

# 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.

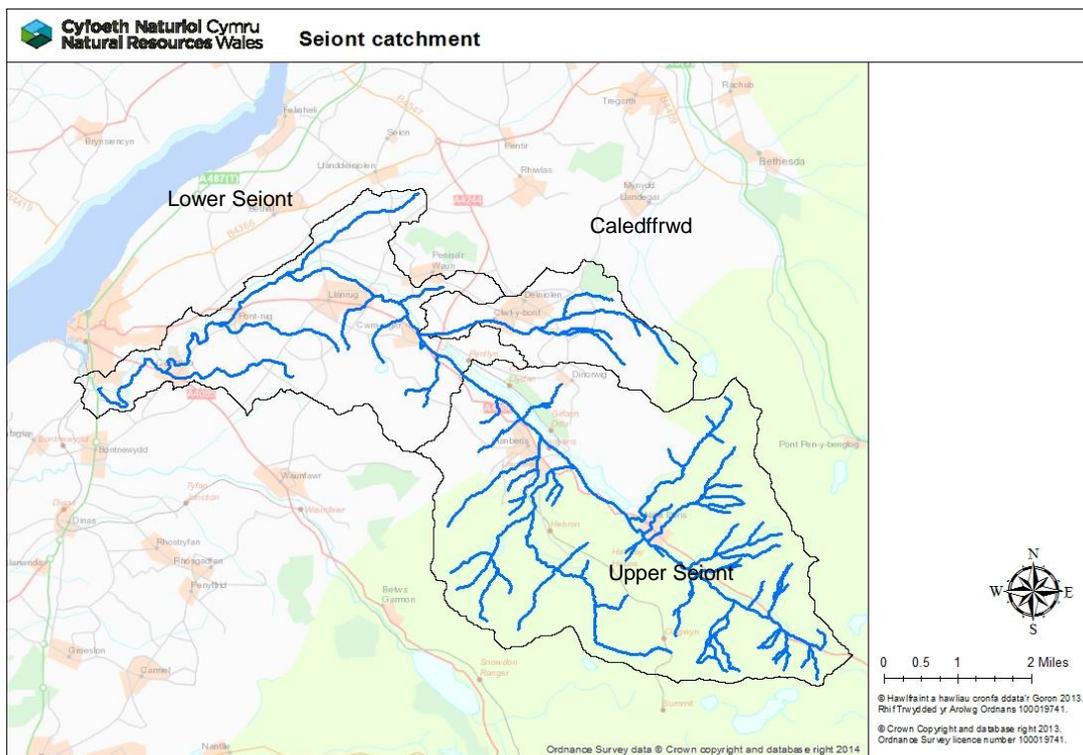
Action tables set out habitat improvements to restore freshwater productivity of salmon and sea trout populations. These tables also include some work which will be carried out by our partner organisations, not just Natural Resources Wales (NRW).

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<sup>2</sup>, 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.



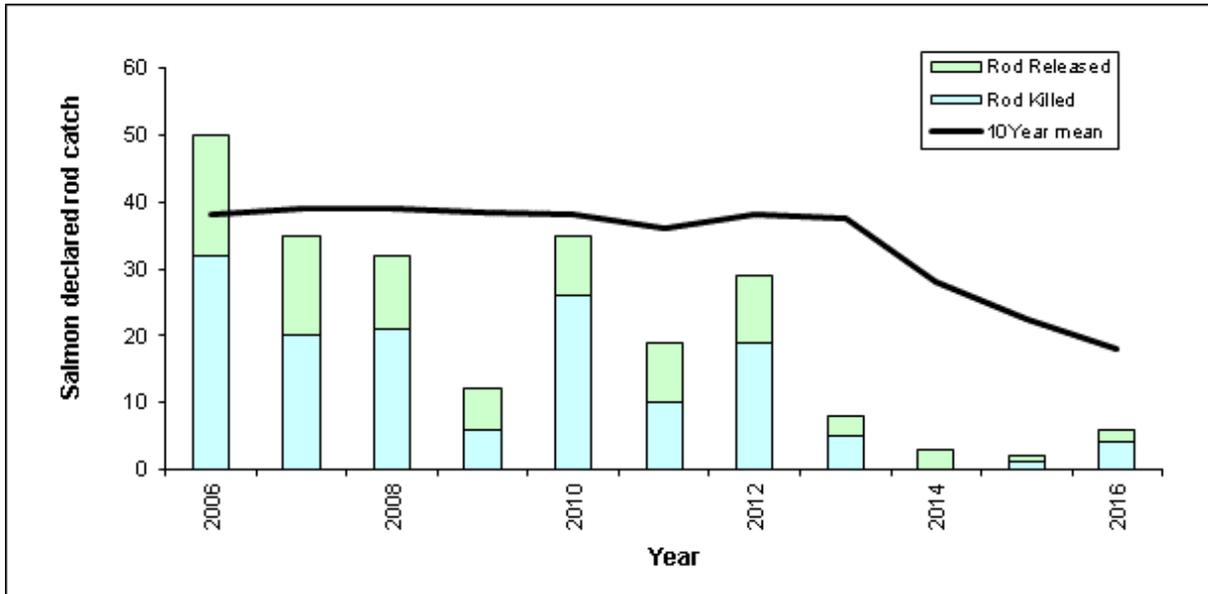
Built beneath the old Dinorwig slate quarry, a hydro-electric power station (HEP) utilises Llyn Peris and Llyn Marchlyn Mawr, supplying electricity to the national grid. The power station owned by First Hydro Limited began operating in February 1982, building up to full capacity in 1984. Adult salmon 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.

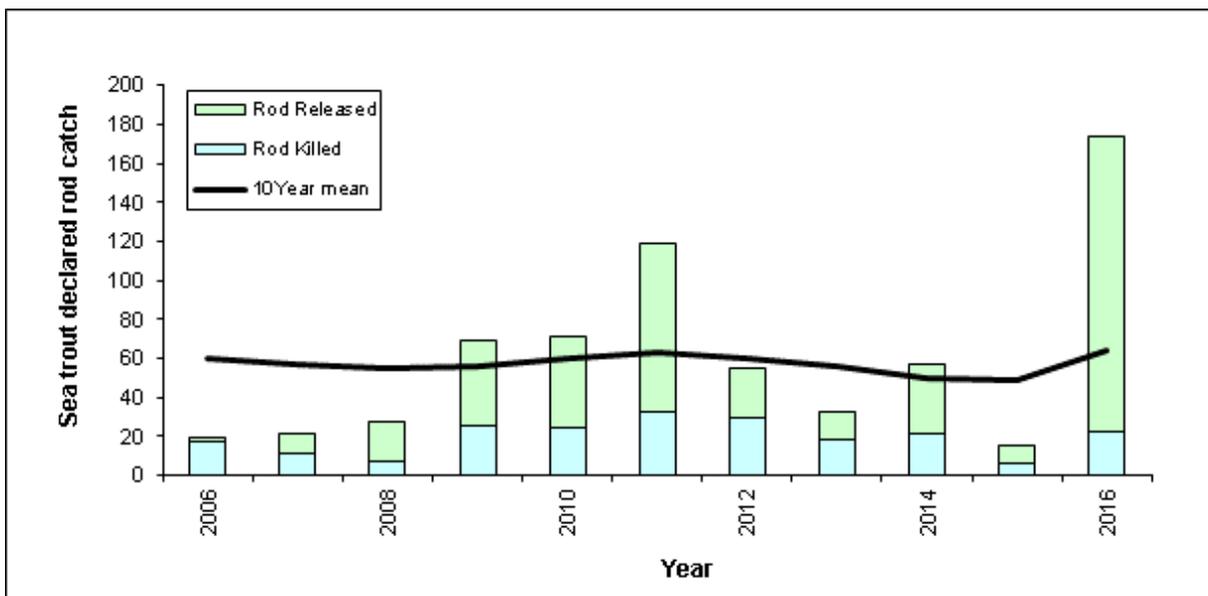
### Rod catches

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

**Salmon rod catch** – has been very low since 2012. The release rate in 2016 was a very poor at 33% and needs to increase urgently to conserve stocks. The average North Wales release rate is 62%.



**Sea trout rod catch** – was excellent in 2016 and way above the average for the last 10 years. The release rate in 2016 was 87% which is very good and needs to be maintained. The North Wales average is 79%.

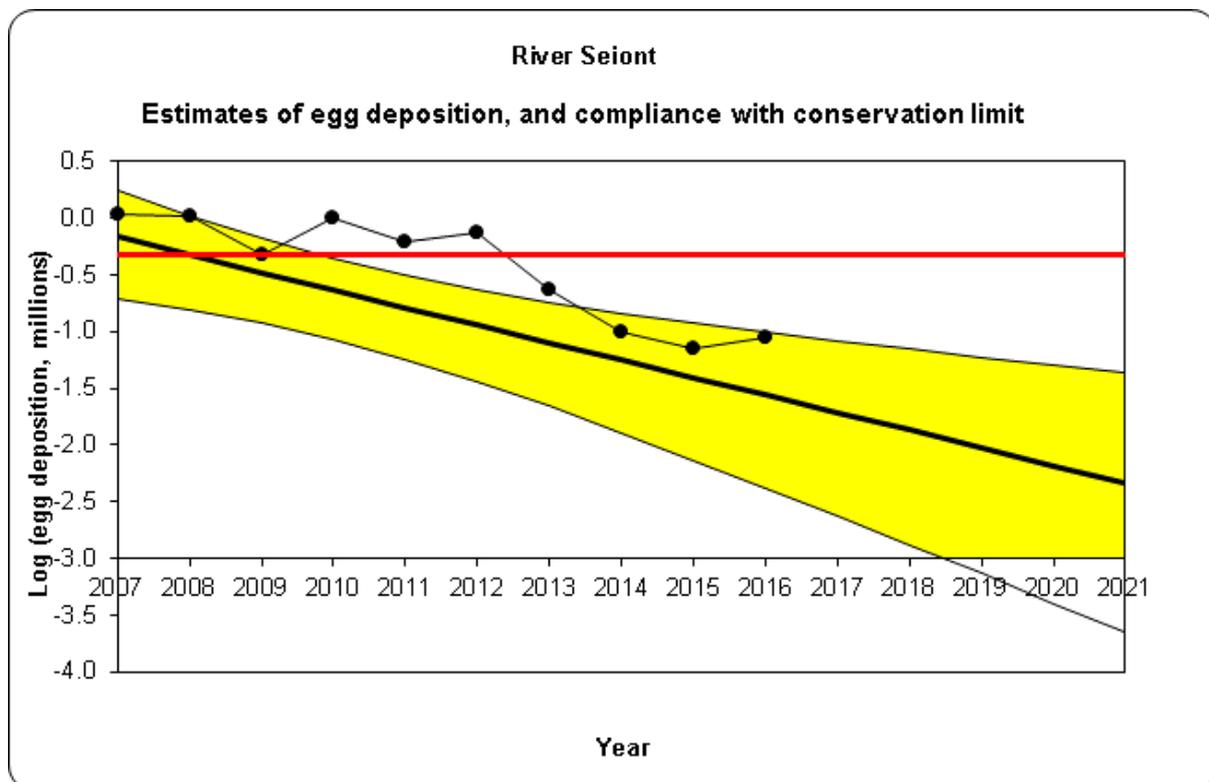


## Stock status

### 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 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. The black trend line and its confidence limits (the yellow band) is fitted to the most recent 10-year series of egg deposition estimates (2007-2016).

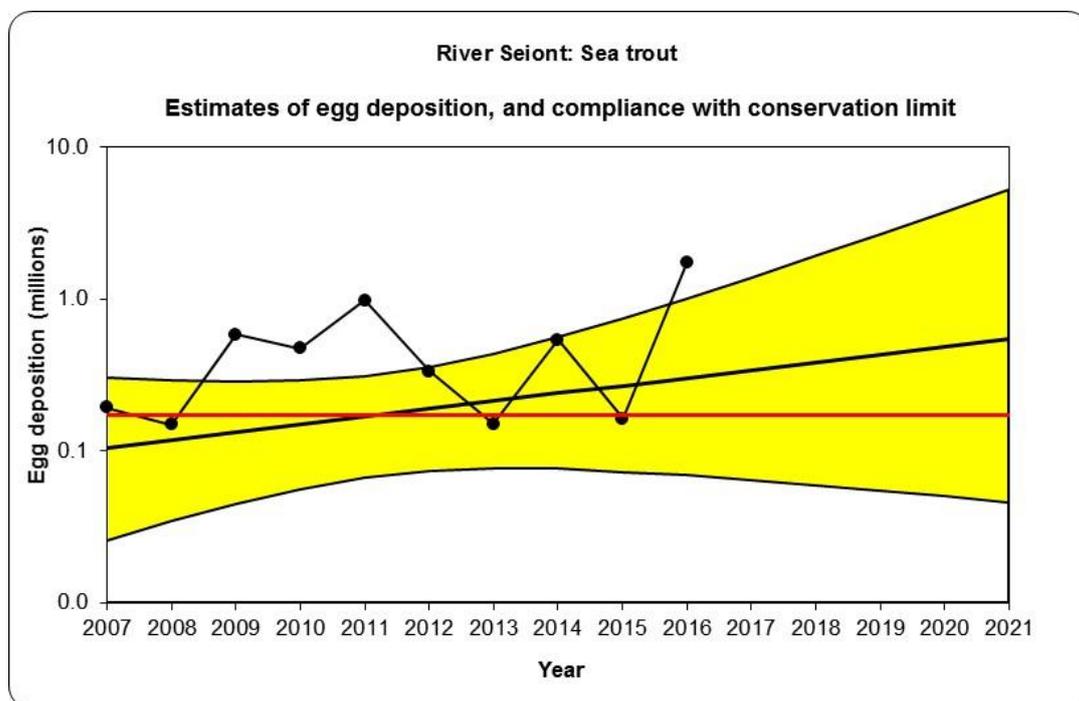
- Current number of eggs being deposited puts stocks **at risk**
- In 5 years' time the predicted status of salmon stocks will be **at risk**
- Based on current data, and the projection of the graph, the stocks of salmon on the Seiont will continue to **decline**

### 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 (2007-2016).

- 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, sea trout stocks will continue to **improve (uncertain)** on the Seiont

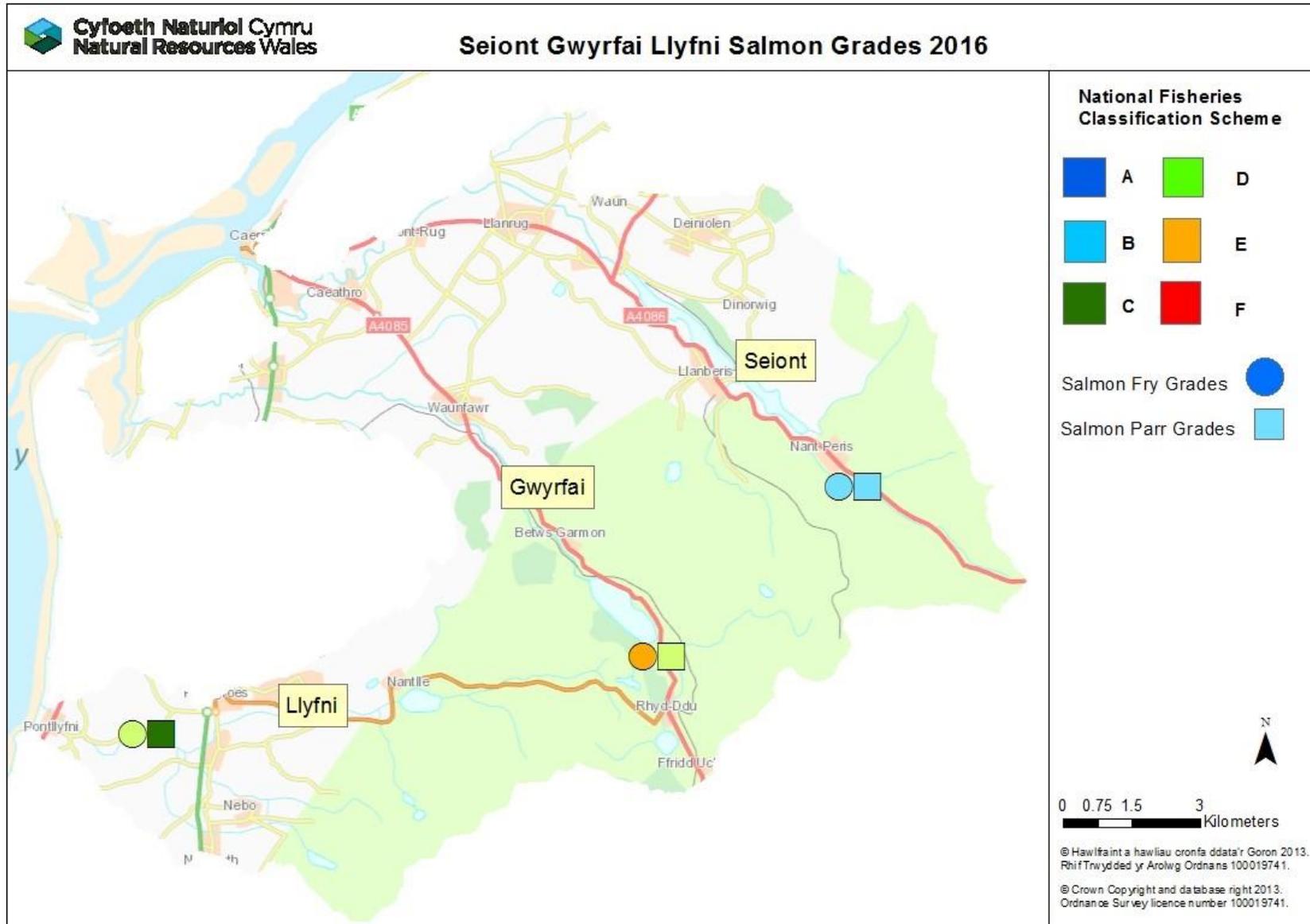
## Juvenile Monitoring

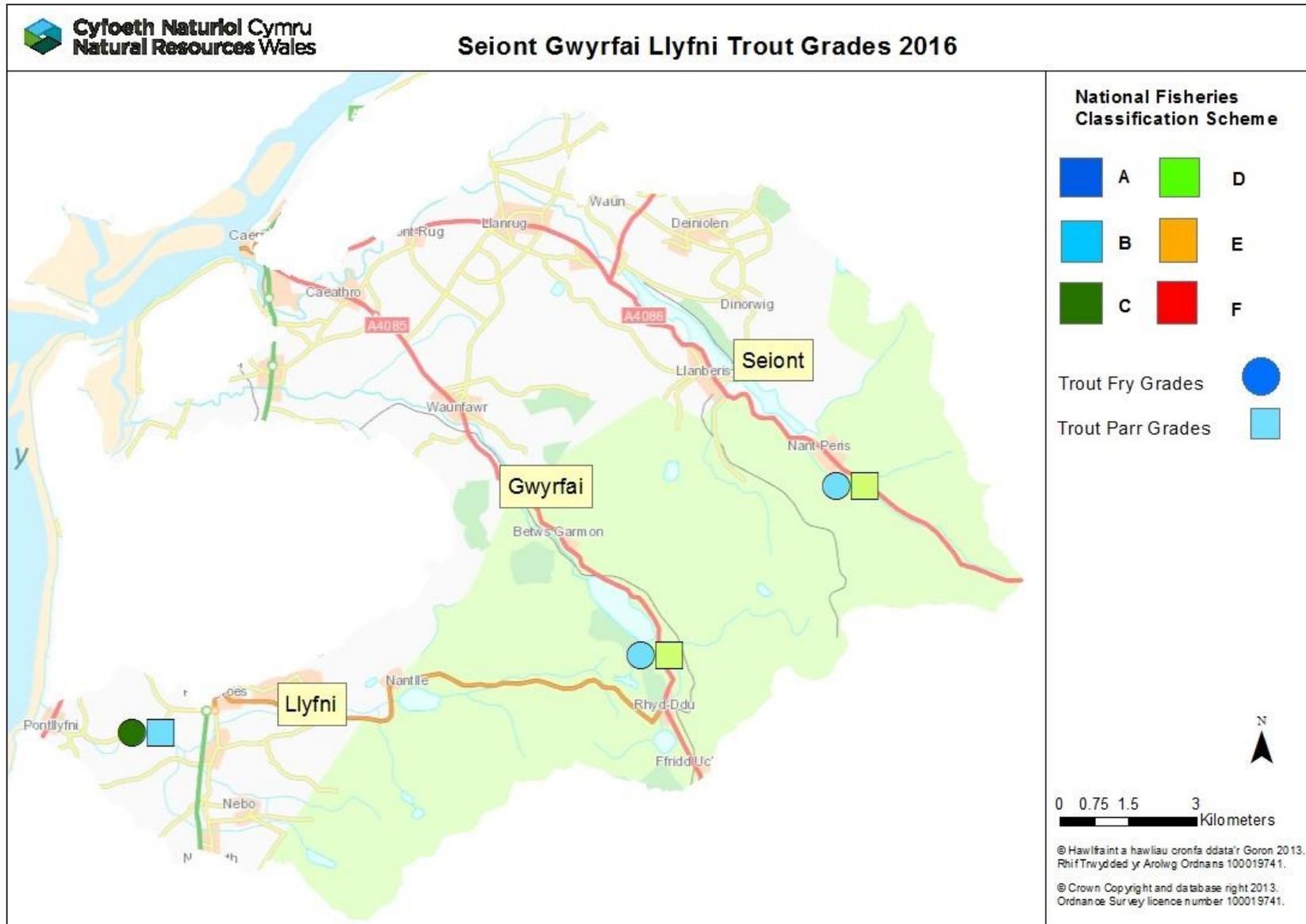
The following map shows the results of the 2015 juvenile salmonid population surveys. They display the National Fish Classification (NFC) grades which have been developed to evaluate and compare the results of fish population surveys in a consistent manner. The NFC ranks survey data by comparing fish 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
<b>A</b>	Excellent	In the top 20% for a fishery of this type
<b>B</b>	Good	In the top 40% for a fishery of this type
<b>C</b>	Fair	In the middle 20% for a fishery of this type
<b>D</b>	Fair	In the bottom 40% for a fishery of this type
<b>E</b>	Poor	In the bottom 20% for a fishery of this type
<b>F</b>	Fishless	No fish of this type present

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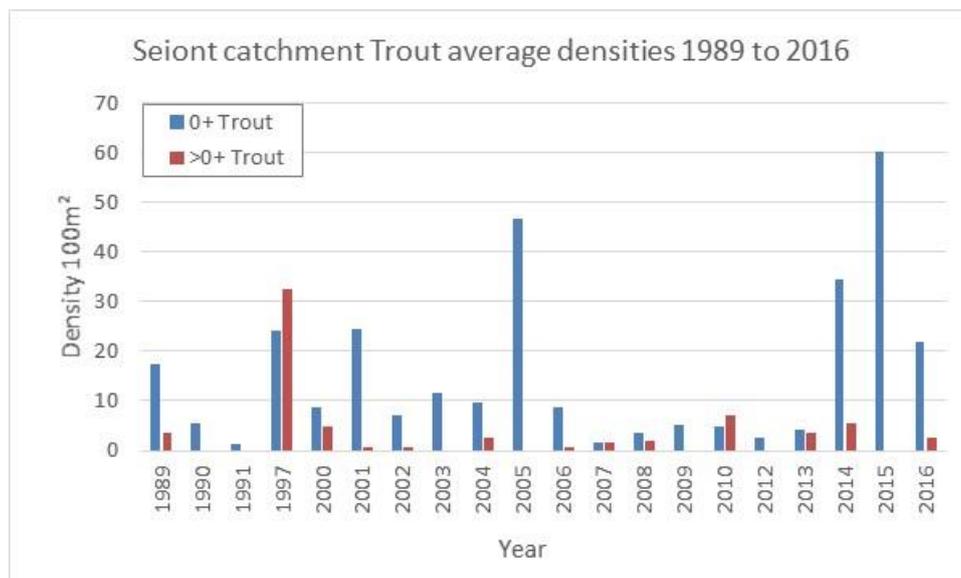
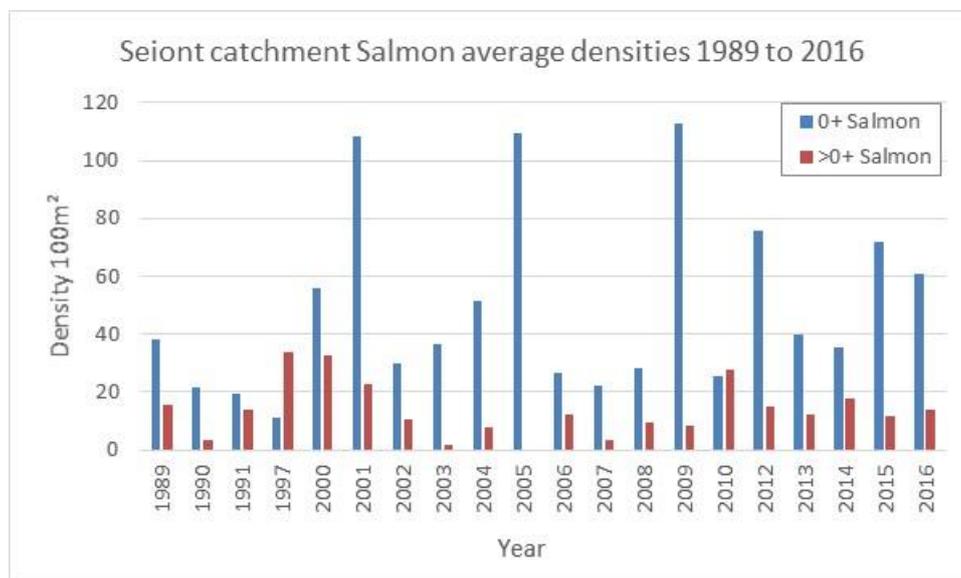
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### Catchment Population Trends

The graphs below show a simple comparison of average salmon and trout densities on the Seiont (Nant Peris) catchment since surveying began in 1989. No surveys were done from 1992 to 1996, 1998 to 1999 & 2011. Since 2014 an additional 20 metres have been fished at the Nant Peris site to take into account trout habitat.

Salmon fry and parr densities have fluctuated on the Seiont (Nant Peris). The current salmon fry densities are good compared to the historic data. Improvements in electro-fishing efficiency may have had some impact on this. The salmon parr density is relatively stable currently compared to the historic data. This does not follow the salmon rod catch trend which has declined from 29 salmon in 2012 to just 2 salmon in 2015.



Brown trout fry densities have improved on the Seiont (Nant Peris) since the addition of the extra habitat at the survey site. The 2016 trout fry results are however low compared to

2014/15. This can be linked directly to rod catch with a decline from 57 sea trout caught in 2014 to just 15 sea trout in 2015. Trout parr densities have remained low, but suitable habitat is limited.

### **Further investigations**

Seiont, Gwyrfai & Llyfni Fishing Society have regularly questioned the use of Nant Peris as a representative site for the Seiont. Due to the width of the Seiont below Llyn Padarn it is not possible to carry out an efficient semi quantitative survey. However we have incorporated a couple of five minute fry surveys in 2016 below Llyn Padarn.

Site	Number caught			
	0+ Salmon	>0+ Salmon	0+ Trout	>0+ Trout
Pen Llyn	0	0	5	1
Upstream Crawia	2	9	2	3

The results at Pen Llyn were poor however work had just been carried out in the area a few month prior to improve the habitat. Future monitoring will hopefully show the benefits. Crawia had less salmon/trout fry than we would have hoped for, however salmon parr numbers were excellent. A good brown trout of 243cm was also caught. The low salmon fry numbers at Crawia could link to the decline in Grilse (1 year sea winter fish) run seen on many Welsh rivers. The consistent salmon fry numbers at Nant Peris could be due to multi sea winter (MSW) salmon spawning. The decline in MSW fish has been less pronounced compared to grilse.

## Fisheries Actions - Seiont

Site	Action	Benefits	Lead	Partner(s)	Timescales for delivery
Seiont	<p><b>Barriers to be addressed:</b></p> <ul style="list-style-type: none"> <li>• Crawia (SH532643) - three boulder weir easements. Alternative mitigation action.</li> <li>• Investigation of barriers on the catchment to improve fish passage</li> <li>• Monitoring of fish pass at Cwellyn Reservoir</li> </ul>	<ul style="list-style-type: none"> <li>• Improved knowledge of barriers to improve access for fish, including salmon and trout to spawning areas upstream.</li> <li>• Improved access to spawning areas and habitat upstream.</li> <li>• Improved fish numbers and increased diversity of fish populations - increased resilience.</li> </ul>	NRW DCWW	SGLI FS CCGRT	2016/17 Ongoing Ongoing
	<p><b>Habitat improvements:</b></p> <p>Financed by Alternative Mitigation funds and other fisheries funds (including rod licence)</p> <ul style="list-style-type: none"> <li>• In-stream habitat work – generating increased spawning areas</li> <li>• In-stream habitat work – maximising the available habitat for juvenile fish</li> <li>• Penllyn, Ffos y Dail, Seiont</li> </ul>	More natural river system, reduced siltation, increased flow diversity, improved spawning gravels and juvenile habitat. Improved fish numbers.	NRW	CCGRT SGLI FS	2016-2020
	<p><b>Padarn work:</b></p> <ul style="list-style-type: none"> <li>• Improving/restoring spawning areas for Arctic charr in Llyn Padarn.</li> </ul>	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
	<p><b>Water Framework Directive:</b></p> <p>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.</p>	<ul style="list-style-type: none"> <li>• Waterbodies protected and improved</li> <li>• WFD waterbodies achieving Good Status/Potential</li> </ul>	NRW	NRW CCGRT Wildlife Trusts Local Authorities Landowners DCWW SNPA	Ongoing
	<p><b>Enforcement:</b></p> <p>Action to reduce illegal activity on information provided and investigations</p>	Reduced illegal activity, more fish remain in the system.	NRW	Stakeholders North Wales Police	Ongoing



**Cyfoeth  
Naturiol**  
Cymru  
**Natural  
Resources**  
Wales

**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**