

Know Your River - Dyfi

Salmon & Sea Trout Catchment Summary

Introduction

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

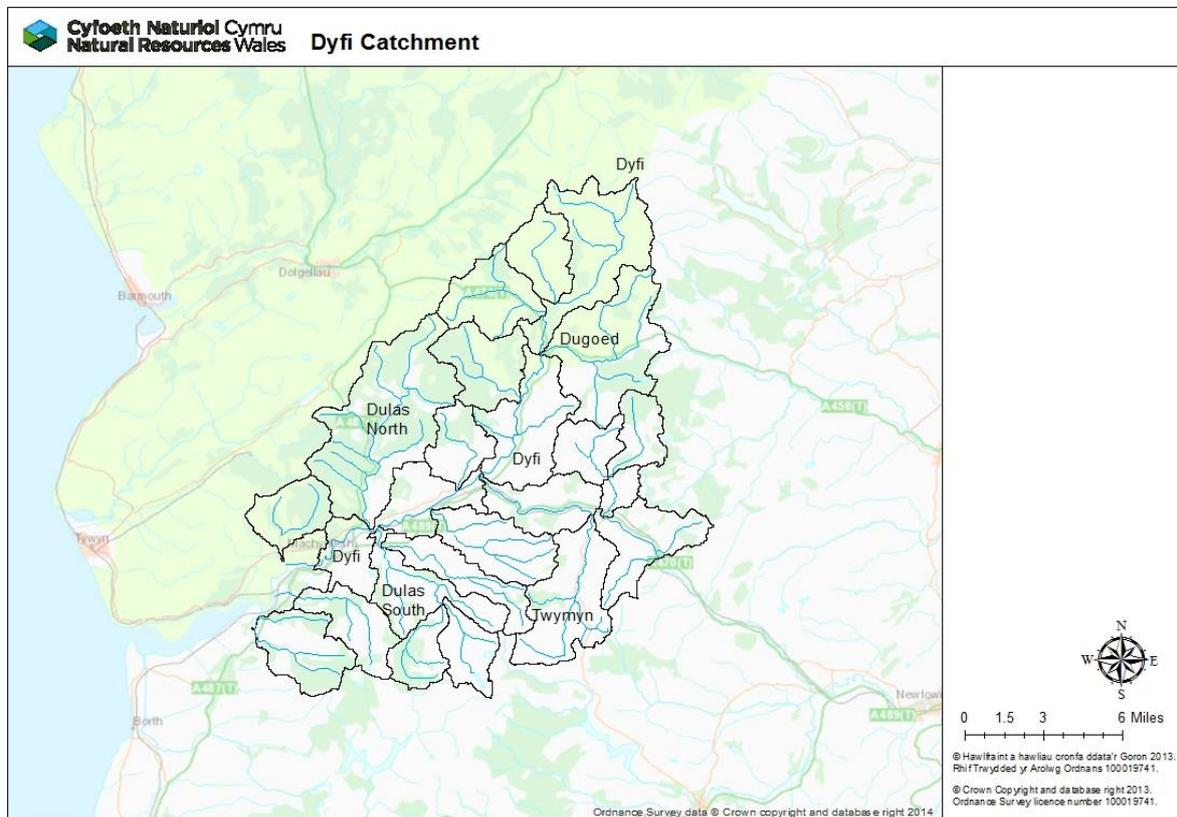
Action tables set out habitat improvements to restore freshwater productivity of salmon and sea trout populations. These tables also include some work which will be carried out by our partner organisations, not just Natural Resources Wales (NRW).

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 Dyfi catchment drains a predominantly upland catchment discharging into the Dyfi estuary and Cardigan Bay. The catchment is mainly rural with agriculture as the main land use whilst



substantial parts of the area are afforested. The nature of the landscape has also encouraged the development of renewable energy production including hydro-electric power stations and wind farms.

The Dyfi catchment lies on a base of Silurian and Ordovician rocks, resulting in rounded hills and plateau country, less rugged than the scenery of Snowdonia to the North. Water quality on the Dyfi catchment is generally good however a number of tributaries have acidification issues that can be exacerbated by coniferous afforestation. The Twymyn is affected by discharges from abandoned lead mines causing elevated levels of zinc.

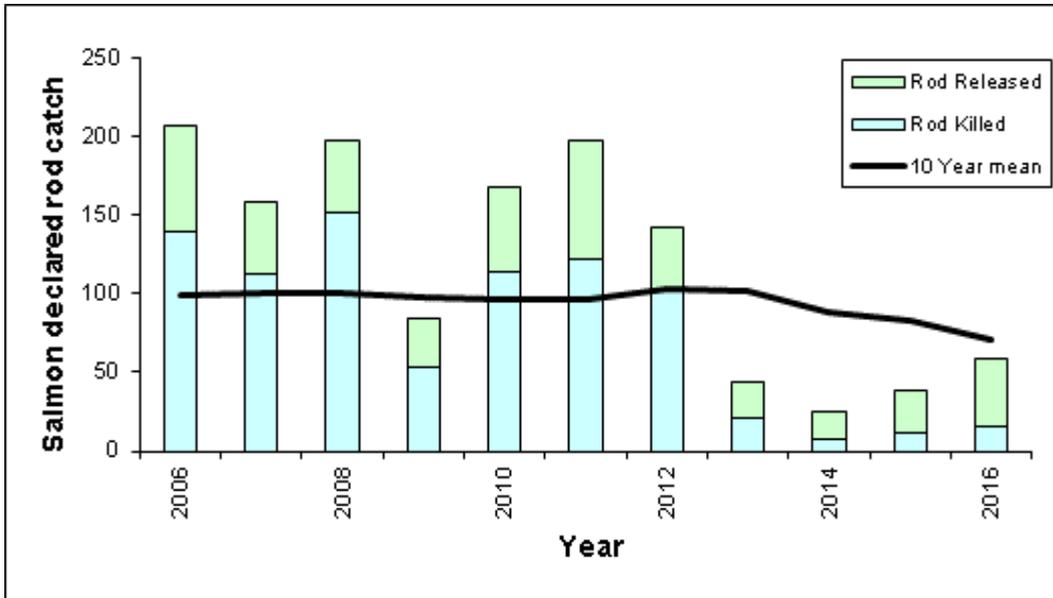
The Dyfi is an important conservation area due to the diverse range of habitats within the catchment area. Due to the presence of sand dunes, wet grasslands, saltmarsh, woodlands, forested areas and riparian habitats, the downstream area of the river and the estuary, are designated as a Site of Special Scientific Interest (SSSI) and one of the only three designated Biosphere Reserves in the United Kingdom. The catchment also contains National Nature Reserves (NNR's), Special Protection Areas (SPA's) and Ramsar sites (wetlands considered to be of international importance, particularly as habitat for wildfowl).



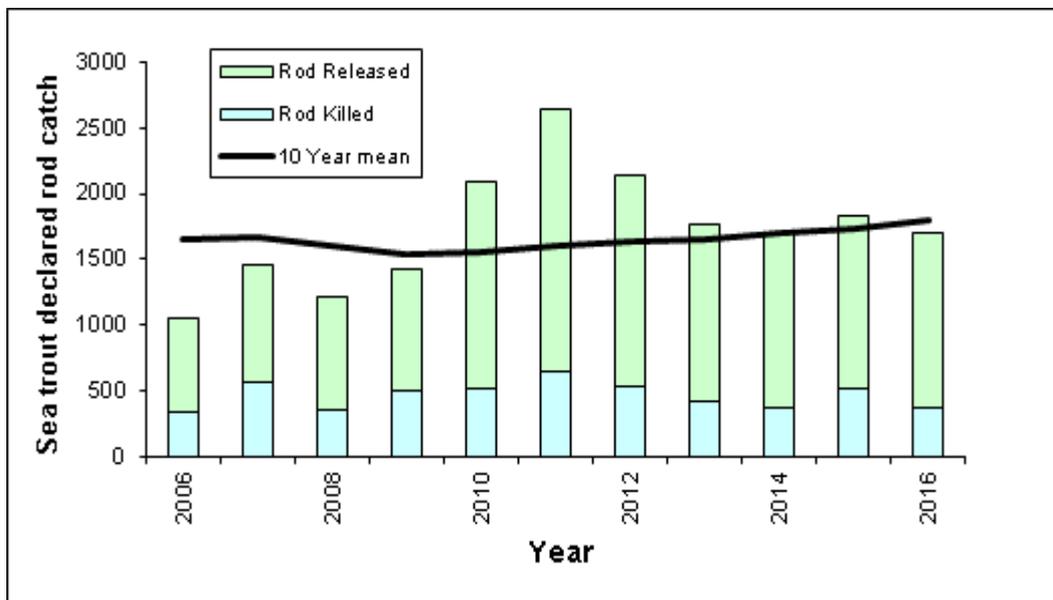
Rod catches

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

Salmon rod catch – has declined since 2012. The release rate in 2016 was 73% which is good and needs to continue to improve to conserve stocks. The North Wales average is 62%.



Sea trout rod catch – has remained consistent. The release rate in 2016 was 78%. This needs to be maintained and improved to conserve stocks. The North Wales average is 79%.

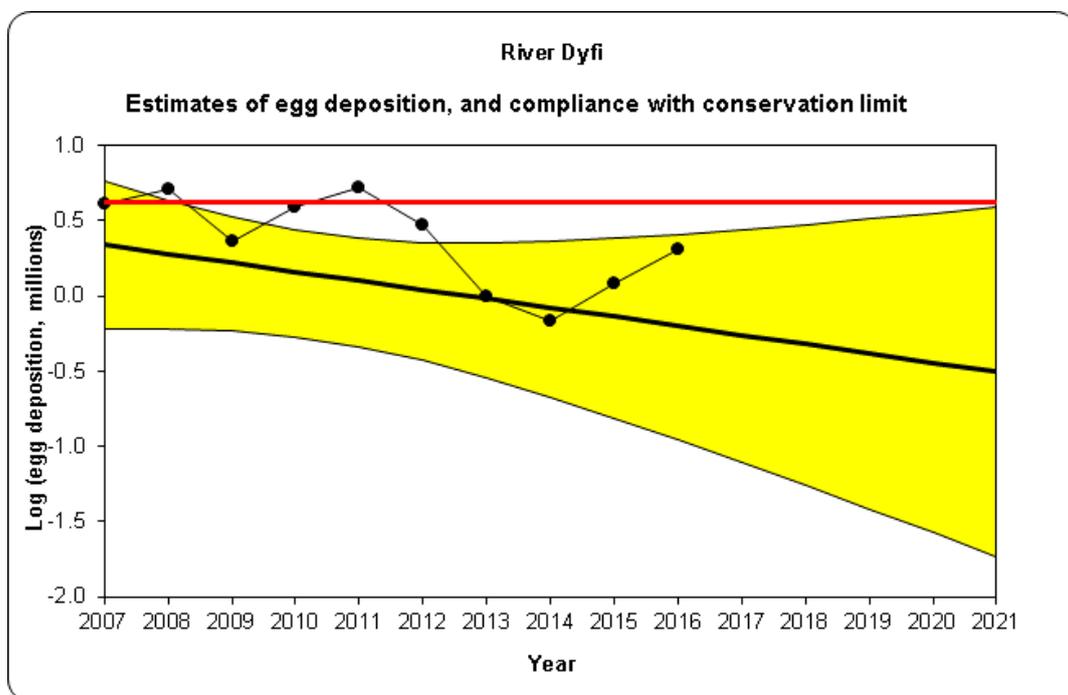


Stock status

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 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. 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).

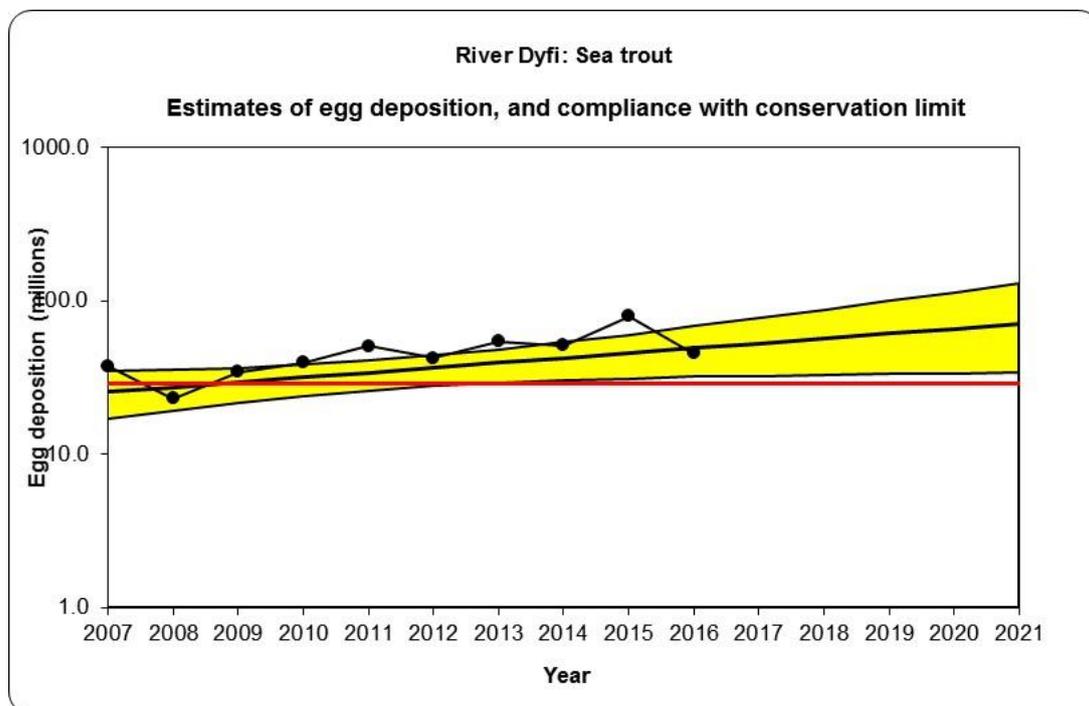
- Current number of eggs being deposited puts stocks **at risk**
- In 5 years' time the predicted status of salmon stocks will be **at risk**
- Based on current data, and the projection of the graph, the stocks of salmon on the Dyfi will continue to **decline (uncertain)**

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?

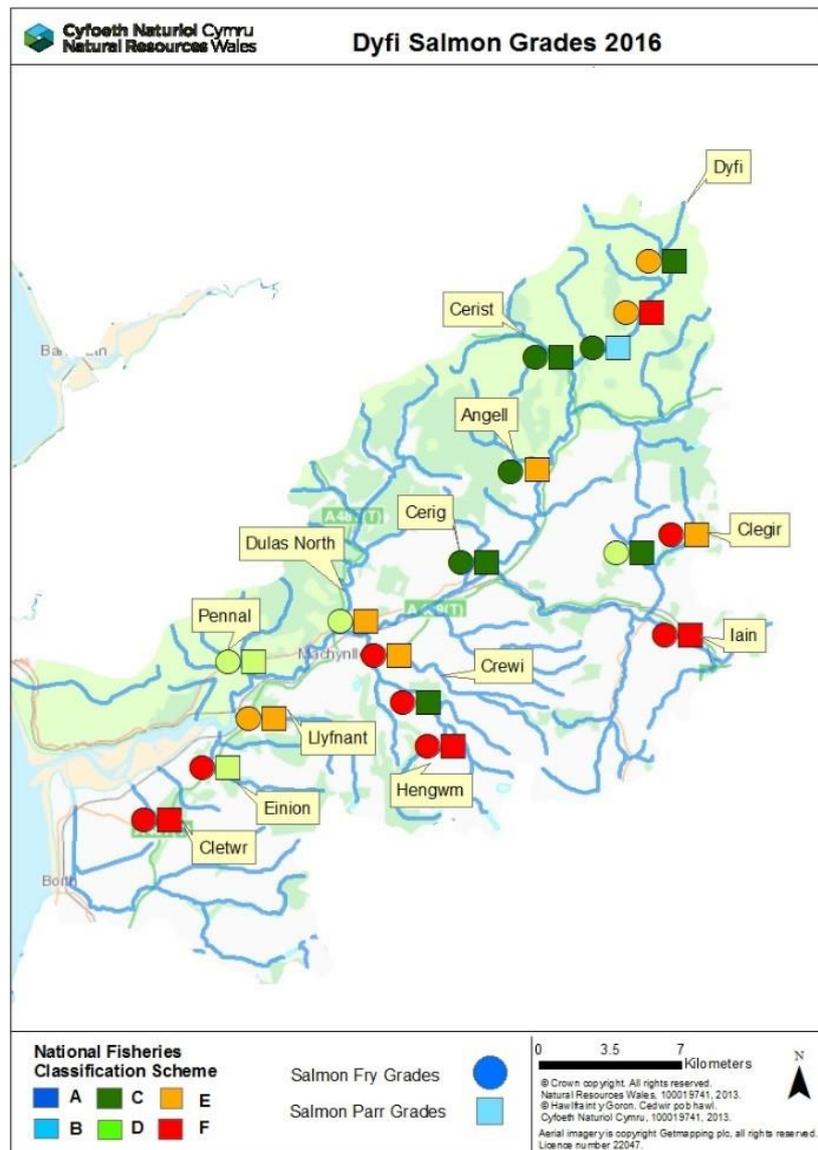
The red line represents the number of eggs required to be deposited to sustain a healthy sea trout stock. The black trend line and its confidence limits (the yellow band) is fitted to the most recent 10-year series of egg deposition estimates (2007-2016).

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

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



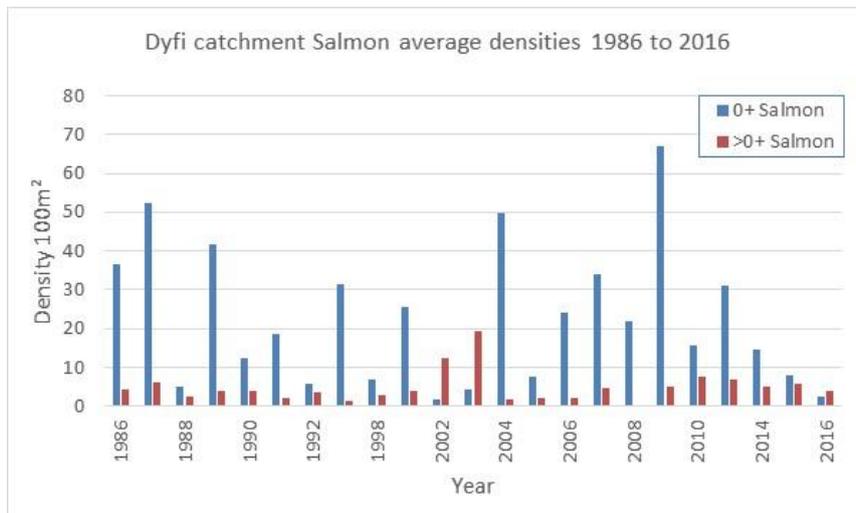


Catchment Population Trends

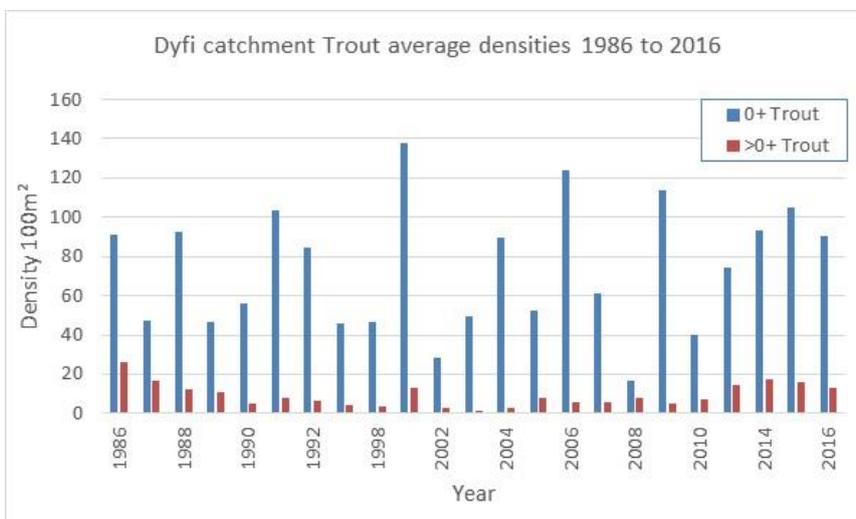
The graphs below show a simple comparison of average salmon and trout densities on the Dyfi catchment since surveying began in 1986. No surveys were done from 1994 to 1997, 1999, 2000, 2011 & 2012. The data used is from the three historic temporal sites on the Crewi, laen & upper Dyfi. The Dulas North is also fished but the data set only runs from 2009 and is not accessible by salmon.

Salmon fry and parr densities have varied since 1986. The densities in 2016 are very low compared to the historic data. There has been a decline in salmon rod catch since 2012 on the Dyfi with salmon catch dropping from 142 fish in 2012 to 44 salmon in 2013. Rod catch has remained at this low level in 2014 & 2015 and salmon fry numbers have continued to decline.

Juvenile salmon densities across Wales in 2016 have been poor, with some catchments showing significant absences of salmon fry. Though declining spawning stock will have lowered recruitment, it was felt that the extremely high flows and unseasonably warm temperatures throughout Nov/Dec/Jan will have adversely affected spawning.



Brown trout fry & parr densities on the Dyfi have remained good in 2016. This links directly to the excellent sea trout rod catch on the Dyfi, which was 1836 fish in 2015. Trout densities do not appear to have been affected by the extreme weather.



Fisheries Actions - Dyfi

Site	Action	Benefits	Lead	Partner(s)	Timescales for delivery
Dyfi	Barriers to be addressed: <ul style="list-style-type: none"> ● Felin Crewi (SH775009)– easement of mill weir and eel pass (designs) ● 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		2016/17 Ongoing
	Habitat improvements: We will investigate where there is opportunity to improve habitat for fish through improving access over barriers, restoration of riparian and instream habitat, including control of invasive species.	More natural river system, reduced siltation, increased flow diversity, improved spawning gravels and juvenile habitat. Improved fish numbers.	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.	<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