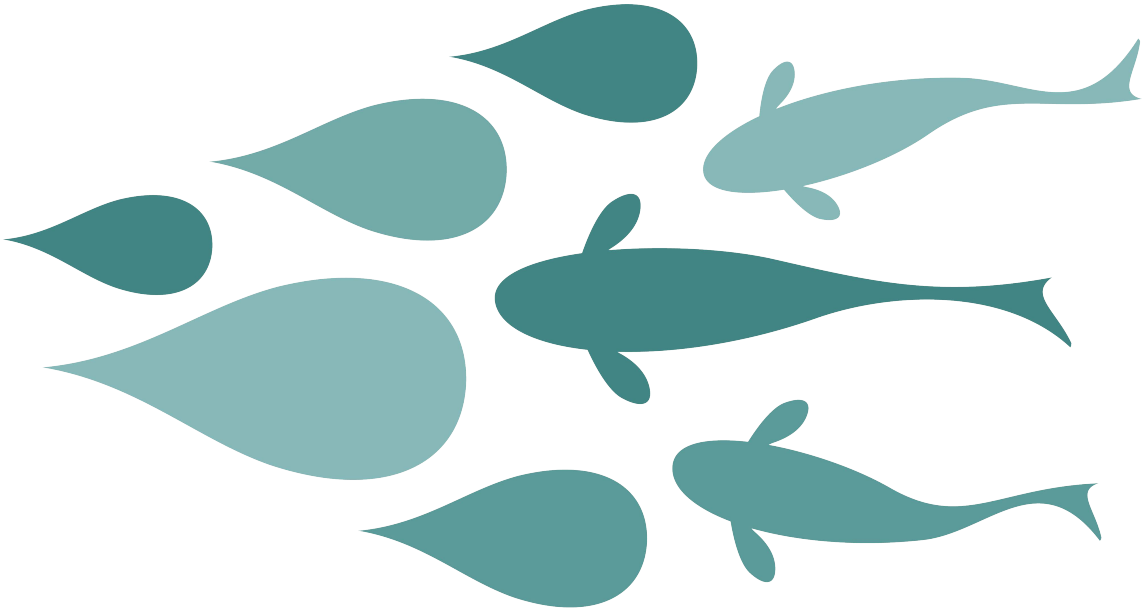
# WESTCOUNTRY RIVERS TRUST ELECTROFISHING SURVEY REPORT- RIVER CAMEL, 2020

River Camel



# WATER FOR GROWTH

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# Executive Summary

This is the fourth consecutive year in which Westcountry Rivers Trust (WRT) have carried out a catchment wide electrofishing report on the River Camel. Due to the global pandemic that is affecting many organisations WRT have had to adapt to a modified, operator safeguarding survey methodology which was incorporated into this year's fry index surveys. The results of the 2020 surveys have shown a slight decrease in numbers overall from those of 2019. Although four years data does not provide enough evidence to draw firm conclusions, the results can be used to guide future work under the Water for Growth project (W4G). Work within the catchment include improvements to fish passage, farm advice, fencing, and riparian and in-river habitat works. This was the final year of the W4G project but thankfully two further years have been granted to enable further monitoring, which is providing a vital snapshot on the health of the catchment.

# 1. Introduction

The Westcountry Rivers Trust (WRT) has undertaken semi-quantitative fry index electrofishing surveys throughout the River Camel as part of its annual monitoring program. This was the fourth year of catchment wide monitoring by WRT which commenced as part of the monitoring for the Water for Growth Project (W4G).

Surveys were undertaken between August and September 2020 and a total of nine sites were electrofished by WRT on the River Camel; site selection was based on key sites which active works relied on capturing the data or important historical sites due to the limited survey potential this year.

## 1.1 Electrofishing Protocols

Electrofishing uses a controlled electric current to induce fish to swim toward an anode and into a hand net, and thereby be counted and assessed. When carried out correctly by experienced and qualified surveyors, it is not harmful to fish and the fish are released back to the same location they were caught. In upland streams and shallower sections of rivers, an electrofishing backpack is used and therefore this type of equipment was used for all the River Camel surveys.

There are several approaches to electrofishing assessments in rivers; quantitative, area semi-quantitative and time semi-quantitative methodologies. All three methods have their advantages and disadvantages.

**Quantitative electrofishing** is a thorough methodology that has the highest degree of accuracy of all the methods. The main disadvantages of this approach are it is less mobile than backpack equipment and it takes longer to undertake surveys. It Is therefore more costly than other approaches. With this method, an area of river is netted off and the fish are removed from this defined stretch in multiple passes until sufficient fish are removed to form a very accurate assessment of species and numbers. It is not required to remove all the fish from the area but rather ensure a consistent fishing method that gives a linear decrease in the number of fish caught per pass. The overall catch decline gives an accurate estimate of the total number of fish in the location. This is known as the 'depletion' methodology.

An **area-based semi-quantitative electrofishing** methodology follows the same process as quantitative electrofishing but only a single pass is carried out. A lack of multiple passes renders the

method only semi quantitative and therefore less accurate, but it has the advantage of being much quicker than the depletion method, and it is suitable for use on all waterbody types. It is able to detect multiple species and is reasonably accurate but is less time efficient and therefore costlier than a time-based methodology (described below).

A **time-based, semi-quantitative electrofishing** methodology differs from both the approaches described above. Instead of limiting the *area* fished (by use of nets) it limits the amount of *time* used to fish to assess fish numbers. As no nets are deployed, fish in deeper sections of large rivers can frequently avoid capture using this method. It is therefore only suitable to assess salmonid fry, who are restricted to a shallower section of upland streams and rivers. This method is extremely rapid and therefore cost-effective, allowing for deployment across whole river catchments although its major drawback is its lower accuracy than netted approaches.

In weighing up the pros and cons of the various approaches it is worth considering what would be required for a truly reliable method. In scientific publications, it is usually considered that if an approach is accurate 95% of the time then this is an acceptable standard. Such an approach would be said to have sufficient statistical power to answer the question asked, for example, '*has this habitat improvement resulted in more fish in the area studied?*'. For an electrofishing methodology to have sufficient statistical power it requires a large number of sites to be fished in a fully quantitative depletion methodology over a number of years. As such an effort is rarely practicable and will cost more than the habitat improvements it attempts to measure, this approach is rarely applied in the UK. River managers in the UK have limited budgets and therefore it is the case that an electrofishing programme of insufficient statistical power to achieve 95% confidence is usually accepted as a compromise between accuracy and cost.

Bearing in mind the limits of statistical power that these approaches usually have (as practically applied), it is important to consider the aim of a given electrofishing programme. In the case of WRT's catchment scale electrofishing programme, the aim is to build up historical data on each catchment to provide information as to how to best take action to improve the fish stocks for salmon and trout. To achieve this, the largest number of sites possible for maximum catchment coverage must be fished over several consecutive years to i) guide current/future conservation strategies and ii) identify whether or not the actions taken on the catchment have had a positive effect on fish numbers. Most importantly the electrofishing programme is specified to be carried out at a catchment scale where salmon and trout spawning areas occur. As most rivers have many tributaries or main stems of considerable length, a relatively large number of sites are required for full coverage. This typically equates to between 20 to 100 sites on rivers in southwest England, depending on the river catchment geography. All things considered, a timed semi-quantitative approach was considered most appropriate for the WRT electrofishing programme. This method will indicate the main issues and areas that need addressing on a river catchment including:

- Upstream barriers to fish-passage
- Degraded habitat quality
- The upper limit of salmon spawning
- Successfully/Unsuccessfully enhanced habitat
- Catchment-scale fry migration due to river levels
- Point source and diffuse pollution

## 1.2 Life cycle and bottlenecks

The aim of the semi-quantitative electrofishing program is to identify issues that prevent salmonids from effectively completing their life cycle, and then proposing solutions that are proportionate to the issue at hand. It is useful to adopt certain conceptual frameworks to each of these aims, and in this report, we will use two of these frameworks; the 'habitat bottlenecks' that describe the causes of issues in salmonid ecology (figure 1), and the 'Defend/Repair/Restore' conservation strategy framework which describes the appropriate habitat action depending on the ecological situation found at the site.

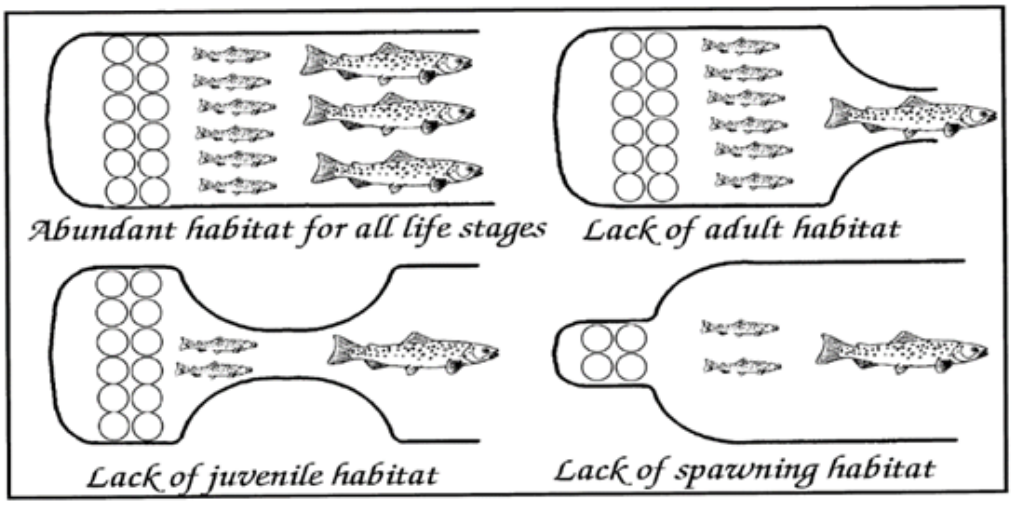


*Figure 1 Diagrams defining salmonid habitat bottlenecks (Summers et al, 1996)*

## 1.3 Catchment Based Fisheries Conservation Strategy (Defend/Repair/Attack)

In using the fry index classification, catchment population abundance monitoring and determining the river reach density classification; a series of priority areas can be outlined and management recommendations made tailored to the particular species. Recommendation actions broadly follow the Defend/Repair/Attack concept, developed by Ronald Campbell of the Tweed Foundation. For every river reach that is classified, a management action can be loosely determined.

Whilst this provides a useful structuring framework, the reality of given situations can bring many complexities and lies on a continuum between these extremes. The goal is to return the river Camel from the unstable point (i.e. poor fish stocks and habitat) to the broad top of a healthy, natural riverine ecosystem. Where the populations are in a very poor state, radical actions may be required to see a change. Conversely, where the stocks are already good, habitat re-engineering and stocking operations would be inappropriate. Actions to achieve these improvements can be divided between 'fish stock actions' such as; fish translocations or bag limits for anglers and 'fish habitat actions' such as; removing barriers to migration or coppicing. In many situations, both types of action will be required. This concept helps divide catchment scale management for fisheries into priorities and therefore can help to maximise multiple benefits through targeted work.

## 2. Site selection

Survey sites were selected to provide representative samples from distinct river reaches, characterized by habitat type, proximity to barriers and proximity to targeted restoration works under W4G. This Four-year project is designed to improve the connectivity of the Camel and Fowey catchments through the removal of barriers to migratory fish passage and improve the ecological diversity of the habitats within the catchments through the direct delivery of riparian and in-river works. The project is due to enter its final year and some of the information from this survey will guide delivery outputs at this stage and provide an insight for future projects and proposals.

## 3. Field Sampling and data analysis methods

Permissions for all sites were established before electrofishing surveys took place and each site was electrofished by a two or three-person team. The voltage of the unit was set at each site depending on the water conductivity which was taken using a hand held conductivity meter. The operatives fished continuously for a standard five minutes over suitable fry habitat without the use of stop nets. The fishing area was variable, and the length of fishing time was fixed. Fish were collected in a net and placed into a holding bucket before processing.

All salmonids were identified to species and fork length was measured and recorded. Numbers or density estimates were recorded for all other species captured. Habitat features such as land use, substrate type and shading were recorded at each site. Any fry that were missed or escaped during electrofishing were assigned to either trout or salmon groups depending on the relative percentage of each species already recorded at the site.

The results of the electrofishing survey are classified according to the methodology of Crozier and Kennedy (1994) (Table 1) with each site being given an equivalent density classification compared to quantitative monitoring. This semi-quantitative methodology was designed by Crozier and Kennedy for both salmon and trout. However, the results for trout need adjustments to consider the difference in the regression line for trout and salmon as described in Crozier and Kennedy 1994.

*Table 1 Semi-quantitative abundance categories for salmon fry (Crozier & Kennedy, 1994)*

| **Density Classification** | **Semi-quantitative (n/5min fishing)** | **Quantitative (n 100m·2)** |
|---|---|---|
| A (excellent) | >23 | >114.7 |
| B (good) | 11-23 | 69.1-114.6 |
| C (fair) | 5-10 | 41.1-69.0 |
| D (poor) | 1-4 | 0.1-41.0 |
| E (absent) | 0 | 0 |

Based on the lengths of fish captured during the survey fry were considered to be any individual that measured up to 85mm for salmon fry and 100mm for trout fry. In the catchment there was a clear difference between 0+ and 1+ age group and so an upper limit cut off point was determined from a length frequency distribution shown in Figure 2 and 3 below.

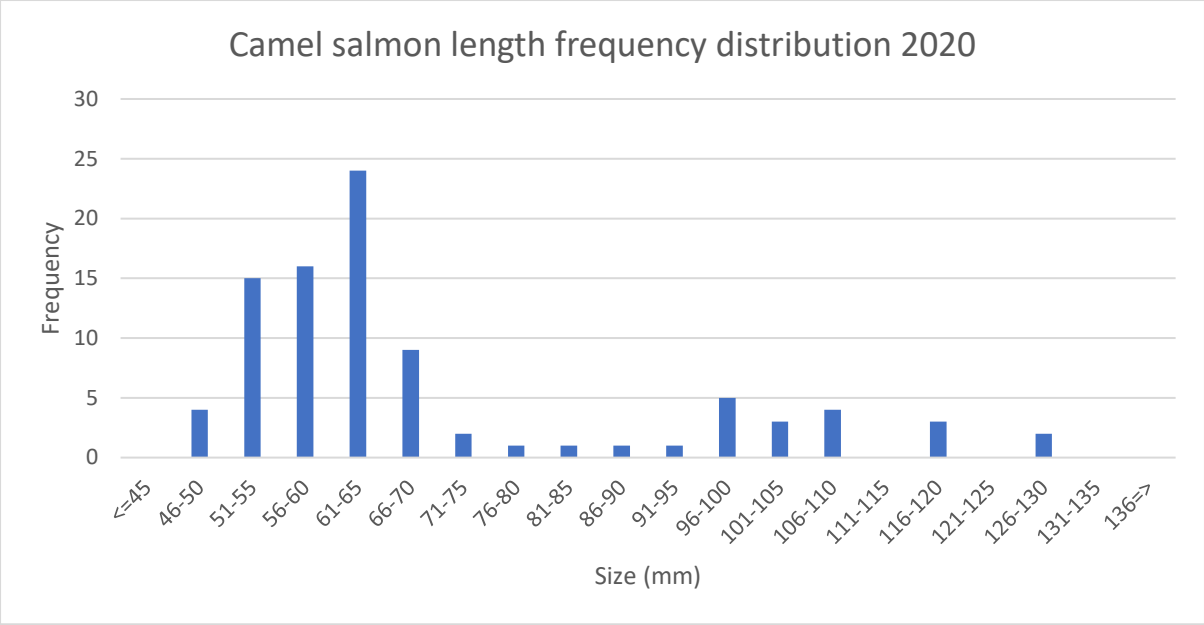


*Figure 2 2020 River Camel salmon length frequency distribution.*

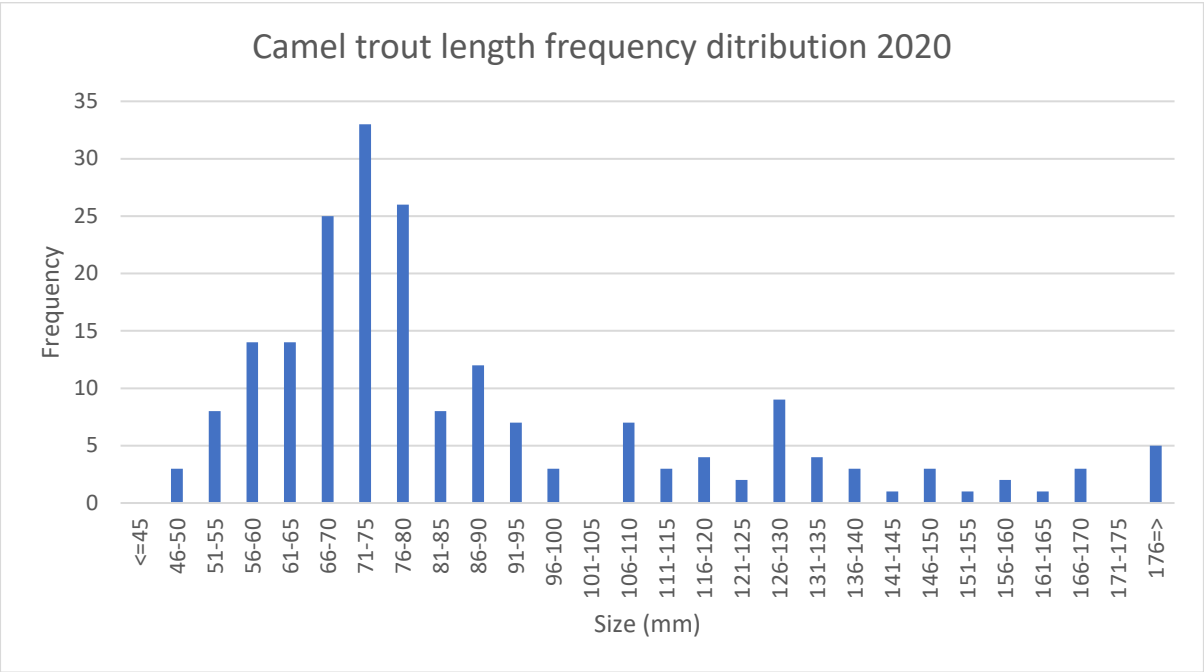


*Figure 3 2020 River Camel brown trout length frequency distribution.*

## 4. Results and Discussion

This survey year had a reduced number of survey sites due to COVID-19 and therefore we should be cautious in drawing conclusions from these results. Next year we will survey a normal number of sites; however, the results from 2020 surveyed sites are discussed below. Weather and other general survey conditions were relatively consistent during the 2020 survey season on the Camel catchment with all surveys being completed on dry days. As in 2019, the river levels during the 2020 survey season were quite low, with water temperature being around 18°C on some watercourses. Therefore, care was taken by the survey team to ensure minimal stress to fish during survey operations, and surveying

ceased if water temperatures were too high or fish health was considered to be at risk, in line with Environment Agency guidance.

*Table 2 2019 Camel EF site classification table*

| Site name | Tributary | 2020 Trout Class | 2020 Salmon Class |
|---|---|---|---|
| Pencarrow | Camel | Good - 12 | Fair - 8 |
| Wendford Bridge | Camel | Poor - 4 | Excellent - 26 |
| High Steps | Crowdy | Good - 11 | Absent - 0 |
| US Allensford | Stannon | Good - 22 | Absent - 0 |
| DS Keybridge | Delank | Good - 16 | Good - 16 |
| US Keybridge | Delank | Fair - 5 | Good - 23 |
| DS Treliver | Ruthern | Good - 19 | Absent - 0 |
| US Treliver | Ruthern | Excellent - 31 | Absent - 0 |
| Trewen Bridge | Allen | Excellent - 37 | Absent - 0 |

In 2020, the River Camel juvenile salmonid survey assessed nine sites and showed similar numbers in salmonid population to those of 2019, with some sites showing slightly increased fish densities and some slightly decreased fish densities. The results shown in figures 6 & 7 highlights the positive impact continued improvement river works can have on a catchment and even though the results, at the moment, should be viewed with some caution. The salmon are still predominantly found in the main stem of the Camel and lower reaches of its tributaries, indicating the importance of ensuring that these waterbodies of various size range remain navigable to migratory fish species and the available habitat in optimum condition to support juvenile salmonids and other species. This continued accessibility is also true of the upper reaches of the smaller tributaries, where migratory sea trout and resident brown trout depend upon quality spawning sites. It is a positive sign to see numbers of juvenile fish continuing to show an increase in the Camel catchment compared to the first year that surveying began. . Other variables such as environmental, ecological and climatic factors may be having an influence on individual annual returns and spawning success of salmonid fish stocks.

*Table 3 Camel Salmon Fry Classifications 2017-2019*

| | | Salmon classifications | | | |
|---|---|---|---|---|---|
| **Site name** | **Tributary** | **2017** | **2018** | **2019** | **2020** |
| Trekeek | Camel | Absent | Absent | Absent - 0 | No data |
| Worthyvale | Camel | No data | Absent | Absent - 0 | No data |
| Pencarrow | Camel | Poor | Excellent | Good - 20 | Fair - 8 |
| Trecarne | Camel | Poor | Good | Good - 12 | No data |
| Wendford Bridge | Camel | Poor | Excellent | Excellent - 65 | Excellent - 26 |
| Tresarett | Camel | Poor | Excellent | Excellent - 46 | No data |
| Waterland | Camel | No data | Excellent | Excellent - 58 | No data |
| Colquite | Camel | Absent | Good | Excellent - 46 | No data |
| US Dunmere | Camel | Absent | Fair | Excellent - 38 | No data |
| St Leonards | Greylake | Absent | Absent | Poor - 1 | No data |
| High Steps | Crowdy | Absent | Absent | Absent - 0 | Absent - 0 |
| US Allensford | Stannon | Absent | Absent | Absent - 0 | Absent - 0 |
| DS Allensford | Stannon | Absent | Absent | Absent - 0 | No data |
| Bradford Bridge | Delank | No data | Absent | Absent - 0 | No data |
| Delford Bridge | Delank | Absent | Absent | Absent - 0 | No data |
| DS Keybridge | Delank | New site for 2020 | | | Good - 16 |
| US Keybridge | Delank | New site for 2020 | | | Good - 23 |
| Coldrinnick | Coldrinnick | No data | Poor | Fair - 6 | No data |
| St Laurence Bridge | St Laurence | Absent | Absent | Absent - 0 | No data |
| Nanstallen | Nanstallen | Absent | Fair | Absent - 0 | No data |
| Trewithian | Ruthern | Absent | Absent | Absent - 0 | No data |
| Blackhay/Tregustick | Ruthern | Absent | Absent | Absent - 0 | No data |
| Ruthern Airfield | Ruthern | No data | Absent | Poor - 1 | No data |
| Cottonwoods | Ruthern | Poor | Absent | Good - 18 | No data |
| Tremore Bridge | Ruthern | No data | Absent | Absent - 0 | No data |
| DS Treliver | Ruthern | New site for 2020 | | | Absent - 0 |
| US Treliver | Ruthern | New site for 2020 | | | Absent - 0 |
| Delabole | Allen | No data | Absent | Absent - 0 | No data |
| Trewen Bridge | Allen | New for 2019 | | Absent - 0 | Absent - 0 |
| US Knightsmill | Allen | Absent | Fair | Absent - 0 | No data |
| DS Knightsmill | Allen | Absent | Poor | Absent - 0 | No data |

Juvenile salmon numbers on the main river have declined from last years results. Pencarrow which scored excellent in 2019 only scored fair this year which is it's second lowest score since the project started. Wendford Bridge scored an excellent in 2020. However, possibly due to the lower salmon scores the trout scores have increased slightly with Pencarrow scoring a good as opposed to a fair last year and Wendford scoring only a few more fish in the poor category.

The Ruthern sites that were fished in previous years unfortunately were unable to be surveyed this year due to the pandemic and restrictions put in place. However, two new sites were selected in the upper catchment and in proximity of some fish passage work being carried out by the project. Although the data doesn't hold much significance this year to the fish passage work being carried out it does give a baseline for the next two years and how the works have improved this site. Both sites showed a complete absence of salmon but did show a healthy population of trout fry on both the US Treliver and DS Treliver both scoring excellent (31 fish) and good (19 fish) respectively.

There have been new sites added in 2020 to help monitor the possible impacts of fish passage work which has taken place within the project. The Keybridge and Treliver sites were added so as to form a baseline of salmon numbers before the removal of a large barrier. Good numbers of salmon were found around Keybridge. In contrast, at Treliver salmon were completely absent, however with historic records showing the River Ruthern with good numbers of salmon in the past there is the potential for the works carried out at Treliver to reverse this trend. We will monitor this in future years.

The historic DeLank sites were unfortunately not surveyed either this year but two new sites, again, located in the proximity of weir removal works were surveyed on the DeLank both above and below the existing weir. Both sites held good numbers of salmon fry US Keybridge produced a good (23 fry) and DS Keybridge produced a good (16 fry). In contrast, US Keybridge only scored fair for trout (5 fry) and DS Keybridge scored good (16 fry). Usually when a site holds higher volumes of salmon the trout numbers are lower which is demonstrated with the keybridge sites having less trout in the site holder more salmon. The salmon classifications were surprising given the downstream site habitat lacked a lot of suitable spawning gravel and predominantly consisted of bedrock outcrops and larger immobile boulders. This suggest that there may be good spawning ground above the weir.

Single sites such as High steps, US Allensford and Trewen Bridge located on the Crowdy, Stannon and Allen respectively were all absent of any salmon, but all held good to excellent classifications of trout. US Allensford and Highsteps both scored good with 11 and 22 fry respectively, whereas Trewen Bridge scored an excellent with 37 fry. The habitat present at both US Allensford and Highsteps is more suited to trout spawning, which consists of smaller matrix of gravels. Trewen Bridge is more suited for salmon spawning but until has had a barrier removed so over the next two years of monitoring it is hoped that salmon may be successful in spawning in this river again.

The line graph (figure 8) was constructed using the average numbers of salmon, trout and combined salmonids caught in 2017, 2018, 2019 and 2020 and since four years of monitoring and data has been collected some trends can now be observed. The graph is starting to show an overall upward trend for average numbers of salmon, trout and combined salmonids. However, 2020 should be viewed with some caution due to the low number of sies surveyed that year.

*Table 4 Camel Trout Fry Classifications 2017-2019.*

| | | Trout fry classifications | | | |
|---|---|---|---|---|---|
| **Site name** | **Tributary** | **2017** | **2018** | **2019** | **2020** |
| Trekeek | Camel | Fair | Excellent | Excellent - 27 | No data |
| Worthyvale | Camel | No data | Good | Good - 15 | No data |
| Pencarrow | Camel | Poor | Good | Fair - 8 | Good - 12 |
| Trecarne | Camel | Fair | Fair | Good - 12 | No data |
| Wendford Bridge | Camel | Poor | Poor | Poor - 1 | Poor - 4 |
| Tresarett | Camel | Poor | Poor | Poor - 3 | No data |
| Waterland | Camel | No data | Fair | Absent - 0 | No data |
| Colquite | Camel | Fair | Fair | Poor - 1 | No data |
| US Dunmere | Camel | Fair | Poor | Poor - 3 | No data |
| St Leonards | Greylake | Fair | Excellent | Excellent - 36 | No data |
| High Steps | Crowdy | Fair | Good | Good - 13 | Good - 11 |
| US Allensford | Stannon | Poor | Excellent | Excellent - 32 | Good - 22 |
| DS Allensford | Stannon | Good | Good | Excellent - 32 | No data |
| Bradford Bridge | Delank | No data | Excellent | Excellent - 43 | No data |
| Delford Bridge | Delank | Poor | Excellent | Excellent - 54 | No data |
| DS Keybridge | Delank | New site for 2020 | | | Good - 16 |
| US Keybridge | Delank | New site for 2020 | | | Fair - 5 |
| Coldrinnick | Coldrinnick | No data | Fair | Good - 12 | No data |
| St Laurence Bridge | St Laurence | Fair | Good | Good - 21 | No data |
| Nanstallen | Nanstallen | Absent | Poor | Good - 22 | No data |
| Trewithian | Ruthern | Poor | Fair | Excellent - 27 | No data |
| Blackhay/Tregustick | Ruthern | Fair | Poor | Fair - 5 | No data |
| Ruthern Airfield | Ruthern | No data | Fair | Good - 13 | No data |
| Cottonwoods | Ruthern | Poor | Absent | Fair - 9 | No data |
| Tremore Bridge | Ruthern | No data | Fair | Excellent - 24 | No data |
| DS Treliver | Ruthern | New site for 2020 | | | Good - 19 |
| US Treliver | Ruthern | New site for 2020 | | | Excellent - 31 |
| Delabole | Allen | No data | Excellent | Excellent - 44 | No data |
| Trewen Bridge | Allen | New site for 2019 | | Excellent - 38 | Excellent - 37 |
| US Knightsmill | Allen | Good | Fair | Excellent - 24 | No data |
| DS Knightsmill | Allen | Good | Good | Excellent - 30 | No data |

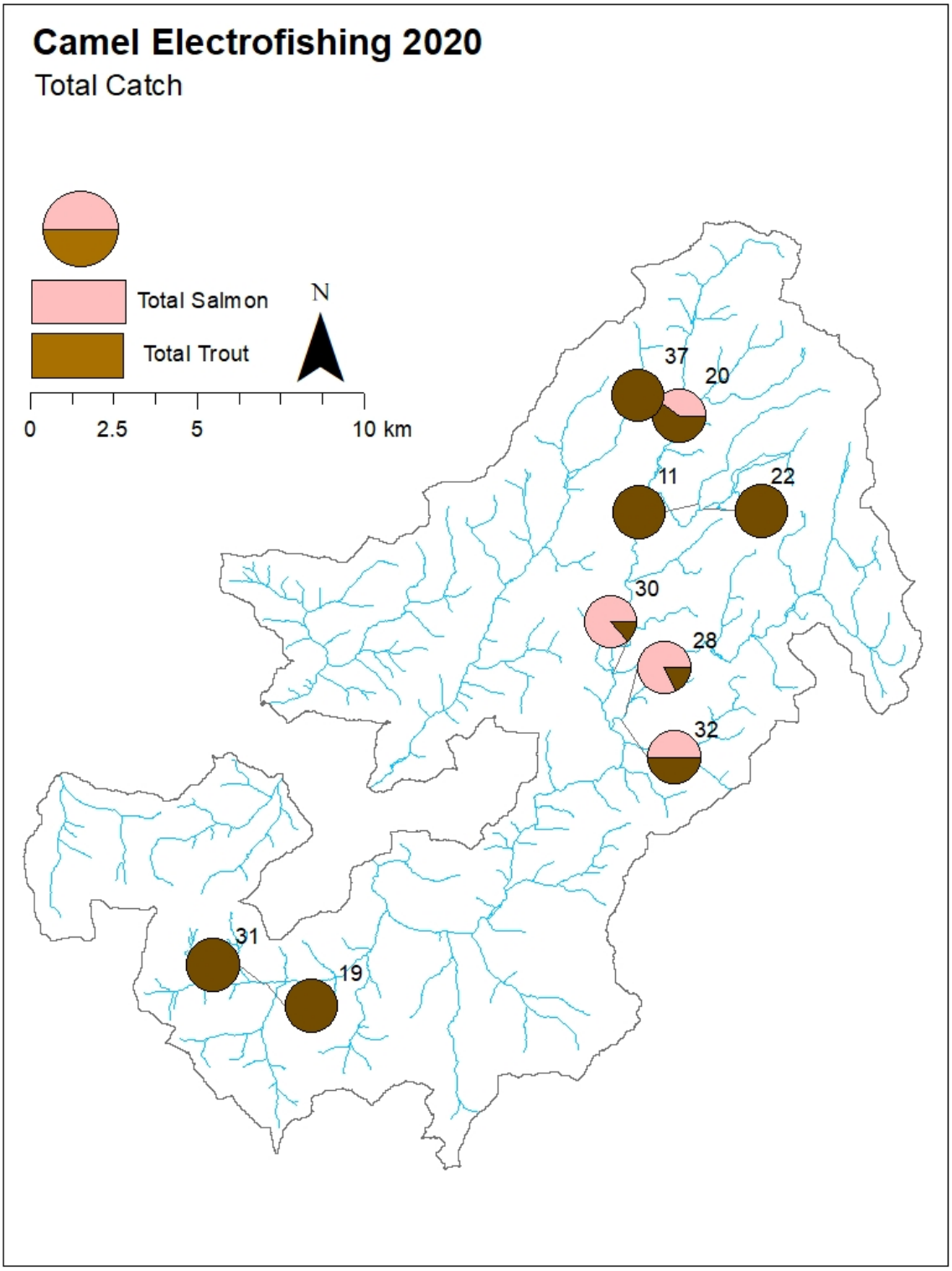


*Figure 4 Geospatial locations of sites and associated salmon and trout fry distributions for the Camel 2020 electrofishing surveys*

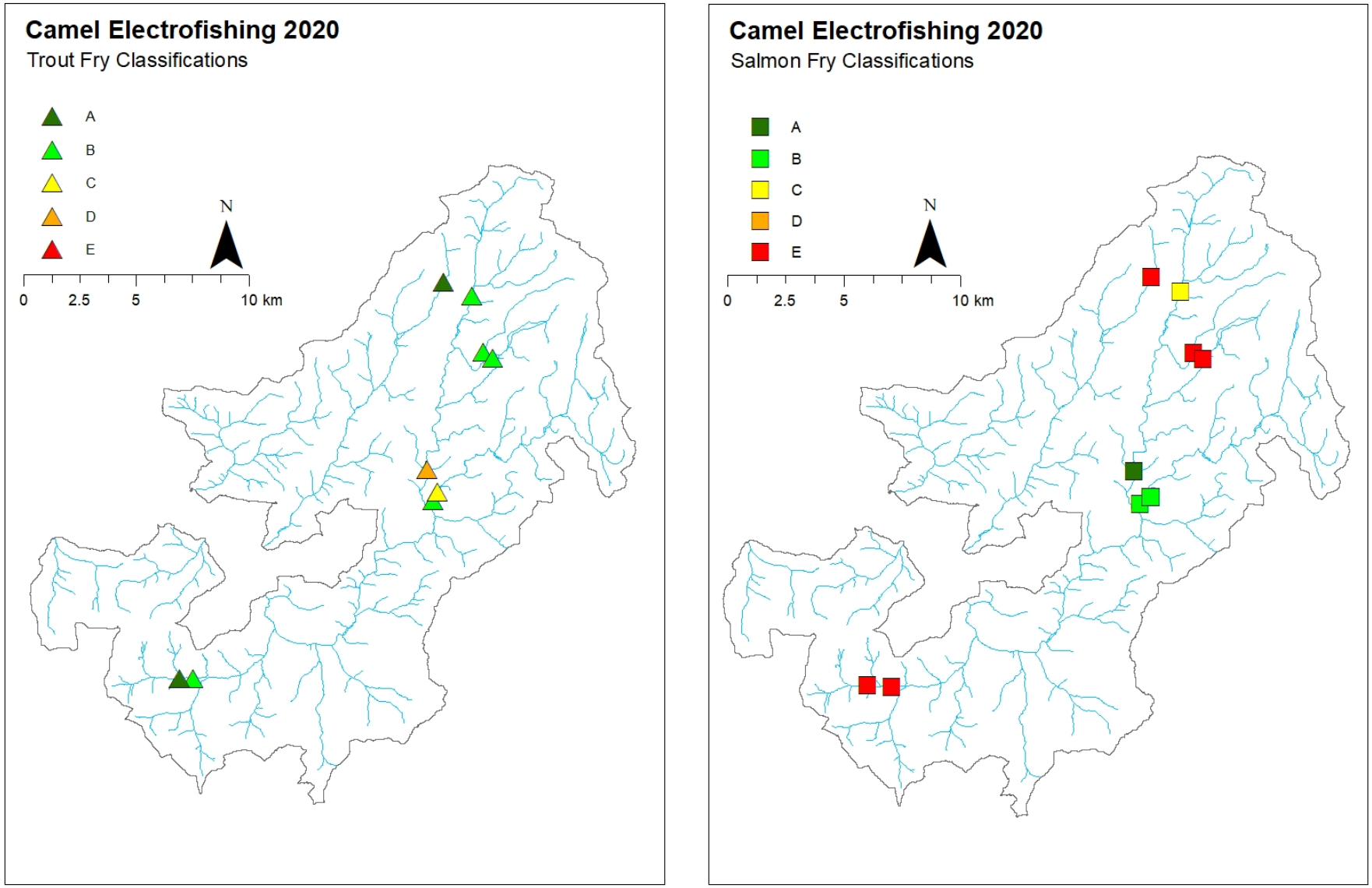


*Figure 5 Trout and salmon classifications for the River Camel catch*

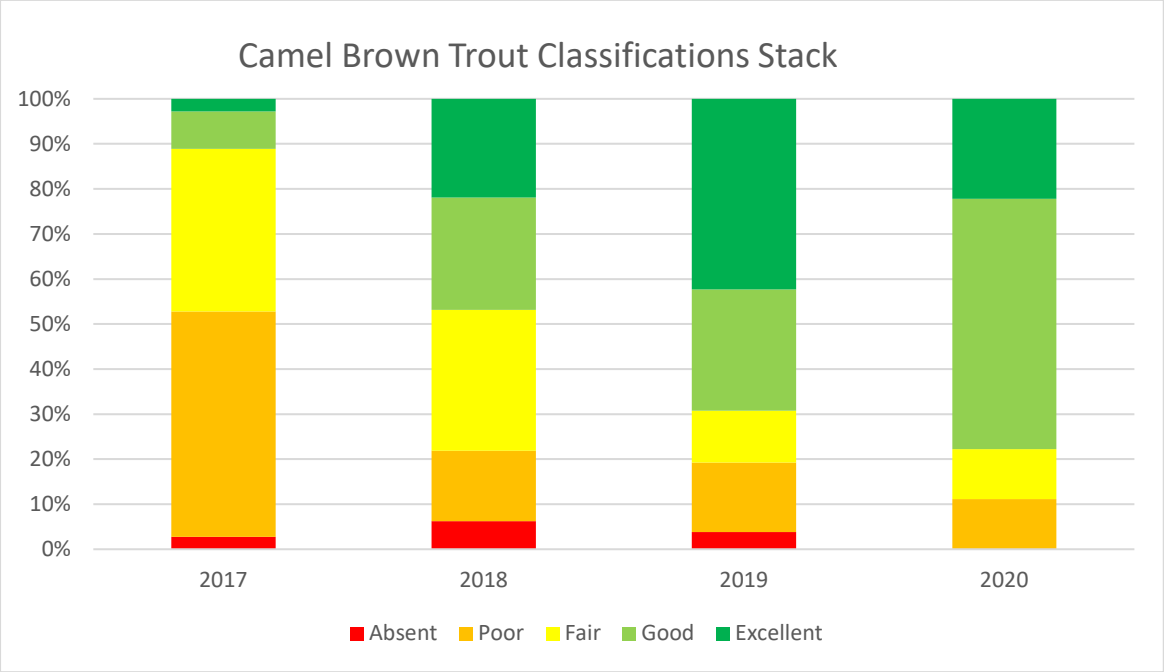


*Figure 6 River Camel trout fry classification stacks*

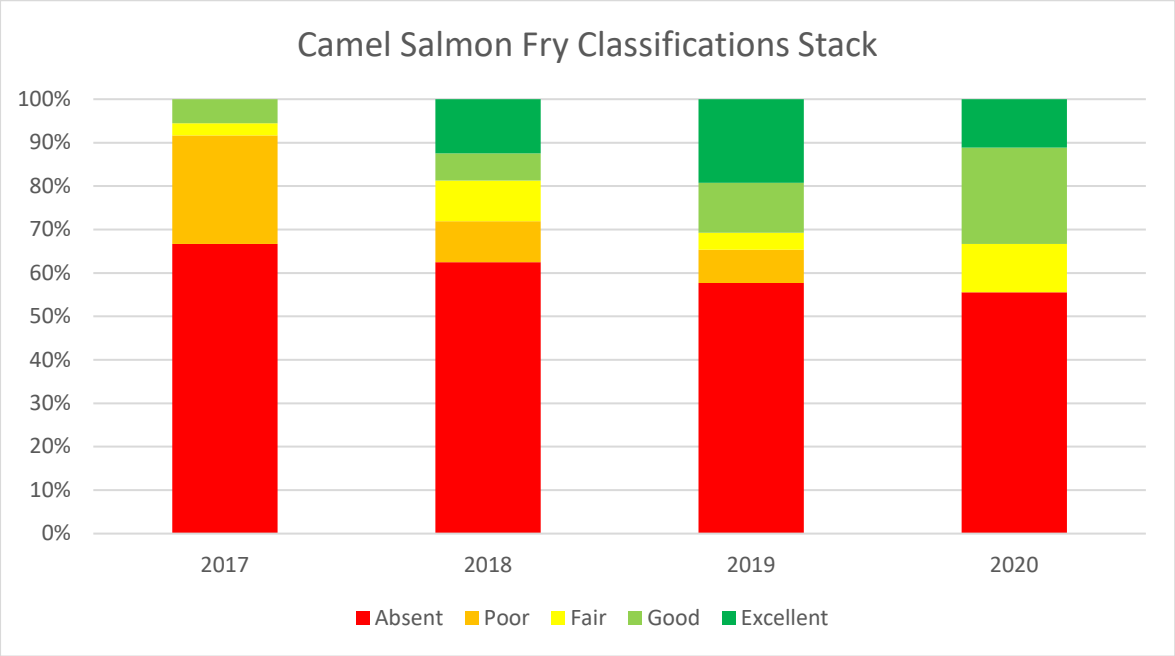


*Figure 7 River Camel salmon fry classification stacks*

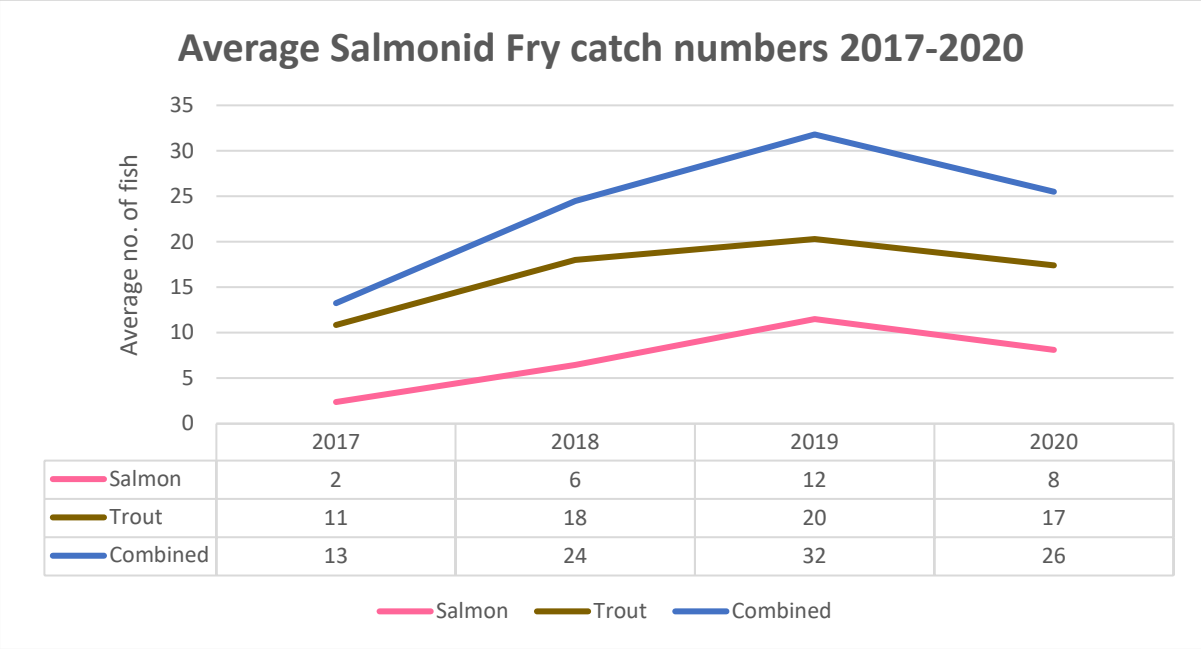


*Figure 8 Multi-year average of fry numbers for salmon, trout and combined salmonids.*

## 5. Recommendations

The WRT electrofishing surveys are undertaken to monitor recruitment of salmon and trout, which have slightly different habitat preferences. One species will often dominate over the other where the other has limited or no presence. Therefore, management strategies need to be considered for each species, hence a conservation strategy for both salmon and trout. These recommendations broadly follow the Defend/Repair/Attack (DRA) concept developed by Ronald Campbell of the Tweed foundation. The fry productivity of the rivers is assessed by a combination of data over the last four years semi-quantitative electrofishing results. These results are then applied in context of existing plans (e.g. Salmon Action Plan, habitat walkover surveys, SSI status and genetic data) to produce assessments and recommendations for each sub-catchment of the river.

The Defend/Repair/Attack strategy identifies sub catchments within the Camel region which would benefit from different intensities of approach when identifying management options. The main river and upper tributaries have overall improved over the sampling period for both salmon and trout, and so any management should be guided in a “Defence” or “Repair” strategies whereby the existing high-quality habitat is retained in a good condition still accessible to fish. Possible work options could be small-scale arboriculture works to continue to allow suitable levels of incident light to reach riffle areas to improve habitat quality for juvenile salmonids. Continual monitoring of the reaches should be carried out to ensure no impassable blockers (natural or manmade) impede fish passage both upstream and downstream. Additionally, measures should be taken to manipulate in-river woody structures moving them in-line with the flow. This would allow unimpeded migration of fish species, improve the connectivity of the river system whilst retaining the woody material as high quality in river habitat.

A large boulder weir has been adjusted to create better passage in lower flows which is located in the middle reaches of the River Ruthern. In addition, a fish passage easement has been installed to Treliver Bridge on mid to upper reaches of the catchment. This will support juvenile fish recruitment in the sub catchment and the results from the next two years will highlight changes in fish populations. The Ruthern is still heavily tunnelled and continued arboriculture management, working upstream from Ruthernbridge would improve the range and quality of available habitat for juvenile salmonids.

Riparian arboriculture work has been carried out along the lower reach from Ruthernbridge to the Camel confluence as historic data suggests this tributary once supported both salmon and trout. Numbers have been low in recent surveys, especially when compared with the rest of the catchment. Continual monitoring of the tributary will help to identify which areas of the reach are not performing to full potential. There is a relativity high level of agriculture around many areas of the Camel so fencing and farm advice will aid in reducing levels of land-based run-off reaching the river therefore improving water quality and in river habitats.

To begin to restore and/or maintain fry habitat in the Camel catchment, WRT recommend the following works:

- ***Fencing:*** Riparian zones identified as receiving significant livestock access, with apparent habitat degradation, should be fenced to limit trampling and bank side poaching. Precautions should be taken to ensure livestock can access drinking water supply. Effective buffer strips dependant on site characteristics is advised.
- ***Coppicing:*** Targeted selective coppicing of woodland and abandoned riparian coppice adjacent to juvenile habitat riffles should be undertaken. This will increase primary productivity and food source for juvenile fish. Shade should be maintained on deeper pools and runs for water temperature and adult fish habitat cover.
- ***Gravel Cleaning:*** Key areas of high spawning potential have been identified, however high sediment loads impact viability and survival. Whilst continued efforts are underway to influence policy and land management practices, selective gravel cleaning should be carried out to ensure available spawning habitat for the coming season.
- ***Erosion Control***: Fencing and effective marginal habitat management will reduce erosion. However, where specific areas of high pressure and vulnerability are identified, erosion protection measures such as woody debris installation, environmentally sensitive revetments, and strategic tree planting would be advantageous.
- ***Fish Passage Assessment***: Assessment of potential fish migration barriers using the Coarse Resolution Rapid Assessment technique developed by the Scottish and Northern Irish Forum For Environmental Research (SNIFFER). A standardised survey technique to assess porosity of in-channel structures.
- ***Farm Advice***: A key management strategy for the protection and enhancement of riverine systems. Approaching and working with local agricultural businesses to offer guidance on best environmental practice, and the use of grants for application of the recommended actions outlined.
- ***In-Channel Habitat Restoration***: Installation and construction of habitat enhancing features, including woody debris introduction, flow manipulation with groins and kickers, bank reprofiling for marginal zonation, strategic tree planting, gravel introduction and riffle

creation, and historic channel restoration. Advanced management usually applied post success of other recommended actions.

| Sub catchment | Action | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Fencing | Coppicing | Gravel Cleaning | Erosion Control | Fish Passage Assessment | Farm Advice | In-channel Habitat Restoration | Walkover Surveys | Increase Monitoring Effort |
| **Allen** | | ✓ | ✓ | ✓ | | ✓ | ✓ | | ✓ |
| **Mid Camel** | ✓ | ✓ | | | ✓ | ✓ | | | ✓ |
| **Crowdy Reservoir** | ✓ | | | | | | | | ✓ |
| **Ruthern** | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | | ✓ |
| **Lanivet Stream** | | ✓ | | | | | | | ✓ |
| **Lower River Camel** | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | |

*Table 5 Recommended DRA actions for River Camel sub catchments*

## 6. Acknowledgments

Thanks to all landowners who gave us permission to undertake surveys on the River Camel catchment during the hard times of the recent pandemic. We would also like to thank the Camel Fisheries Association, Natural England, and the Environment Agency.