



ELECTRO-FISHING REPORT 2014 – EDEN AND LEET WATER

The electro-fishing programme carried out each summer by The Tweed Foundation forms part of the Fisheries Management Plan, which details the information that is required to manage the fish stocks of the Tweed and Eye catchments. Input 2c of the Plan is:-

"Monitor the juvenile populations of each stock of Salmon, the influence of habitat characteristics on them and the effects of predation."

Electro-fishing of monitoring sites is the basic tool for building up a picture of the variation in numbers of juvenile Salmon and Trout throughout the Tweed catchment over time. A network of sites has been established throughout the Tweed and Eye catchments with the aim of sampling them every three years. As we continue to return to these sites, our understanding of the factors affecting the numbers of juvenile fish, both natural and man-made, will improve. It is with this information that appropriate management decisions can be recommended, such as measures to reduce the exploitation of returning Salmon or the adult Brown trout that spawn the next generation of juvenile fish (e.g. catch regulations) or through habitat restoration.

The sites electro-fished are primarily fast-flowing, relatively shallow areas in the main channels and larger side burns which are the preferred habitat of Salmon fry (first year fish). Trout by contrast dominate the smaller tributaries and burns which is where they spawn. An example of Tweed Foundation Fry Index electro-fishing can be found at:

<https://www.youtube.com/watch?v=P77zKgUmXIQ>



A typical electro-fishing site

The life cycle of Salmon and Trout

To understand the results provided on the following pages, a brief guide to the life cycle of Salmon and Trout is provided:-



The fry are "the young of the year" that are spawned as eggs in the autumn and emerge out of the gravel as larvae around April/May. By summer these fish are 5 or 6 cm in length.
(*picture – a Salmon fry recently emerged*)



Parr are fish that are one year or older. Features of Salmon Parr that can be used to distinguish them from Trout Parr include distinctive Parr marks along the flank, a black dot on the gill cover, a more forked tail and generally an absence of red in the tail and adipose fin.
(*picture – Salmon Parr (top), Trout Parr (bottom)*)



Most Salmon Parr leave the river in the spring as Smolts at a length of around 12 cm (at one, two or three years of age). Trout Parr on the other hand either drop down into the main river to become adult Brown Trout or become Smolts in spring time and go to sea to become Sea-trout.
(*picture – Salmon smolt*)



Adult Salmon and Sea-trout typically return from the sea after 1 or 2 winters, although some Sea-trout may return after the first summer. Adult fish commonly return to their stream from which they were spawned to ensure that adaptations to the local environment are passed onto their offspring.

(picture – adult Salmon (top), adult Sea-trout (bottom))

Other Fish Species

The presence/absence and simple abundance of other fish species is recorded at each monitoring site as detailed in the management plan:-

"INPUT 8.1: Collect and collate historical and present day records of native fish species"



All three species of Lamprey (Brook, River and Sea) spawn within the Tweed catchment, but individuals recorded at sample sites are nearly always in the larval stage. Only larval Sea Lamprey can be identified to species by eye. River and Sea Lampreys migrate out to sea in autumn after metamorphosing from their larval stage, returning to spawn as adults. The Brook Lamprey remains in freshwater as an adult, but does not feed at all before spawning.



The number and length of Eels are also recorded. There has been considerable international concern in recent years over the decline in numbers of Eels in European rivers and data from the Tweed has already contributed to one study.

Other fish species generally found at electro-fishing sites include:-



Baggies (Minnows)



Beardies (Stone Loach)



Stickleback

Based on the fish data recorded for each site, MAP 3 shows the presence/absence for each fish species.



ELECTRO-FISHING RESULTS

The evaluation of sites is carried out primarily with fry:- their numbers are quite variable due to high natural mortality, but this age class indicates the spawning success in the immediate vicinity of each monitoring site the previous autumn since they do not generally disperse very far from where they were spawned and none will have yet migrated to the sea. In the Tweed catchment, increasing numbers of smolts are leaving after just one year in the river so decreasing the numbers of parr that are present by the summer sampling period. In areas where adult fish would be expected to spawn, low numbers of fry would indicate a lack of spawning fish or a problem in the local environment, which can then be investigated further.

A baseline survey of the whole Tweed catchment was made from 2006 to 2008 and the results from the 386 sites ranked from lowest to highest values and then divided up into six categories (Very Low; Low, Moderate; High; Very High). Each result from this survey has been assigned to one of these six categories and is displayed on the following maps (MAP 1 & MAP 2).

KEY FINDINGS

Salmon Fry (MAP 1)

- The geographical distribution and abundance of Salmon fry in 2014 is very similar to previous years for both the Eden and Leet Water. Salmon fry were recorded in typically 'High' to 'Very High' numbers on the lower Eden Water up to the Stichill Linn which is an impassable barrier for fish other than Eels.
- Salmon fry are generally absent from the Leet Water or are only present in 'Very Low' numbers. A possible reason for the consistently higher results on the lower Eden Water is the presence of higher quality instream habitat due to stones and gravel being washed down from an area of Basalt and Spilite bedrock upstream of Stichill Linn. As this area has eroded over time since the last ice age, this may have provided a supply of larger substrate which is more suitable for spawning and rearing of fry; such a source is missing on the Leet Water, which generally has finer alluvial substrate and only small areas of gravels. There may also be differences in agricultural practices and their linkage to the watercourse but this requires further investigation.

Trout Fry (MAP 2)

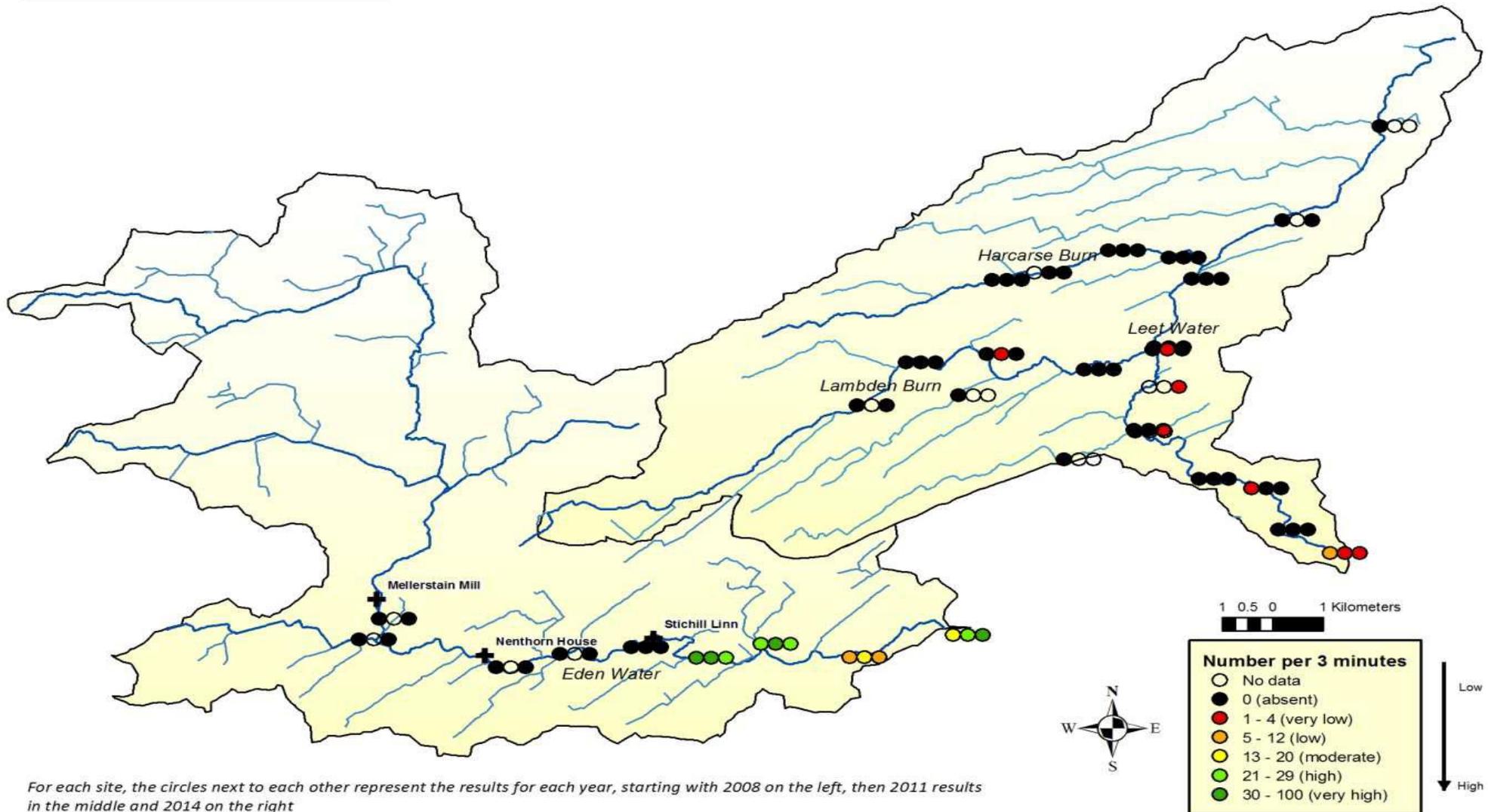
- The Trout fry results are quite mixed on the lower Eden Water but it should be remembered that for this size of watercourse Salmon fry would be expected to be more abundant than Trout, which tend to be spawned in smaller burns. The fry numbers between Stichill Linn and Mellerstain (another obstruction) continue to be in the 'Very Low' and 'Low' categories which will be because these areas have very small breeding populations. Upstream of the Linn the Trout are isolated from the rest of the catchment and in the Mellerstain area they are also further fragmented by barriers.
- The consistently poor results for Trout fry in the main channel of the Leet Water are probably because Trout are unable to successfully spawn in this area, either due to the fine substrate clogging the relatively small areas of spawning gravels (a function of the low gradient of the channel) or the intensive land practices in the local area and canalisation of many river sections in the past. Better results are found in the Lambden Burn and Harcarse Burn, which are the type of smaller watercourses preferred by Trout and where the habitat quality is better. The absence of Trout fry at the top of the Harcarse Burn is probably due to a small weir further downstream preventing access for adult Trout.

Other fish species

- Of particular note is the fact that larval Lamprey were recorded at seven out of nine sites on the Eden Water but they have never been recorded on the Leet Water. There is no obvious reason for this result as there is an abundance of suitable habitat for them there (fine sediment). Further investigations will be required and consideration given to reintroducing them to this part of the catchment. Beardies (Stone Loach) and Baggies (Minnows) are found at most sites on both rivers, with smaller numbers of Stickleback and Eels recorded. Grayling fry have been recorded at a single site downstream of Stichill Linn on the Eden.

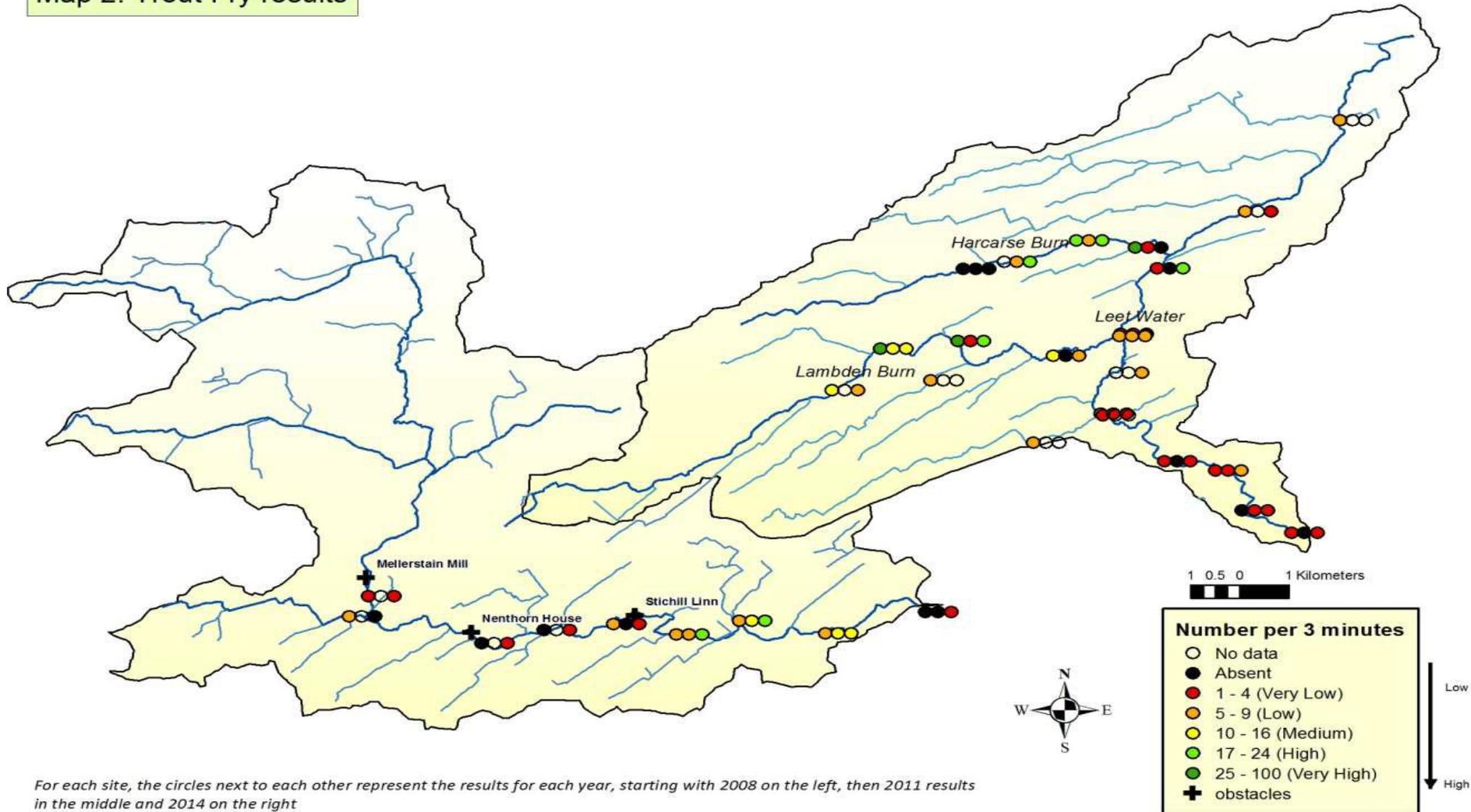


Map 1. Salmon Fry results





Map 2. Trout Fry results



For each site, the circles next to each other represent the results for each year, starting with 2008 on the left, then 2011 results in the middle and 2014 on the right



Map 3. Other fish species results

