Cyfoeth Naturiol Cymru
Natural Resources Wales

Know Your River – Dwyfor
Salmon & Sea Trout Catchment Summary

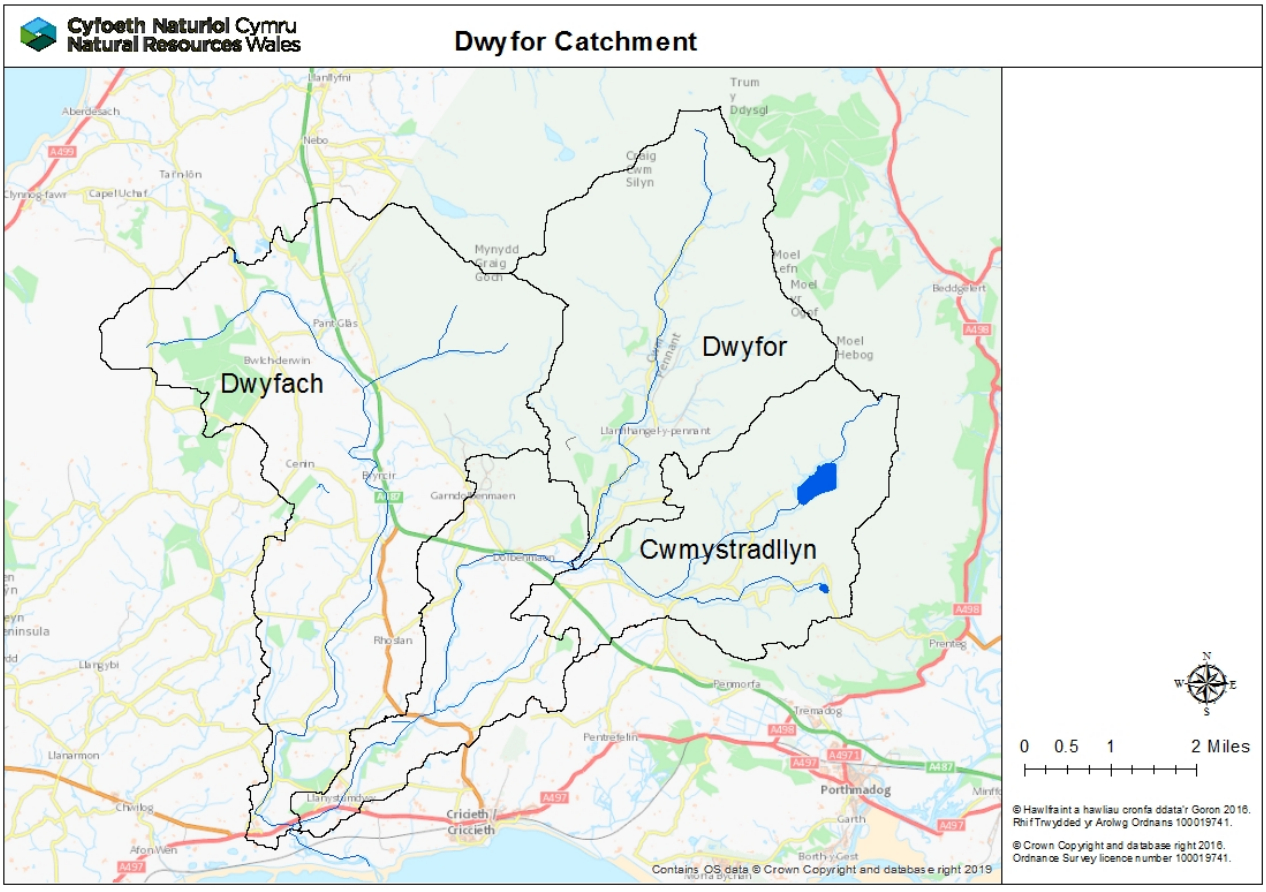
Introduction

This report describes the status of the salmon and sea trout populations in the Dwyfor catchment. Bringing together data from rod catches, adult 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 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 principal salmon rivers where, in the past, Salmon Action Plans have been produced, and/or, in SAC rivers, where condition assessments have been undertaken under the Habitats Directive. In addition, the status of various fish species in all our rivers is reported as part of Water Framework Directive (WFD) assessments. This report refers to these commitments. Its purpose is to provide, for our customers, an informative and useful summary of stock status and remedial work planned - specifically for anglers, fishery and land owners; as well as other partners.



Catchment

The Dwyfor catchment is divided into two main rivers, the Afon Dwyfor and the Afon Dwyfach. The Dwyfor subcatchment is mountainous. It rises in Cwm Pennant and has one main tributary, the Afon Cwm Ystradllyn (also known as the Afon Henwy). The Cwm Pennant streams in the upper reaches of the Dwyfor are acidic. They drain unafforested mountains of base-poor Ordovician rocks overlain by acidic, often waterlogged soils with low buffering capacity. The Afon Dwyfach has a moorland catchment and is less acidic.

Naturally elevated levels of zinc are characteristic in the catchment. This is evidenced by the presence of disused zinc mines dotted throughout the area. Disused copper mines and slate quarries are also found. Current industries in the catchment include a sand and gravel quarry and a cement works.

There is a major water abstraction scheme in the catchment, involving Llyn Ystradllyn and the Afon Dwyfor, known as the Garndolbenmaen scheme. Under this scheme Welsh Water/Dŵr Cymru are licenced to abstract a combined total of five million m^3 of water per calendar year from Llyn Cwmystradllyn and the Afon Dwyfor at Dolbenmaen. Welsh Water/Dŵr Cymru are required to maintain a uniform continuous compensation water discharge of 3010 m^3 per day for the general benefit of riparian river interests. Freshet releases must be made for fisheries management and angling purposes.

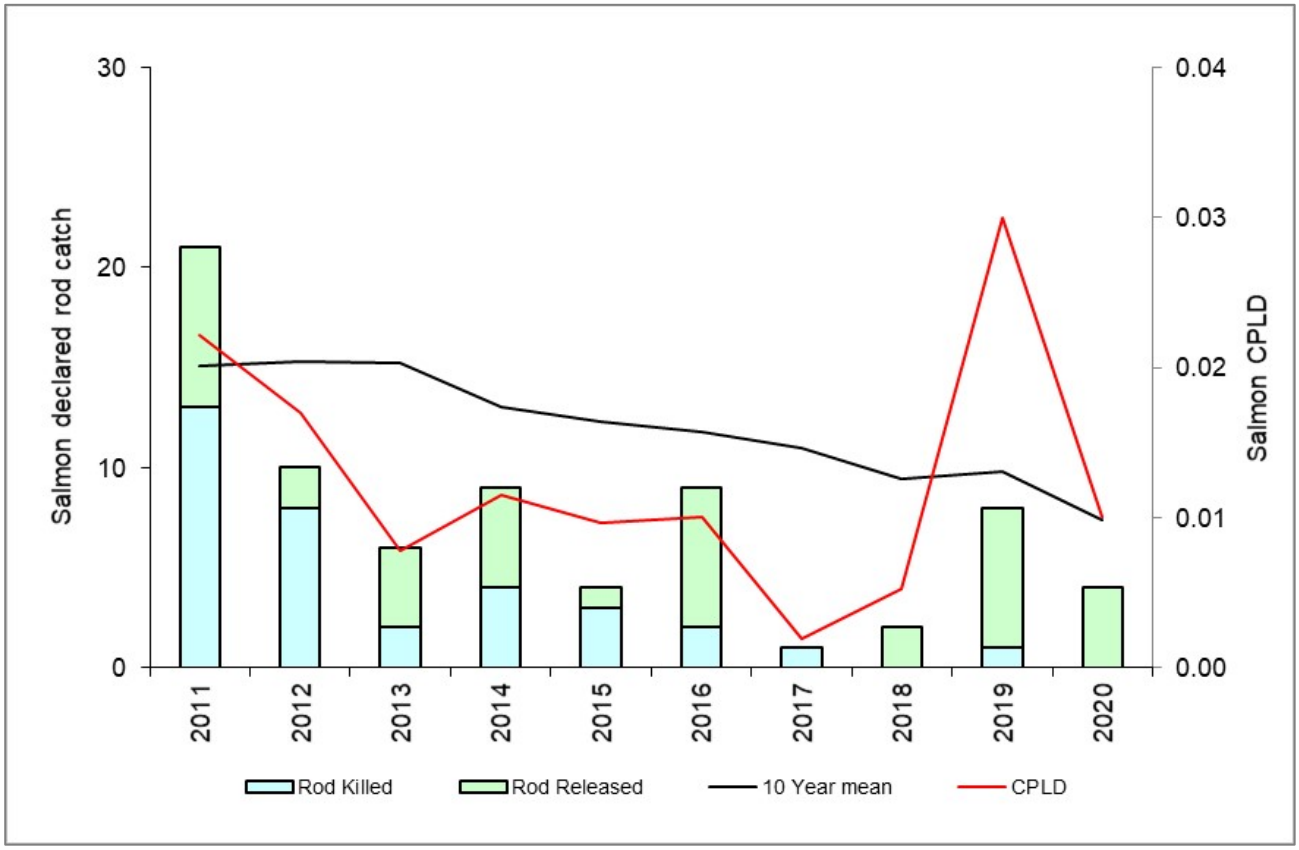
A high proportion of the Dwyfor catchment is available for spawning. However, impassable waterfalls in the upper reaches of some of the tributaries of the Dwyfor restrict salmonid access.

Rod Catches

The following tables/graphs show the total declared rod catches of salmon and sea trout on the Dwyfor and Catch Per Licence Day. CPLD is an estimate of the average catch per fishing day on a catchment.

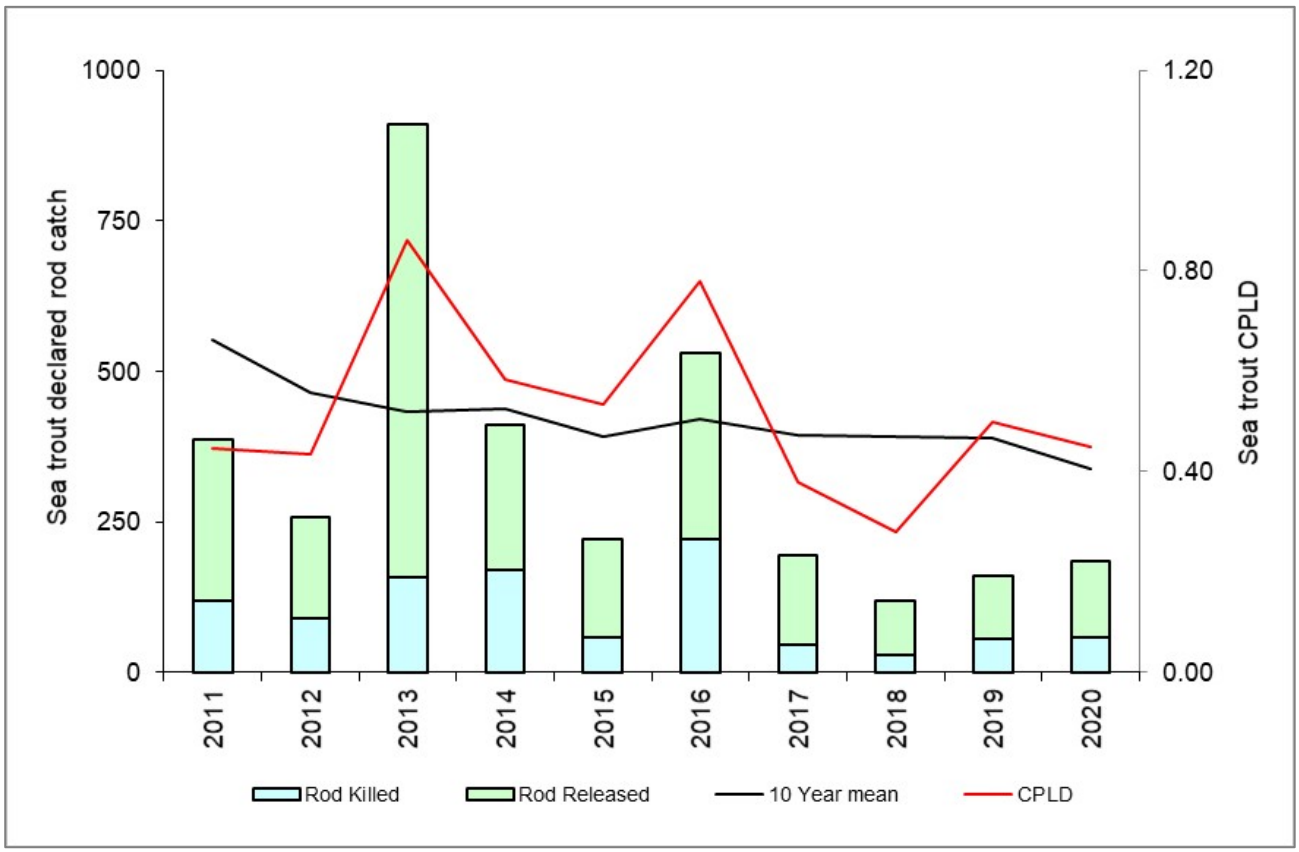
Salmon Rod Catch

Year	Caught	Rod Killed	Rod Released	10 Year mean	Percentage released	Catch per license day
2020	4	0	4	7.4	100	0.010
2019	8	1	7	9.8	88	0.030
2018	2	0	2	9.4	100	0.005
2017	1	1	0	11.0	0	0.002
2016	9	2	7	11.8	78	0.010
2015	4	3	1	12.3	25	0.010
2014	9	4	5	13.0	56	0.012
2013	6	2	4	15.2	67	0.008
2012	10	8	2	15.3	20	0.017
2011	21	13	8	15.1	38	0.022



Sea Trout Rod Catch

Year	Caught	Rod Killed	Rod Released	10 Year mean	Percentage released	Catch per license day
2020	184	57	127	337.3	69	0.448
2019	159	56	103	389.6	65	0.500
2018	119	29	90	392.4	76	0.280
2017	195	45	150	395.0	77	0.380
2016	531	221	310	421.0	58	0.780
2015	222	58	164	391.4	74	0.535
2014	411	169	242	438.3	59	0.584
2013	909	157	752	431.9	83	0.861
2012	257	90	167	465.6	65	0.434
2011	386	118	268	551.0	69	0.445

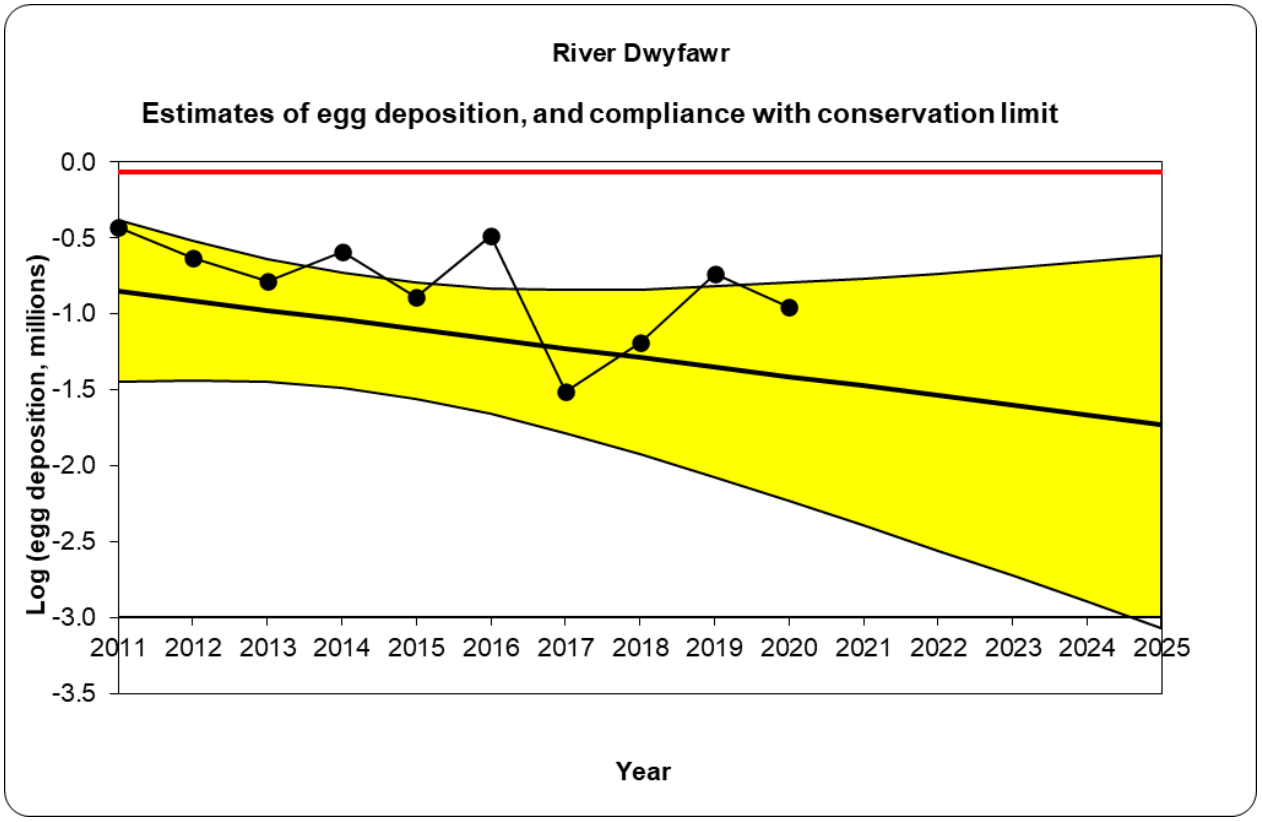


Stock Status

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 ten-year series of egg deposition estimates (2011 - 2020).

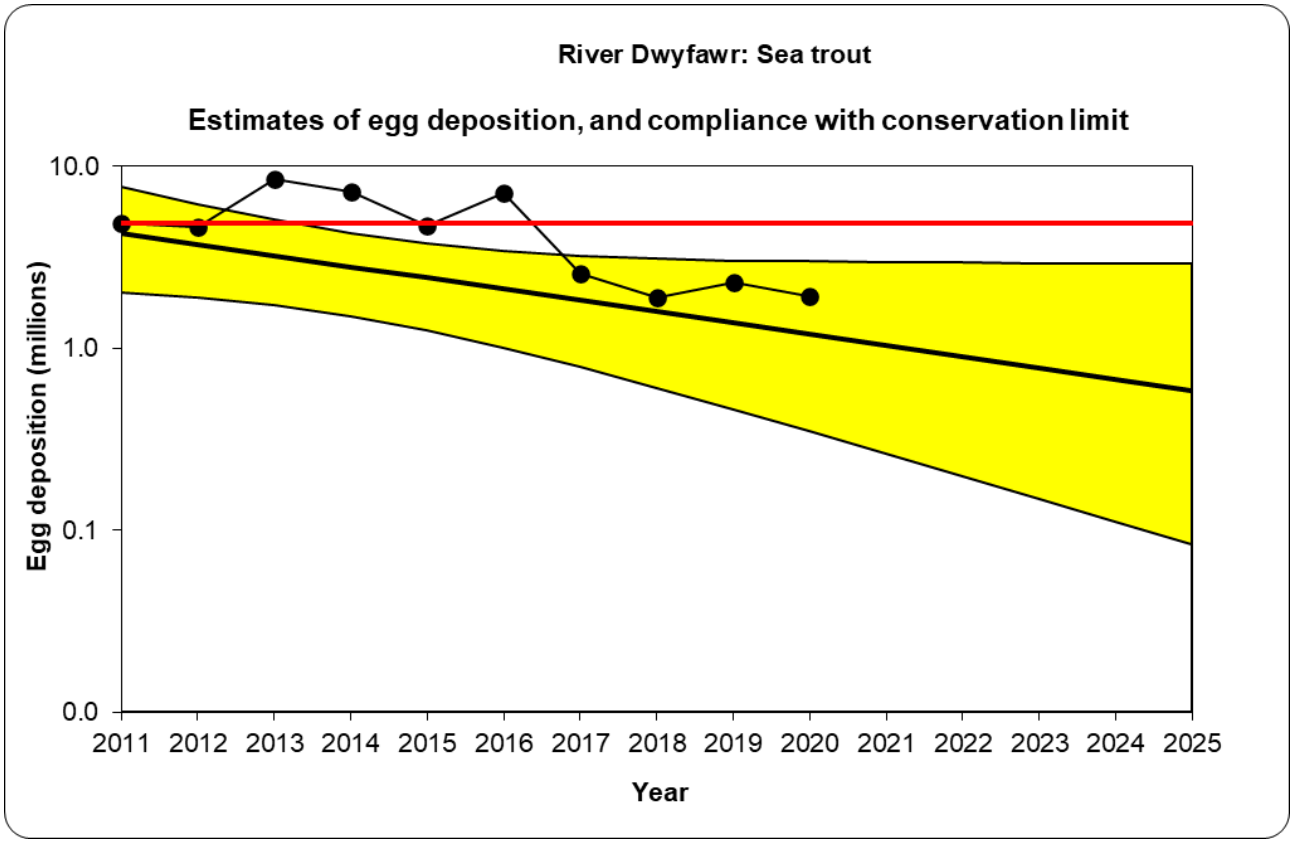
- Current number of eggs being deposited puts stocks **at risk**
- In five years' time the predicted status of salmon stocks will be **at risk**
- Based on current data, and the projection of the graph, the stocks of salmon on the Dwyfor will continue to **decline (uncertain trend)**

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: Technical case for fishing controls to protect salmon and sea trout).



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Juvenile Salmonid Monitoring Programme

In 2021 the temporal (annual) programme consists of one site on the Dwyfor. The temporal data is used to look at trends in juvenile salmon and trout densities giving an indication of how successful spawning has been across the whole catchment.

Salmon and Trout Classifications

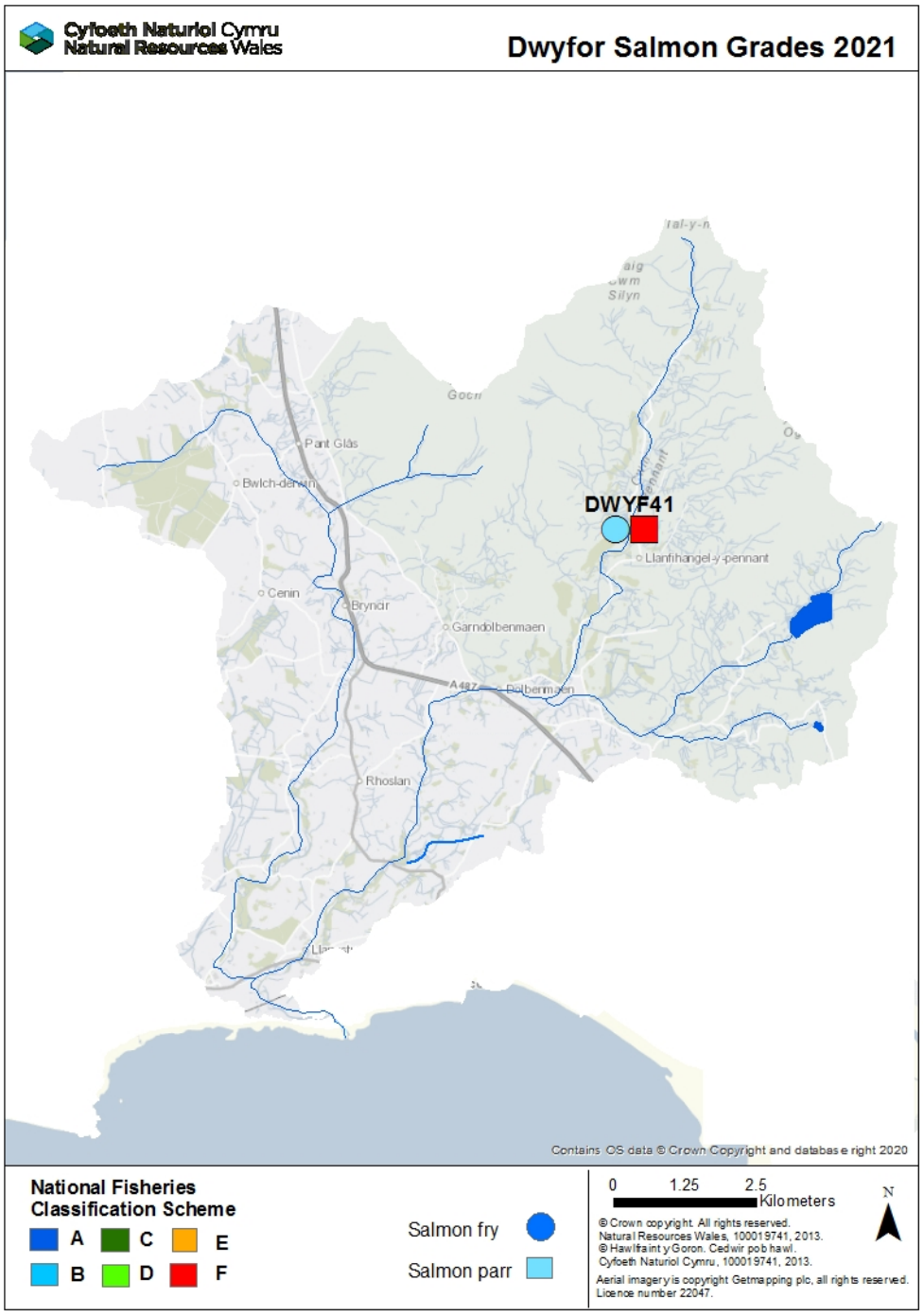
The tables/maps below show the results of the routine juvenile salmonid population surveys on the Dwyfor in 2021.

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.

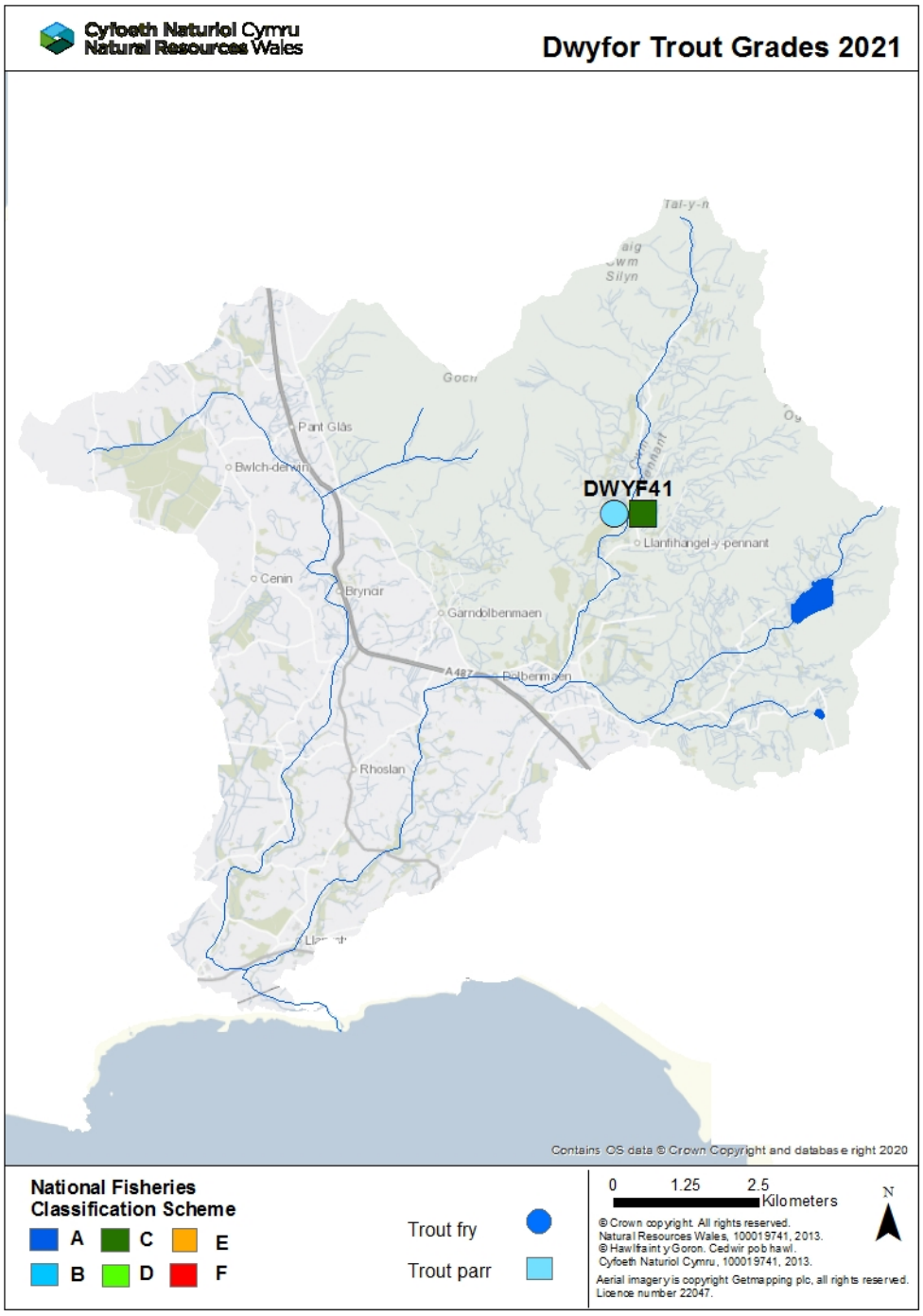
Grade	Descriptor	Interpretation
A	Excellent	In the top 20% for a fishery of this type
B	Good	In the top 40% for a fishery of this type
C	Fair	In the middle 20% for a fishery of this type
D	Fair	In the bottom 40% for a fishery of this type
E	Poor	In the bottom 20% for a fishery of this type
F	Fishless	No fish of this type present

Catchment	Site code	Year	Salmon fry grade	Salmon parr grade	Trout fry grade	Trout parr grade
Dwyfor	41	2021	**B**	**F**	**B**	**C**

Map of Juvenile Salmon Results



Map of Juvenile Trout Results

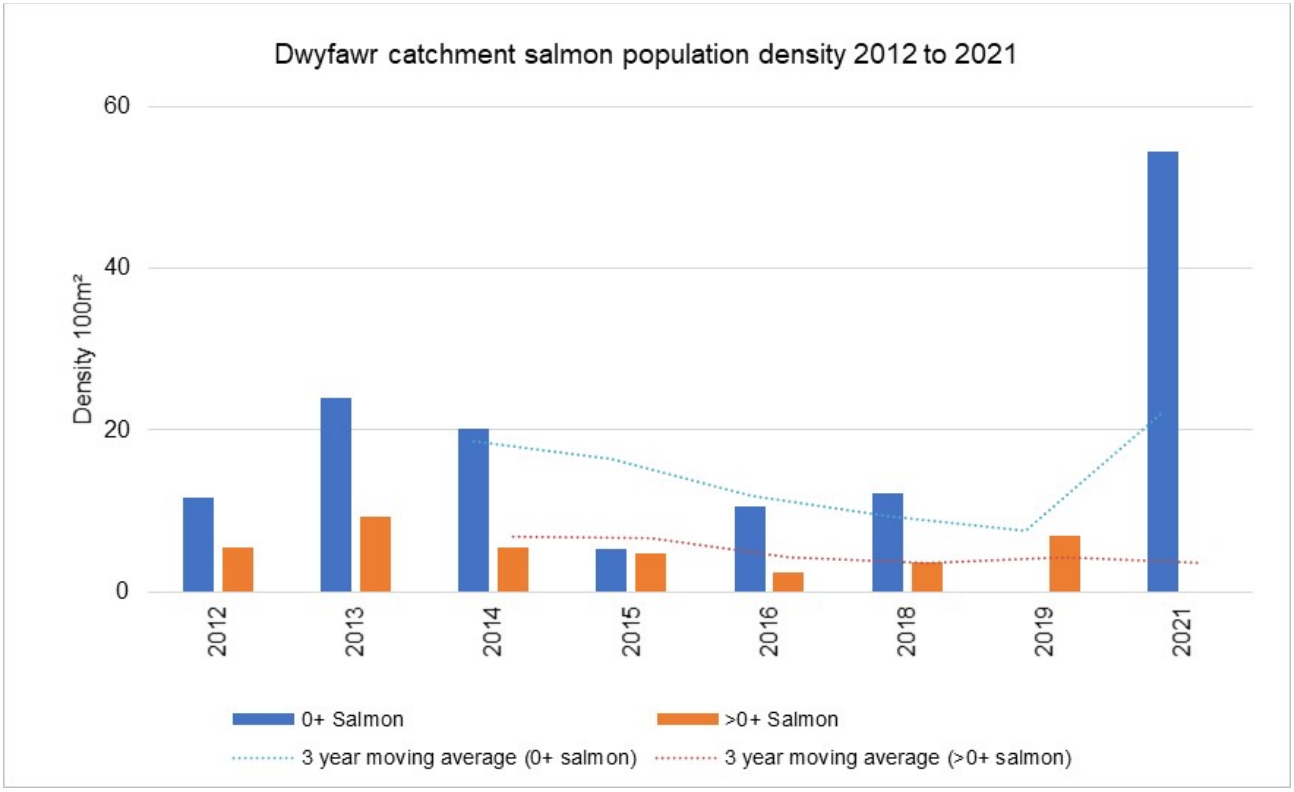


Catchment Population Trends

The table below shows the average salmon and trout densities from the temporal site on the Dwyfor catchment since 2012. NB – no surveys were carried out in 2017 due to high flows, covid restrictions stopped surveys in 2020. NA stands for not applicable.

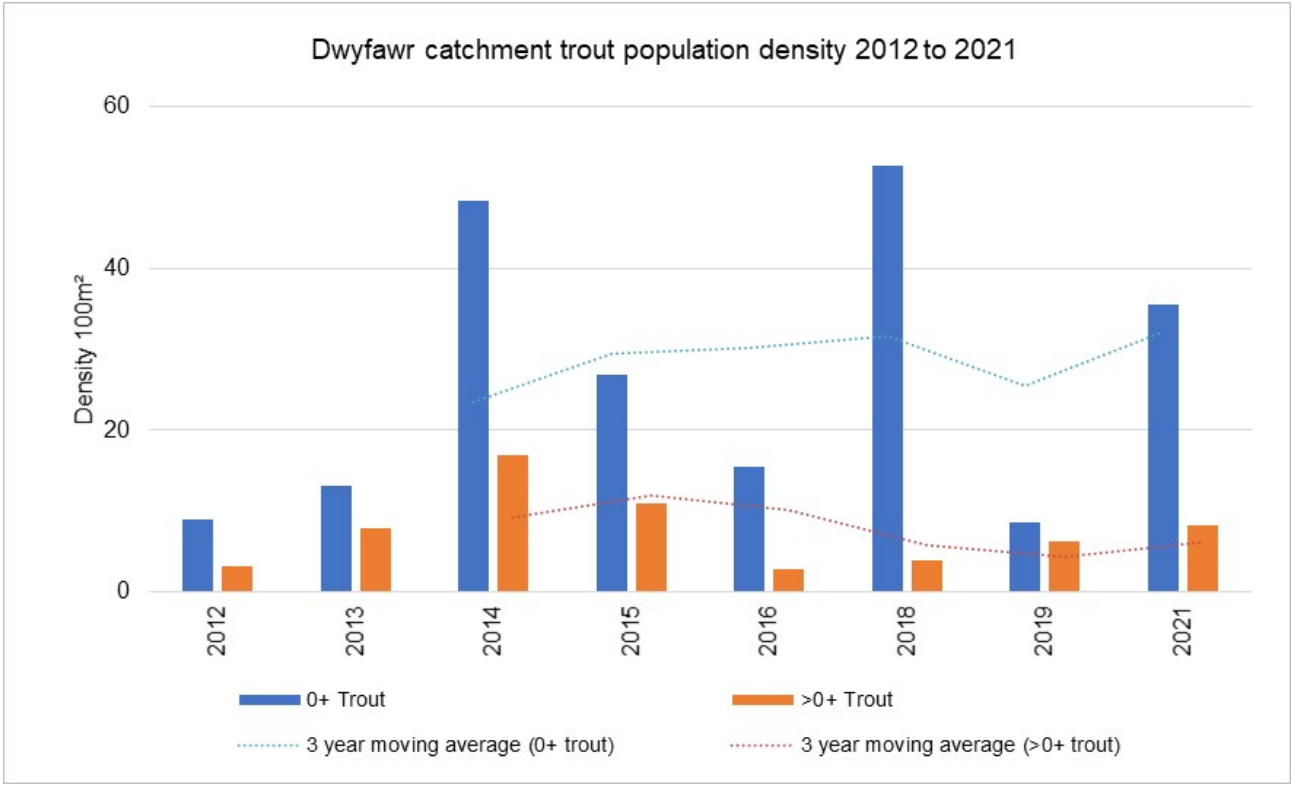
Salmon population trend

Year	0+ Salmon	3-year average (0+ salmon)	>0+ Salmon	3-year average (0+ salmon)
2021	54.5	22.2	0.0	3.5
2019	0.0	7.6	6.9	4.3
2018	12.1	9.3	3.6	3.6
2016	10.6	12.0	2.4	4.2
2015	5.2	16.4	4.8	6.5
2014	20.1	18.5	5.5	6.7
2013	23.9	NA	9.3	NA
2012	11.6	NA	5.4	NA



Trout population trend

Year	0+ Trout	3-year average (0+ trout)	>0+ Trout	3-year average (0+ trout)
2021	35.5	32.2	8.2	6.1
2019	8.5	25.6	6.2	4.3
2018	52.7	31.7	4.0	5.9
2016	15.5	30.2	2.7	10.2
2015	26.9	29.4	10.9	11.9
2014	48.3	23.5	16.8	9.3
2013	13.1	-	7.9	-
2012	8.9	-	3.1	-



Dwyfor Fisheries Action Table

Planned actions	Benefits	Lead	Partner(s)	Timescale for delivery
Habitat improvements: Dwyfor - Llanfihangel - in-river habitat restoration – placement of boulders within the channel.	Increased habitat available for spawning and juvenile fish.	NRW		2021-22
Habitat improvements: Upper Dwyfor – riparian habitat restoration – fencing and crossing points.	Improved riparian habitat, stabilised banks and protection of spawning areas.	NRW		2021-22
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		On-going
Water Framework Directive: We will continue to work to ensure no deterioration, monitor the status of the environment and investigate the 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 Wildlife trusts Local authorities Landowner DCWW	On-going
Enforcement: Action to reduce illegal activity on information provided and investigations.	Reduce illegal activity, more fish remain in the system.	NRW	Stakeholders North Wales Police	On-going