Cyfoeth Naturiol Cymru
Natural Resources Wales

Usk 2015 Fish Survey Summary

Sophie Gott

Report No .....

Introduction

The river Usk is one of the premier salmon rivers in Wales. The catchment is also important in terms of its general ecology; it is designated as a Special Area of Conservation (SAC), and is home to several protected species of fish, plants, mammals and invertebrates. The water quality, biology (aquatic invertebrates and plants) and fish of the catchment are routinely monitored by the Natural Resources Wales on a fixed programme.

This report presents a summary of the findings of the 2015 temporal programme and compares them to historic long-term datasets.

This summary will be followed up by a full Salmon and Sea Trout Catchment Summary in the new year.

The Usk Fish Monitoring Programme

The Usk catchment has a network of sites which are fished either on an annual basis (temporal), or a six year rolling basis (spatial); this programme has been in place since 2006, although is broadly comparable to previous survey programmes

In 2015 a temporal survey programme was undertaken on the Usk catchment, comprising 13 quantitative electric fishing surveys.

All of the sites were surveyed using a fully quantitative (Q) catch depletion technique between stop nets and with at least 3 runs.

Results

Salmon were present in varying numbers at all of the sites surveyed, from Poor (E) overall classifications on the Menasgin and Rhiangoll to Excellent (A) on the Cilieni and Ysgir (Figures 1a and 1b).

Overall juvenile salmon numbers across the catchment are poorer than in the last two years, with a lower average density and fewer sites in the Excellent (A) or Good (B) classifications. The average densities of fry and parr are broadly similar to those seen in 2011, and whilst low, are not outside of the usual range. Likewise, at individual sites the variation remains roughly within the usual range.

Brown trout were present in varying numbers at all of the sites surveyed from Poor (E) overall classifications on the Crai, Tarell and Rhiangoll to Excellent (A) on the Cilieni and Honddu (Figures 1a and 1b).

Overall brown trout numbers across the catchment are higher than in the previously two years, although the number of sites in the Excellent (A) or Good (B) classifications remains roughly the same. As with the salmon, the average densities of fry and >0+ trout remain well within the usual range.

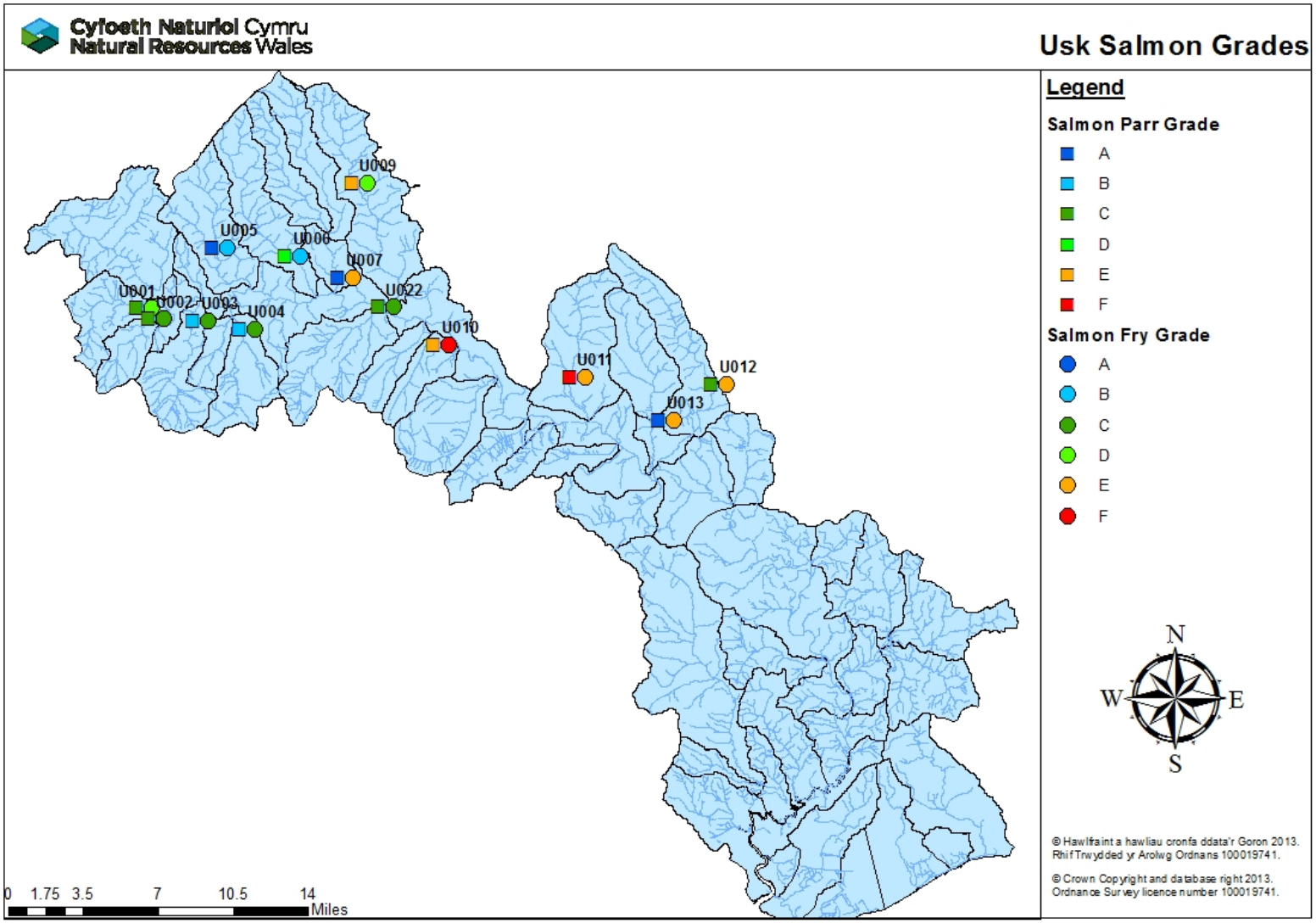

Figure 1a Salmon fry (0+) and parr (>0+) classification for the Usk catchment in 2015. Rivers surveyed – Usk (U001); Hydfer (U002); Crai (U003); Senni (U004); Cilieni (U005); Bran (U006); Ysgir (U007); Honddu (U009); Menasgin (U010); Rhiangoll (U011); Grwyne Fawr (U012); Grwyne Fechan (U013) and Tarell (U022).

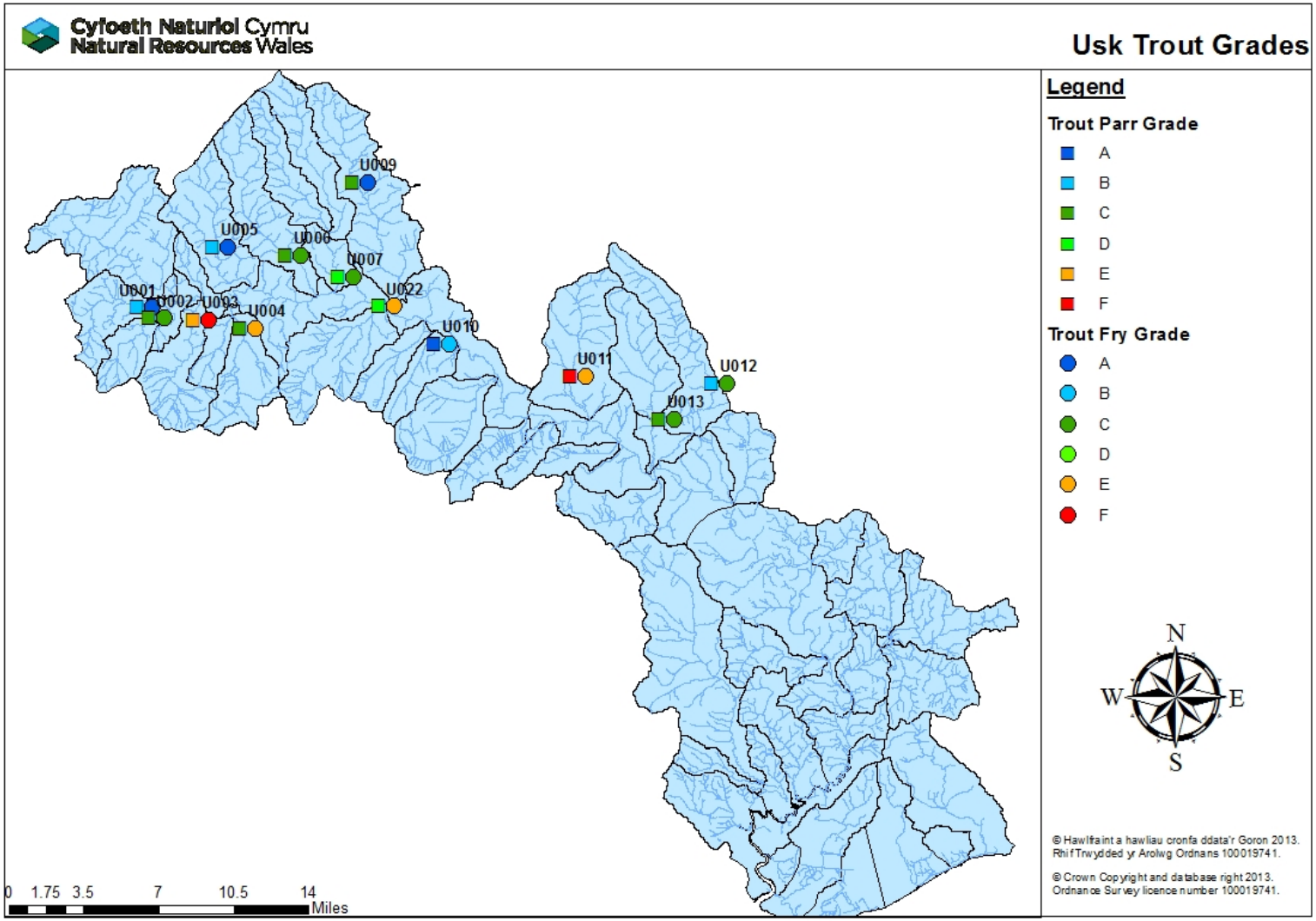

Figure 1b Brown trout fry (0+) and parr (>0+) classification for the Usk catchment in 2015. Rivers surveyed – Usk (U001); Hydfer (U002); Crai (U003); Senni (U004); Cilieni (U005); Bran (U006); Ysgir (U007); Honddu (U009); Menasgin (U010); Rhiangoll (U011); Grwyne Fawr (U012); Grwyne Fechan (U013) and Tarell (U022).

Catchment Population Trends

The data from all quantitative surveys done in the Usk catchment, between 1986 and 2015 were used in this analysis, with the exception of post and pre stocking surveys.

Both salmon and brown trout were analysed using both a linear and non-linear model on the 30 year data set (1986 – 2015), and just the linear model on the 14 year data set (2002 – 2015), the latter representing the period for which the surveys were standardised and undertaken every year. The 14 year data set used data only from surveys conducted annually as part of the temporal Core Fish Monitoring Programme.

The linear model 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 a 2.5% chance of an upward trend.

The non-linear model fits a curved line to the data, which may be more informative in long data sets of naturally fluctuating fish populations. It can highlight particular times within the data series where upwards or downwards trends have been more evident; however no statistical significance can be calculated for these trends. It is not used for analysing short-term datasets as the effect of abnormal years (e.g. the high flows and inefficient survey conditions of 2007 and 2008) can heavily skew the results.

It is important to remember that these trends will fluctuate year on year, and should be considered as part of a bigger analysis, including for example rod catch and habitat availability.

Salmon

On the face of it, the juvenile salmon populations in the Usk look to have increased since surveying began in 1986 (Fig 2a) with an overall juvenile upward trend ($P = 0.9002$); this upward trend is more evident in fry ($P = 0.6821$) than in parr, the latter of which show a slightly declining trend ($P = 0.2172$).

However, the statistical significance of this upward trend has decreased in recent years, and the non-linear analysis (Fig 2b) suggests that salmon densities have declined from a peak in the late 1990s early 2000s. This is further evidenced by the short-term linear analysis (Fig 2c) which suggests approximately a 99% chance of a downwards trend ($P = 0.00795$) in overall salmon densities; roughly equivalent in both fry and parr.

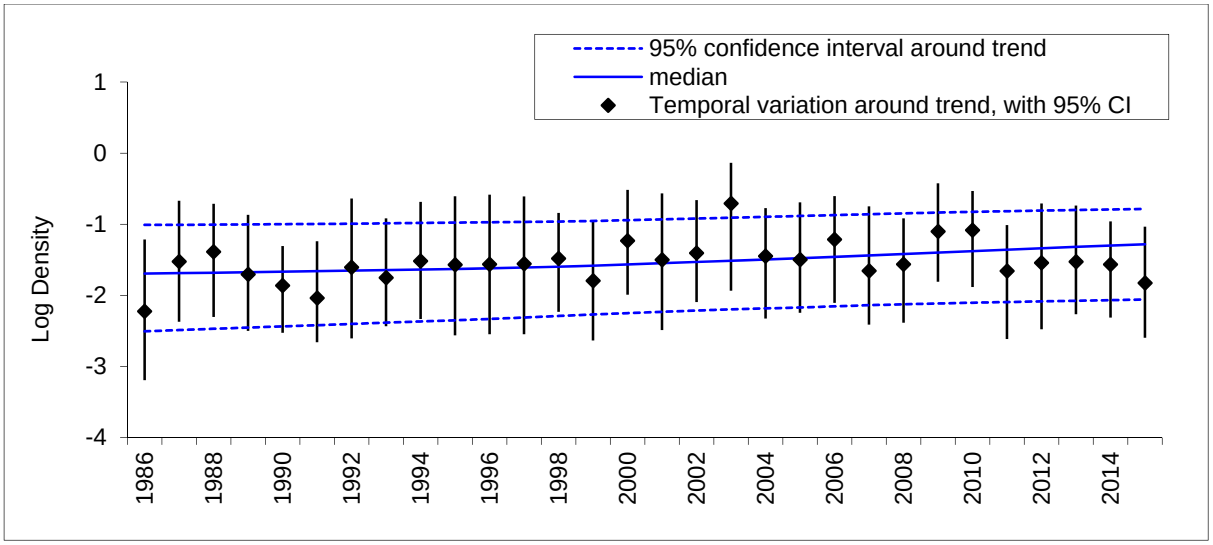

Figure 2a - Linear analysis of juvenile salmon populations in the Usk catchment, 1986 to 2015 (P = 0.9002)

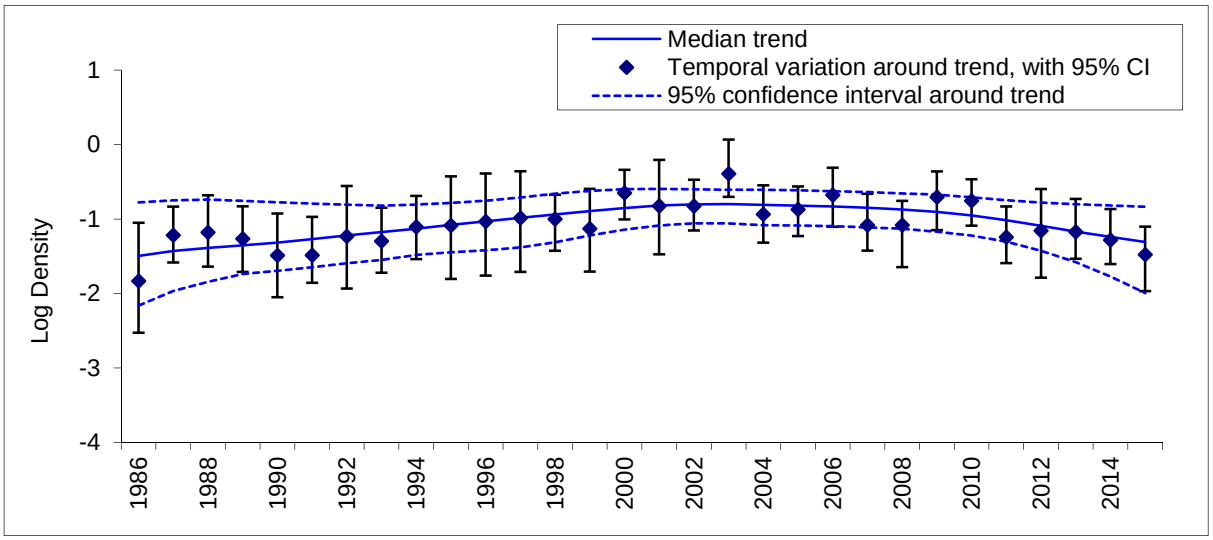

Figure 2b - Non-linear analysis of juvenile salmon populations in the Usk catchment, 1986 to 2015

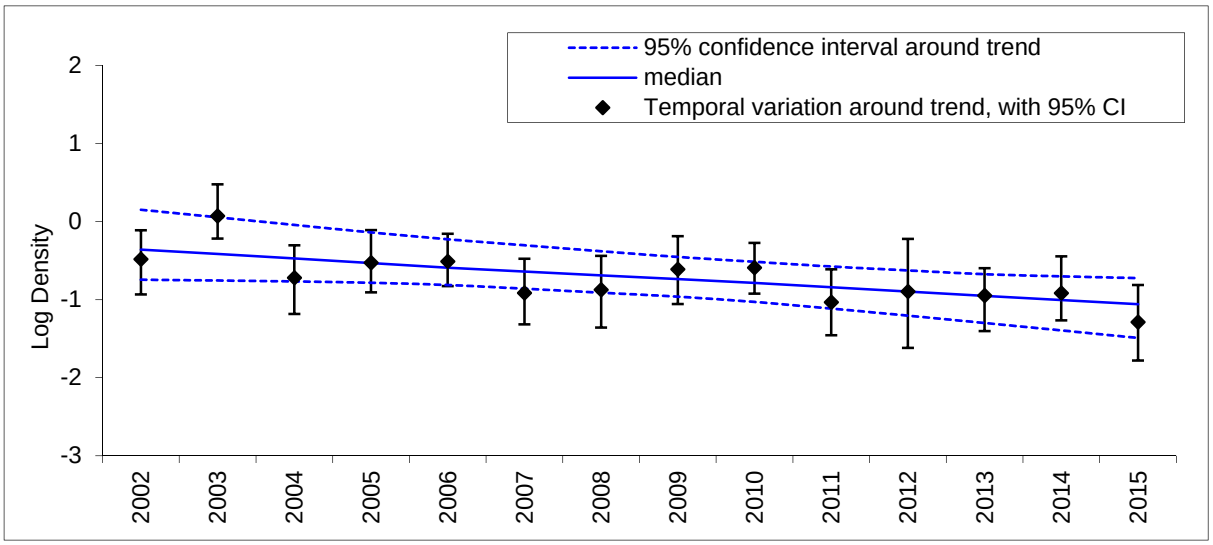

Figure 2c - Linear analysis of juvenile salmon populations in the Usk catchment, 2002 to 2015 (P = 0.00795)

Brown Trout

The trend in brown trout populations in the Usk catchment appears to mirror that of the salmon. The long-term linear analysis suggests a decline over the time period of 1986 to 2015 (Fig 3a), albeit not a significant one (P = 0.2924), and a trend which has markedly improved from a highly statistically significant downwards trend just a couple of years ago. The trend in trout fry over this time period is upwards (P = 0.8029), with the overall decline being strongly driven by a downwards trend in parr and adults (>0+), although this is no longer statistically significant (P = 0.0556).

The non-linear analysis suggests a levelling out of this downwards trend in the early part of this century, and possibly an upturn (Fig 3b). This is backed up by the short-term dataset (Fig 3c), which shows an overall upwards trend (P = 0.8668), where the trend is now roughly equivalent in fry (P = 0.8076) and parr (P = 0.7053).

Of note is that in 2013 when the full spatial survey was carried out in the catchment, the Habscore results, suggested that the majority of sites have trout parr and adult numbers well within normal ranges. Furthermore, these data are from sites traditionally picked for juvenile salmon and as such, there is an inherent bias against larger brown trout habitat.

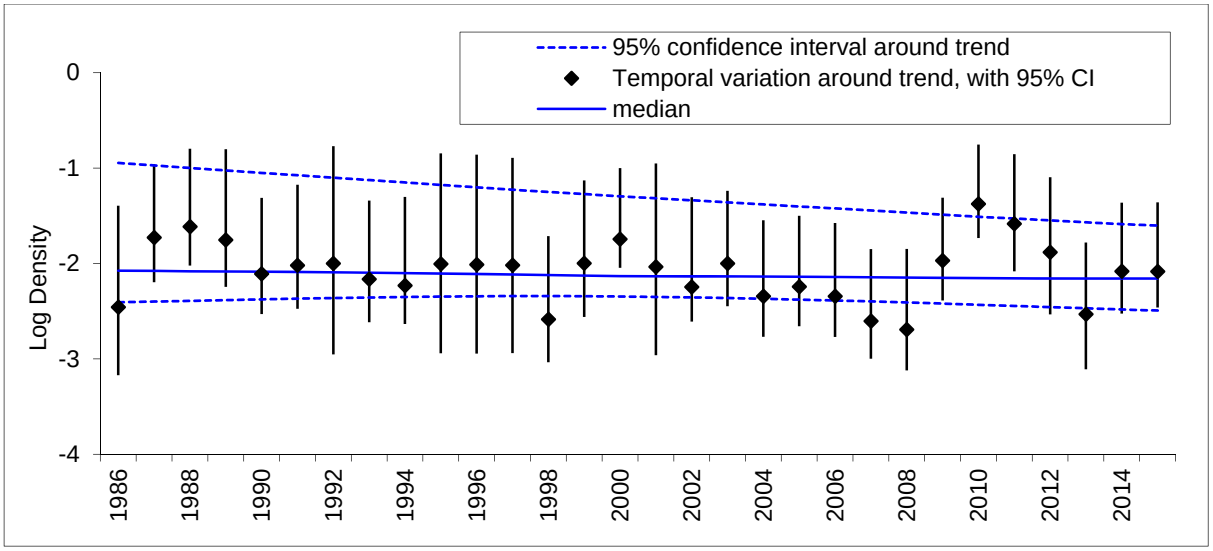

Figure 3a - Linear analysis of brown trout populations in the Usk catchment, 1986 to 2015 (P = 0.2924)

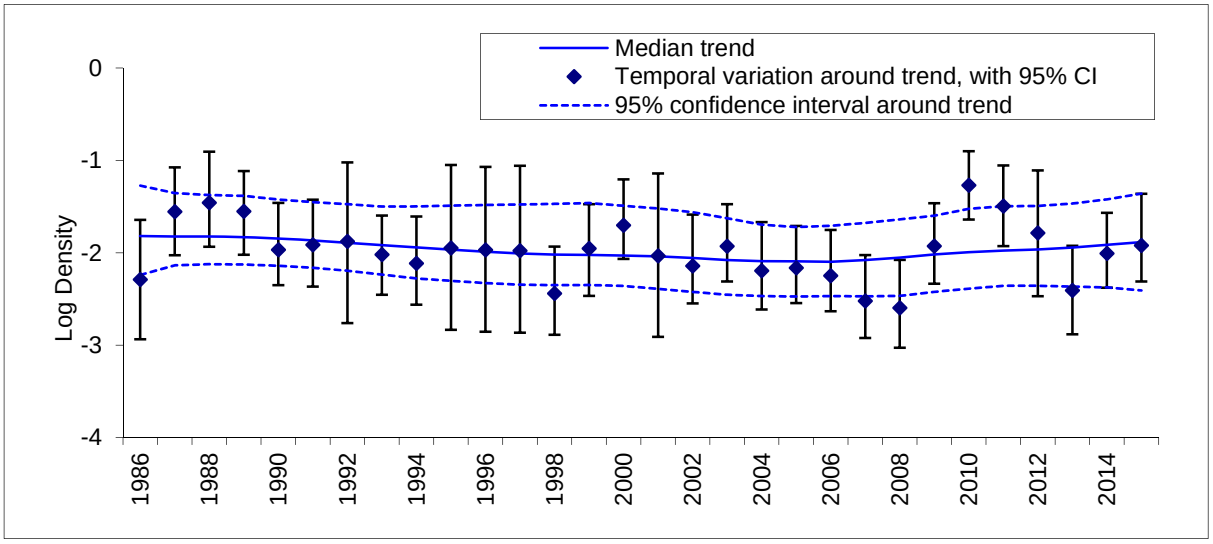

Figure 3b – Non-linear analysis of brown trout population in the Usk catchment, 1986 to 2015

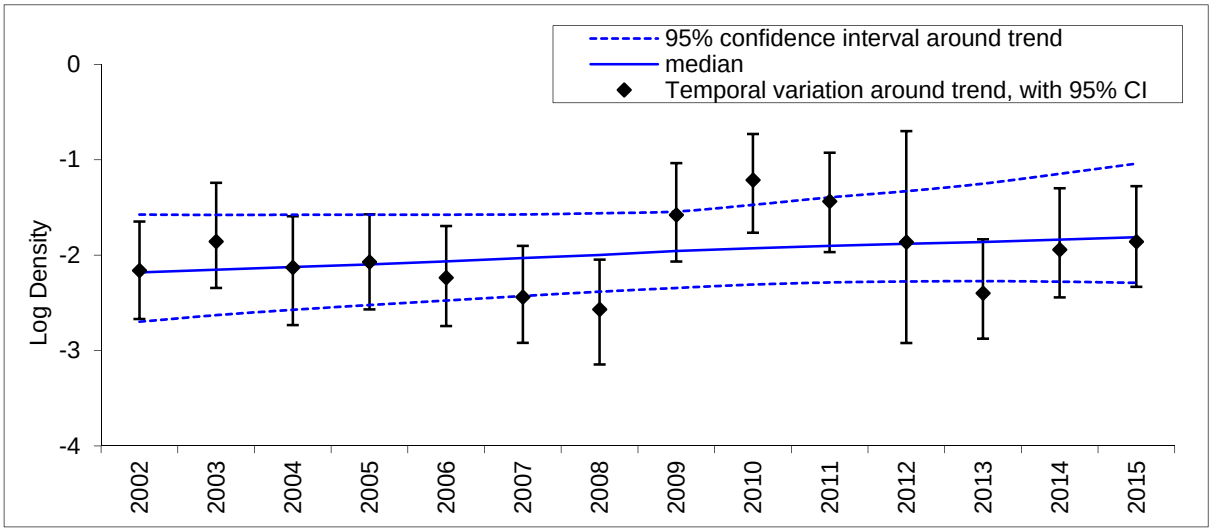

Figure 3c - Linear analysis of brown trout populations in the Usk catchment, 2002 to 2015 (P = 0.8668)