

## Juvenile Salmon Stocks in the Upper Dee, 2015-2018

### Introduction

Since 2013, electrofishing surveys have been taking place in the upper catchment to monitor changes in juvenile fish populations in conjunction with the Upper Dee Riparian Scheme (UDRS) tree planting.

The Upper Dee Riparian Scheme (UDRS) is a European funded project aimed at restoring the upper Dee catchment to protect salmon and freshwater pearl mussel populations. The project has enabled a variety of deciduous trees to be planted in tree enclosures along the bank tops of most of the upper Dee rivers and burns. The trees will help stabilise riverbanks preventing erosion and will introduce nutrients by providing leaf litter and woody debris. The trees will provide many benefits to pearl mussels and fish by providing shade which will reduce water temperatures.

Water temperatures recorded on the Geldie Burn and the River Gairn this summer peaked at 26 °C. A high temperature of 27°C sustained over several days is lethal to juvenile fish. So far, these temperatures have not been continuous for a long enough period to cause mortality, but government climate change predictions indicate an increase of 4°C by 2080. Offsetting the effects of climate change in the riparian zone now is vital for the future survival of salmon, trout and mussels.

### Methods

16 sites have been electrofished on the River Gairn, Callater Burn, Clunie Water, Ey Burn and the Geldie Burn for the past 4 years (Fig. 1). When studying the spread of juvenile fish population in a river and identifying trends between years it is valuable to have multiple years of data, collected the same way from exactly the same sites.

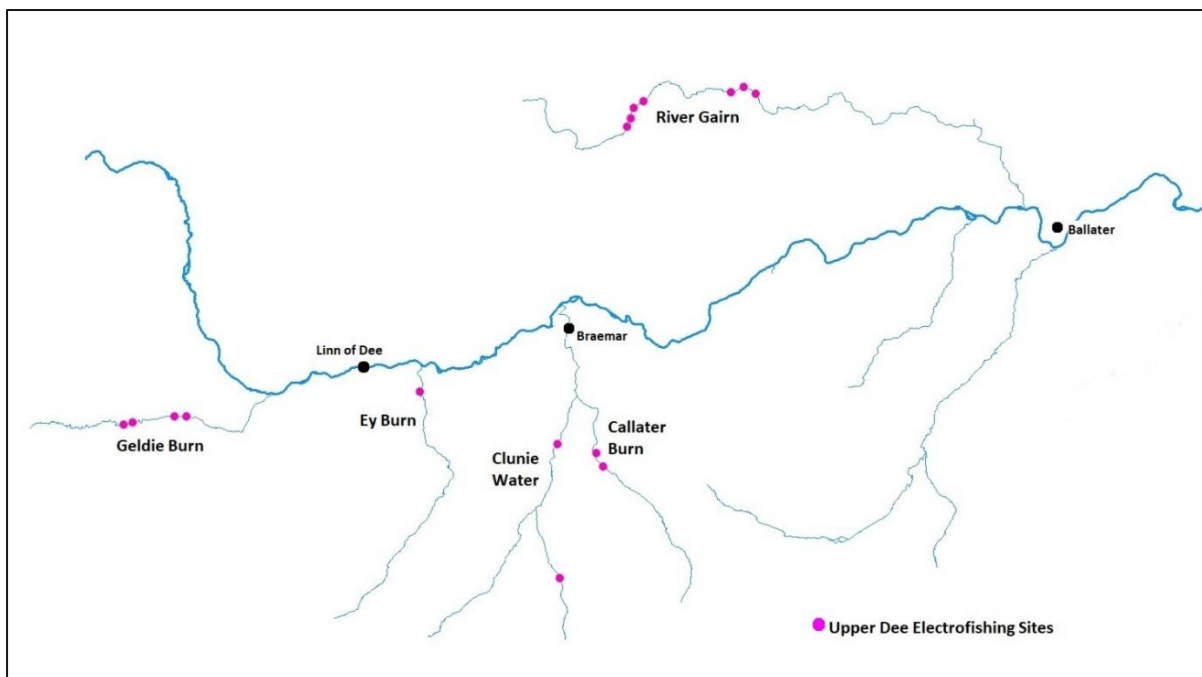


Figure 1. Upper Dee catchment electrofishing survey sites represented by pink dots.



Figure 2. Electrofishing

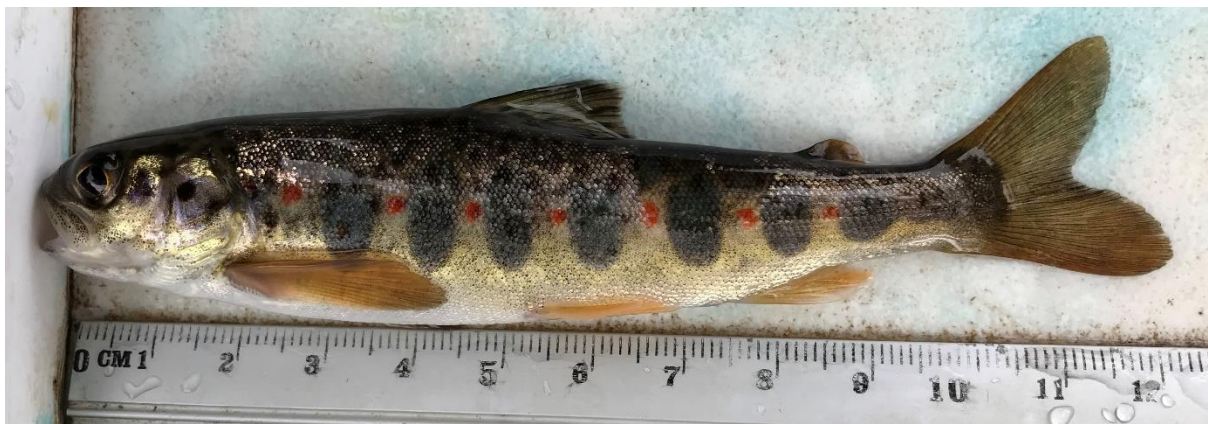


Figure 3. Salmon parr from the Ey Burn.

## Results and Discussion

The graph below shows the average number of salmon fry caught at the 16 UDRS sites from 2015-2018. All sites were a minimum of 100m<sup>2</sup>.

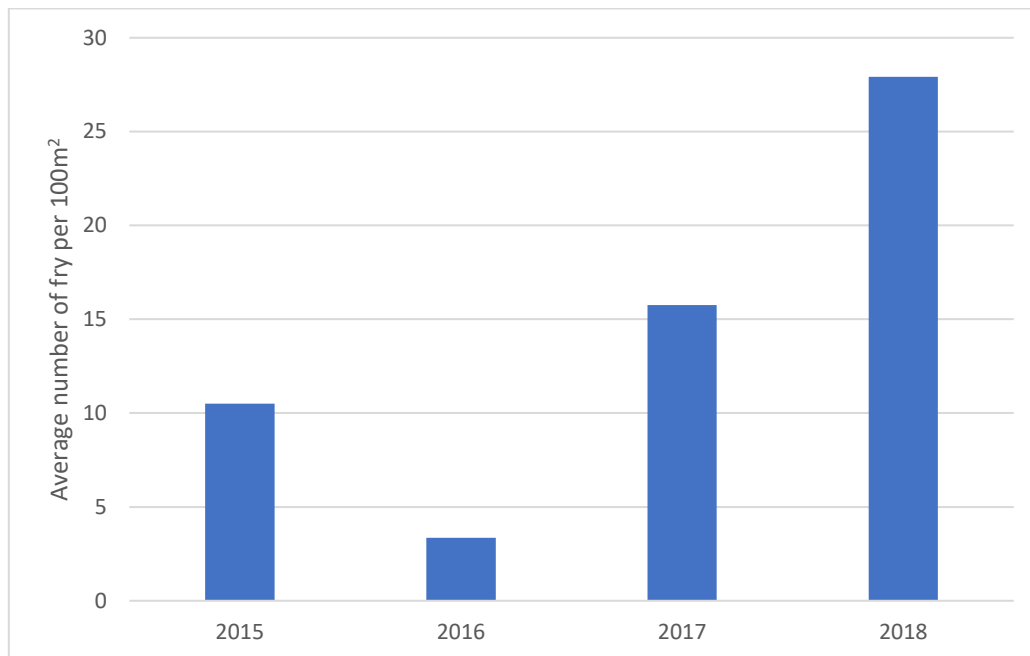


Figure 4. Average number of salmon fry caught by electrofishing in the upper Dee catchment, 2015-2018.

In 2015, the average number of salmon fry caught was 10 per 100m<sup>2</sup>.

2016 saw the average fall to 3 fry per 100m<sup>2</sup>, which could be due to several reasons. The major flood caused by Storm Frank which happened in December of 2015 was the biggest since 1829. It caused considerable erosion, shifting of substrate and devastated miles of river bank. The flood washed out many eggs which were laid in the gravel at spawning time, resulting in far fewer hatching out as fry. Other rivers in Scotland and Wales, that did not endure the flooding that the Dee had but also saw a decline in fry numbers in 2016. This suggests that there are other factors influencing fry abundance at a wider scale. Finally, 2015 saw the poorest rod catches on record, which suggests that there were low numbers of spawning adults to produce the 2016 fry population.

in 2017, the average number of fry per 100m<sup>2</sup> increased to 16. A higher density from the previous year is strong indication that the river is recovering from the effects of the storm.

The average fry density in 2018 increased to 28 per 100m<sup>2</sup>. This supports the above average redd counts seen in 2017.

Parr densities in the upper tributaries were not significantly affected by Storm Frank. Surprisingly, the number of parr at most sites increased between 2016 to 2017. It is possible that survival improved through less competition with fry.

The number of parr steadily increased from 8 per 100m<sup>2</sup> in 2015, to 10 per 100m<sup>2</sup> in 2016 and to 12 per 100m<sup>2</sup> in 2017. In 2018 the number of parr almost doubled from 12 in to 22 per 100m<sup>2</sup>. This may be due to the high numbers of fry recorded in the 2017 surveys subsequently being caught as parr in 2018.

Juvenile fish numbers in 2018 are good in comparison to previous years. However, the warm weather combined with the lack of rainfall over the spring and summer months have resulted in very low water levels. It is possible that fish may be pushed into neighbouring territories as the river becomes shallower and narrower, resulting in them living closer together and so catching more in the electrofishing surveys.

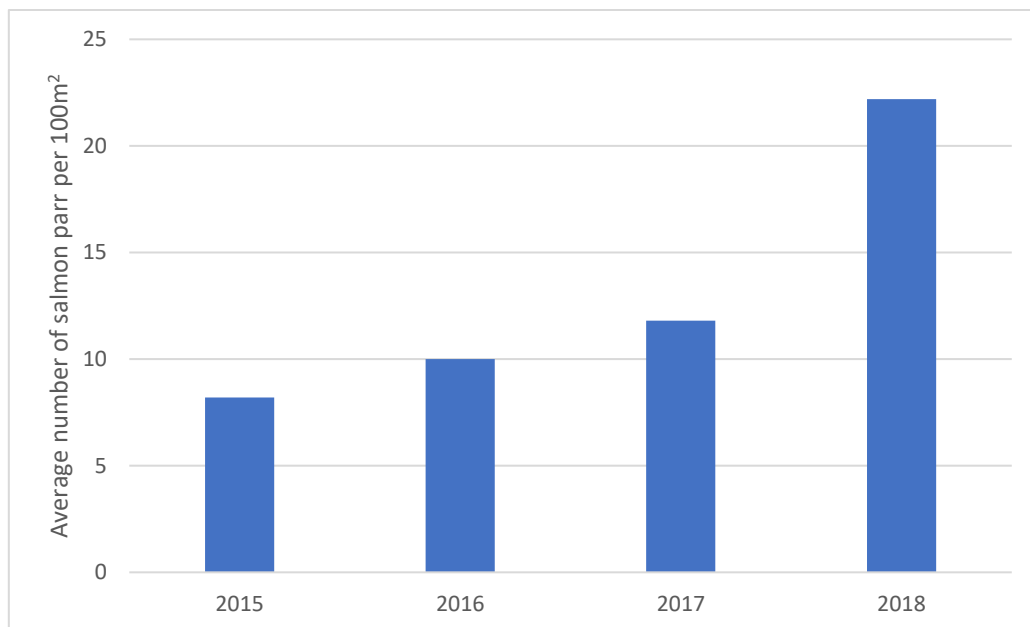


Figure 5. Average number of salmon parr caught by electrofishing in the upper Dee catchment, 2015-2018.



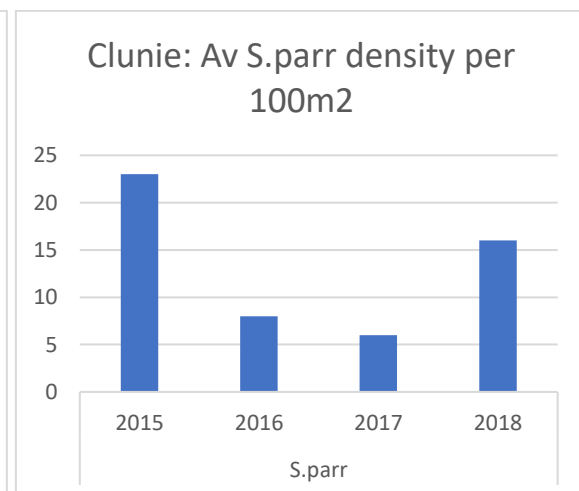
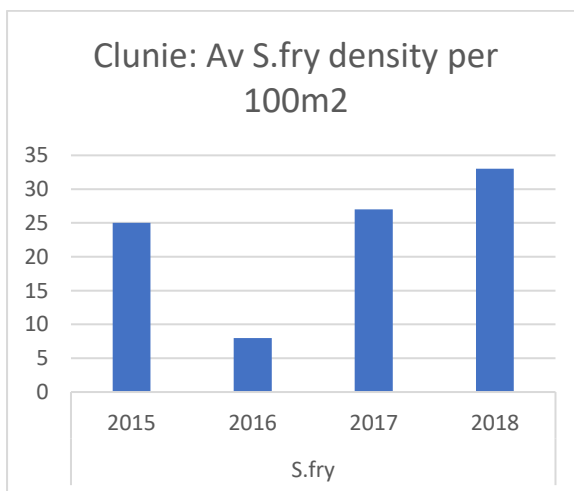
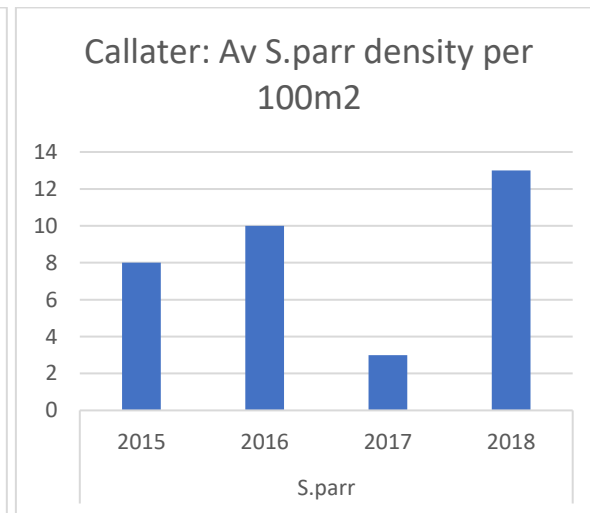
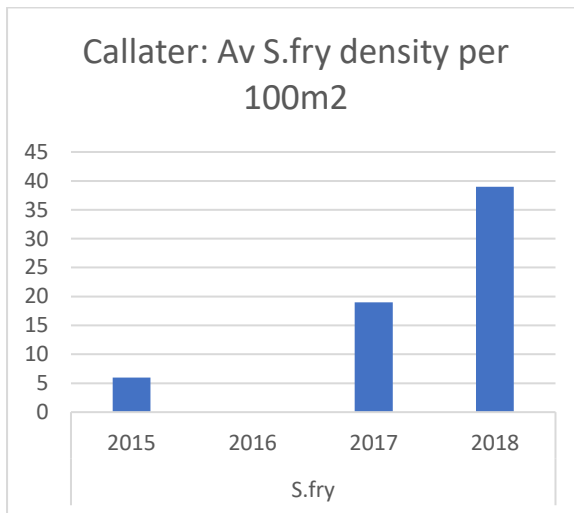
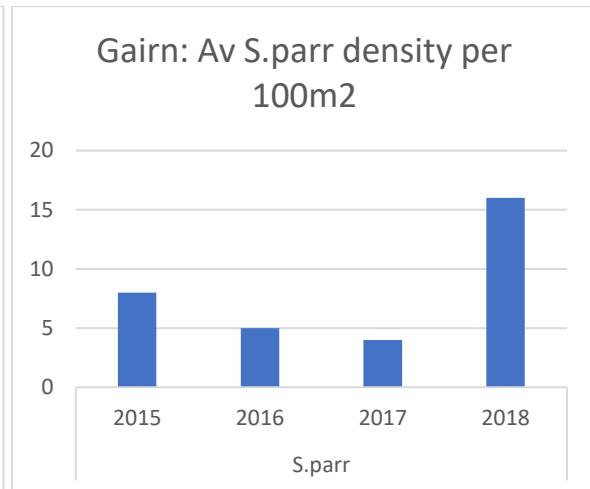
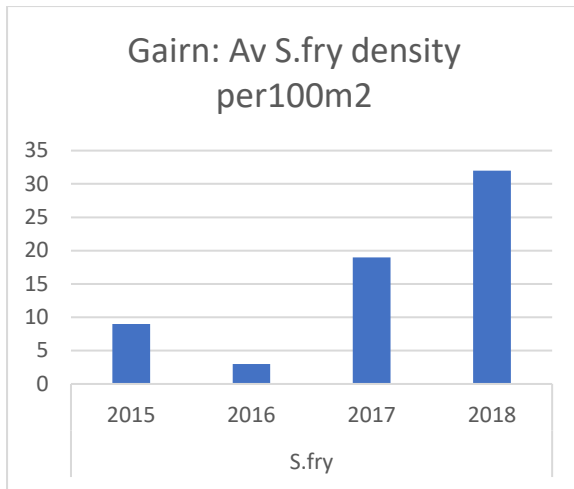
Figure 6. River Gairn in 2017.

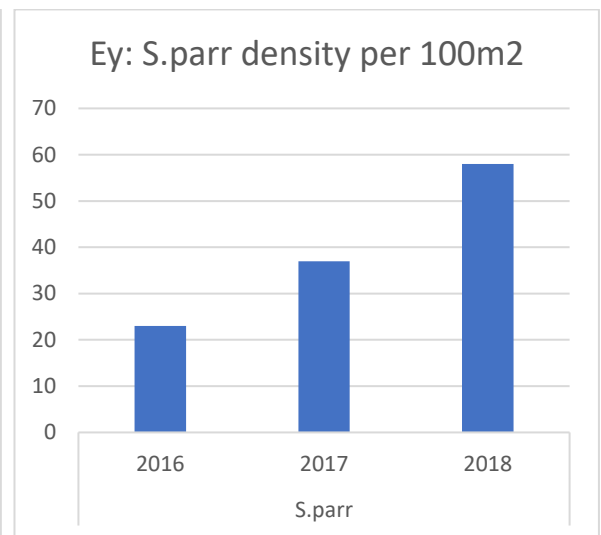
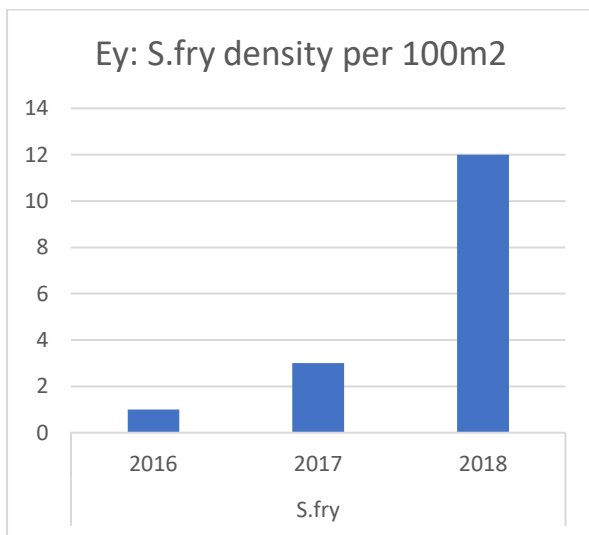
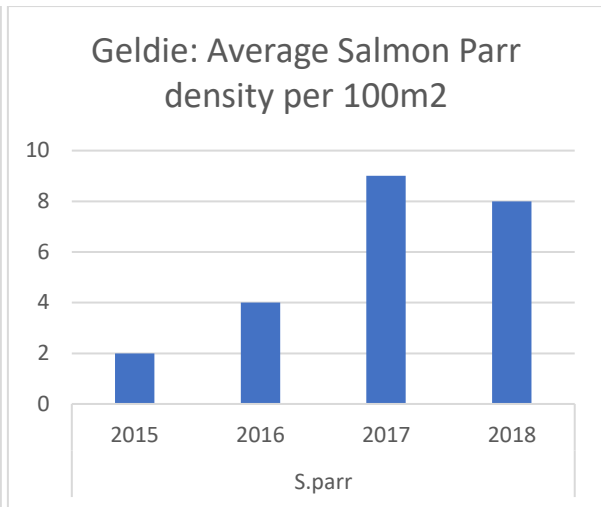
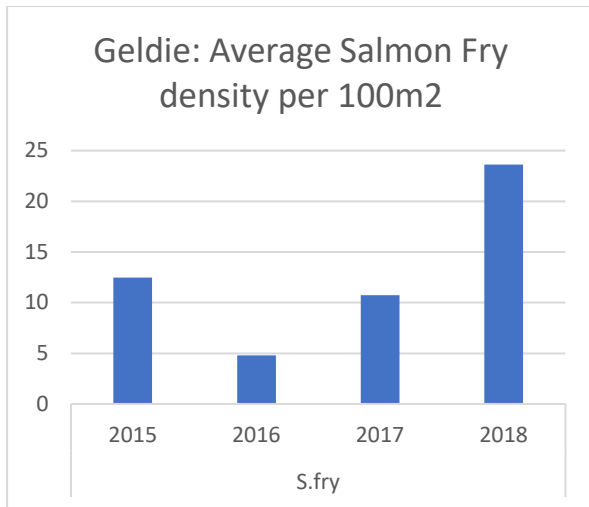


Figure 7. River Gairn in 2018.

These photos were taken from a site on the River Gairn which is visited every year and electrofished. The picture on the left was taken in 2017 when river levels were moderate, when most of the instream rocks are underwater. The picture on the right was taken in 2018 when river levels were very low following a long dry spell. The red circle highlights an area revealing exposed rocks in the lower water level. Low water conditions were found at all sites throughout the upper catchment in 2018.

The following graphs display the electrofishing results of the individual upper rivers.





Following the SFCC guidelines, no data was collected for the Ey Burn site in 2015 due to the water temperature falling below the optimal range to electrofish safely.