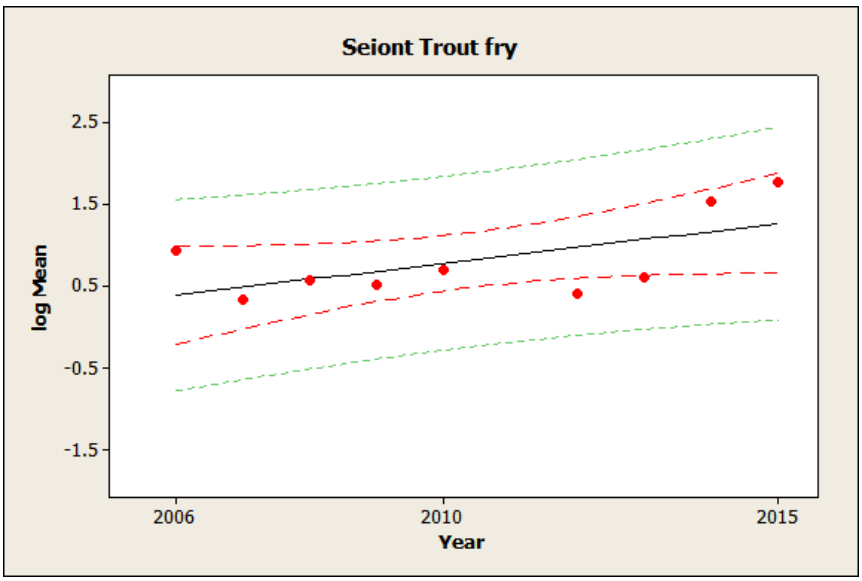
- Salmon fry densities on the Seiont have shown an **improvement** since 2006.
- This trend is **not statistically significant (P = 0.09)**.
- The improvement at Nant Peris does not reflect the Seiont rod catch data or the general declining UK trend. The 2013/14 seasons have seen some of the poorest 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



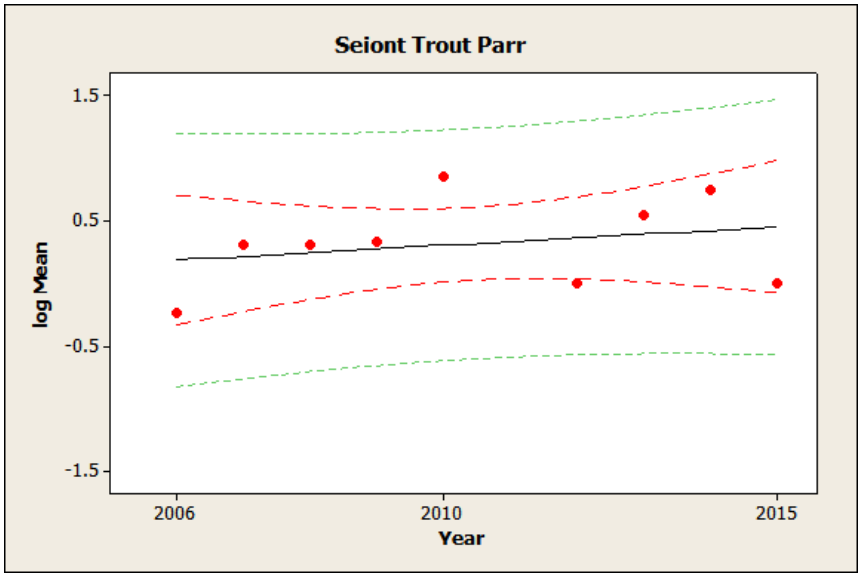
- Salmon parr densities on the Seiont have shown an **improvement** since 2006.
- This trend is **not statistically significant (P = 0.32)**.
- The improvement at Nant Peris does not reflect the Seiont rod catch data or the general declining UK trend.

Trout Fry



- Trout fry densities on the Seiont have shown an **improvement** since 2006.
- This trend is **not statistically significant (P = 0.77)**.
- The improvement at Nant Peris does not reflect the Seiont rod catch data, this has remained stable. Many North Wales Rivers have seen much improved Sea Trout rod catch over the past couple of years but this has not been seen on the Seiont.

Trout Parr



- Trout parr densities on the Seiont have shown an **improvement** since 2006.
- This trend is **not statistically significant (P = 0.50)**.
- The number of Trout Parr caught at the Nant Peris site has always been very low so this does not give us a good picture of what is occurring on the Seiont.

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Fisheries Actions - Seiont

Site	Action	Benefits	Lead	Partner(s)	Timescales for delivery
Seiont	**Barriers to be addressed:** • Crawia (SH532643) - three boulder weir easements. Alternative mitigation action. • Investigation of barriers on the catchment to improve fish passage • Monitoring of fish pass at Cwellyn Reservoir	• 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 DCWW	SGLI FS CCGRT	2016/17 Ongoing Ongoing
	Habitat improvements: Financed by Alternative Mitigation funds and other fisheries funds (including rod licence) • In-stream habitat work – generating increased spawning areas • In-stream habitat work – maximising the available habitat for juvenile fish • Penllyn, Ffos y Dail, Seiont	More natural river system, reduced siltation, increased flow diversity, improved spawning gravels and juvenile habitat. Improved fish numbers.	NRW	CCGRT SGLI FS	2016-2020
	Padarn work: • Improving/restoring spawning areas for Arctic charr in Llyn Padarn.	NRW have undertaken modelling hydromorphological modelling of the Afon y Bala (key charr spawning area) and have identified preferred options to enhance the area available for spawning. NRW are currently in dialogue with collaborative partners to deliver the optimal improvements.	FHC	NRW Gwynedd CC SNPA	2016-20
	Improvements in phosphorus discharges (Llyn Padarn)	DCWW AMP6 improvements will result in operational P permit levels dropping to 0.2 mg/l. Surface water infiltration into the network will be significantly reduced along with the construction of new storm sewage tank at Llanberis sewage treatment works that will significantly reduce the volume and the nutrient loading of storm sewage entering Llyn Padarn during significant rainfall events.	DCWW	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.	• Waterbodies protected and improved • WFD waterbodies achieving Good Status/Potential	NRW	NRW CCGRT 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

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Abbreviations

NRW – Natural Resources Wales
FHC – First Hydro Company
GwyneddCC – Gwynedd County Council
SGLIFS – Seiont Gwyrfai Llyfni Fishing Society
DCWW – Dwr Cymru Welsh Water
CCGRT - Clwyd, Conwy & Gwynedd Rivers Trust
SNPA – Snowdonia National Park Association