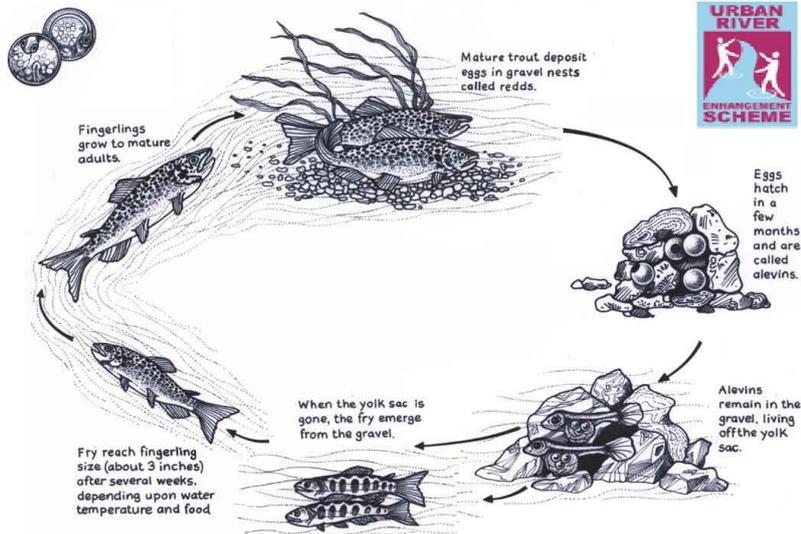


# RIVER IN THE CLASSROOM

A GUIDE TO HATCHING BROWN TROUT IN SCHOOLS AND RELEASING THEM INTO YOUR LOCAL RIVER



## TROUT LIFE CYCLE



## Foreword

It gives me great pleasure to be introducing this project into your local schools through the Urban Rivers Enhancement Scheme (URES).

By bringing the river environment into the classroom children will experience the magical world of the brown trout. They will see how it evolves from egg to alevin, from fry to parr and ultimately a full grown trout swimming in their local river.

The river in the classroom project is designed to give the children a hands-on experience that will directly contribute to their local environment. They will learn about the life cycle of the trout and their need for fast flowing water, clean spawning gravel and good habitat.

Discover how the river in the classroom can link to the National Curriculum, and provide opportunities for exciting enhancement activities.

This manual could not have been created without the input of Paul Peters [paul.daniel.peters@gmail.com](mailto:paul.daniel.peters@gmail.com) the fishery biologist who provided the scientific knowledge and designed the hatchery systems.

We hope you enjoy your Rivers in the Classroom project

**Jack Spees**

Director

Ribble Rivers Trust

**Philip Lord**

Chairman of Trustees

Ribble Rivers Trust





## Introduction

**River in the Classroom** is being introduced into classrooms throughout the Ribble catchment and is based on an initiative first developed by JetSet and the Environment Agency. It is already in place in selected schools within the catchment but now it is being introduced into your District. Students follow the development of brown trout from eggs, to alevin, to fry in the school environment and then release them into their local river.

Hatching trout in the classroom is a hands-on activity suitable for all abilities it captures the children's imaginations and helps connect them to wildlife management issues problems and possibilities for solutions. This project can facilitate learning across the curriculum. It is also an activity that will encourage interest in and ownership of the children's local environment.

This manual aims to provide all the information you need to help you through the process. If you have any further questions please contact the Ribble Rivers Trust.

The Ribble Rivers Trust team will visit your school to install the hatchery system. Wherever possible we also like to take this opportunity to talk to the children and explain the benefits and their role in making this exciting project an enjoyable experience. We will also emphasise to the children why it is important for their environment.

This booklet is designed to guide you through the project from tank installation to releasing the trout into the river. You will be supported throughout the project by Ribble River Trust (RRT) staff.



# River in the Classroom Maintenance and Welfare Procedure

## Nature's way

**Brown trout** spawn during the winter and will shed their **eggs** in November or December. They spawn in rivers and streams that have very clean flowing water with sediment free gravel bottoms. Spawning trout shed (lay) their eggs into shallow depressions excavated by the female fish in the gravel of the riverbed. Once the eggs have been shed, the fish bury them under more gravel. This 'nest' is called a **redd**.

The cold flowing winter water in a clean river bubbles over rocks and gathers oxygen from the air. This clear water flows through the clean porous gravel and provides adequate circulation and oxygenation for the eggs. Flowing water prevents siltation and also removes any waste product or pollutants that would otherwise build up around the eggs and newly hatched fry.

When the eggs hatch, about 8 weeks after shedding depending on the temperature, the small fish called **alevin** have a large yolk sac attached to them. This sac supplies the fry with all the nourishment they need. The alevins will remain safely hidden in the gravel for the early part of their development. Only when the yolk sac is almost used up do they venture out of the gravel and into the river or stream in search of food. The young fish are then known as **fry**.



**Eggs Hatching**



**Alevin free swimming**

## How we replicate the natural river conditions in a classroom

The photograph below shows a typical classroom hatchery system in situ.



### Water Chiller

The chiller cools the water in the tank to the corresponding winter temperature of the river. This large box contains similar technology to a domestic fridge. However the box also contains a reservoir of water and a water pump. The chiller operates a closed circuit system to ensure the water in the chiller reservoir never mixes with the water in the tank. A metal coil containing the chiller water is placed into the tank under the gravel where it cools the water. The chiller is fitted with a thermostat this means that the tanks temperature can be maintained at any level we choose. The water temperature will vary throughout the project as the trout grow.

### Insulating Jacket

The tank is fitted with an insulating jacket covering three sides and a lid. This insulates the tank from room temperature making it easier for the chiller to keep the water cold. It also prevents too much light getting into the tank replicating riverbed conditions where the eggs would be buried under the gravel. One side of the tank has a removable insulation panel that allows periodic inspection and can be removed completely once the fish are free swimming.

### Filters

Filters help keep the tank water clean and ensure the best survival of the fry by filtering and treating the water. Water is treated to remove substances harmful to fry for example chlorine found in tap water.

# How we setup your Hatchery

## Early Considerations

In consultation with RRT staff, decide where you would like to place your hatchery tank. Once set up it is impossible to move the tank safely without emptying it of water and putting the fish at risk.

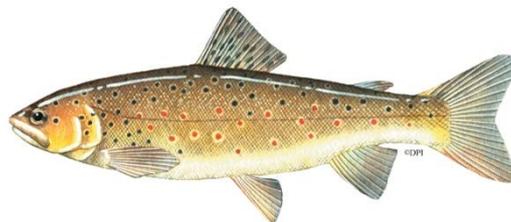
Choose a quiet corner where it will receive little heat, bright light or other disturbances such as bumping or jarring. The chiller unit should be beside or below the tank. Once switched on, the chiller will hum and occasionally make gurgling noises. It would be worth considering whether this noise will disturb anyone using the room. The chiller and external filter system will need to be plugged into the electricity and left on for the duration of the project. You will need an uninterrupted electricity supply with two sockets or a trailing lead adaptor.

### Safety Tip

To avoid the possibility of one of the plugs getting wet position the hatchery to one side of the wall socket. Arrange a drip loop in the cord to hang below the socket this will cause any water travelling along the cord to drip off the loop preventing it from coming in contact with the socket.

## Timescale

RRT staff will install the tanks prior to the eggs arriving and ensure it is working correctly. This will take place in December. In January we will switch the tanks on one or two days prior to the eggs arriving and being introduced into the hatchery.



**Adult Brown Trout**

# Maintenance and Welfare

## From Egg to Fry

The trout eggs you will receive will probably be in the 'eyed' stage of development, where two dark spots (the eyes) can be seen in the egg. That is, they will be halfway through their incubation period. The incubation time of trout is temperature dependent, hence the phrase 'degree-days' where the number of degree-days is divided by the incubation temperature. E.g. 300 degree days at 8 degree centigrade would equate to 37.5 days. In this instance it will be difficult to judge the exact hatching date of your eggs on arrival.

## Incubation Period

There are some important steps during the incubation period to ensure the healthy development of the eggs.

- Daily checks carried out on the equipment and eggs.
- Any dead (white) eggs are removed to prevent infection (as often as possible - twice a day is good, and especially last thing on Friday).
- A stable water temperature (8oC) and water clarity maintained.
- The tank is kept in darkness to prevent UV damage to the eggs(the removable cover can be taken off when in use as a teaching aid)

## Hatching - Alevin

(An alevin is a baby trout with a yolk sac, sometimes referred to as a 'sac fry').

After the incubation period, the eggs will begin to hatch (completion usually taking between 2 - 4 days after the first egg hatching); these alevin tend to lie on the gravel, wriggling occasionally. **From the point of all or a majority of the eggs hatching the temperature should be increased to 13oC, at a rate of one degree per day**, as this will enable an increased metabolism and therefore increased rate of growth. (The procedure for altering the chiller temperature will be demonstrated by RRT staff). At this new temperature the fry should start to 'swim up' between 14 - 21 days; at this time feeding can commence (see the next section). During the hatching stage carry out the following duties:

- Daily checks carried out on the hatchery equipment, eggs or fry.
- Any dead (white) eggs, egg cases or malformed fry are removed to prevent infection

- The tank is kept in darkness to prevent UV damage to the eggs (when not in use as a teaching aid)
- A stable water temperature (13oC) and water clarity are maintained

Note: Some alevin don't survive, and this is perfectly normal.

## Swim Up

As yolk sacs disappear, some trout will start swimming around looking for food. When you see the first trout swim up the tank, start feeding. This is the time that you can remove the darkening cover from the front of your tank - at this point UV light will not harm the fish. This stage will last about 7 days. During the hatching stage carryout the following duties:

- Daily checks carried out on the hatchery equipment and fish
- Any egg cases or malformed fry removed to prevent infection
- A stable water temperature (13oC) and water clarity maintained
- Feed trout (2 - 3 times a day) by spreading a miniscule amount of food across the surface of tank. **Tip: little and often is better than lots rarely.** The trout can survive over the weekend without any food, however during holidays the automated feeder will need to be set up.
- Now is a good time to 'boost' your tank's nitrifying bacteria, start dosing with Easy Balance twice a week.

Note: Some fry don't survive or learn to feed properly for various reasons. This is perfectly normal.

## Fry

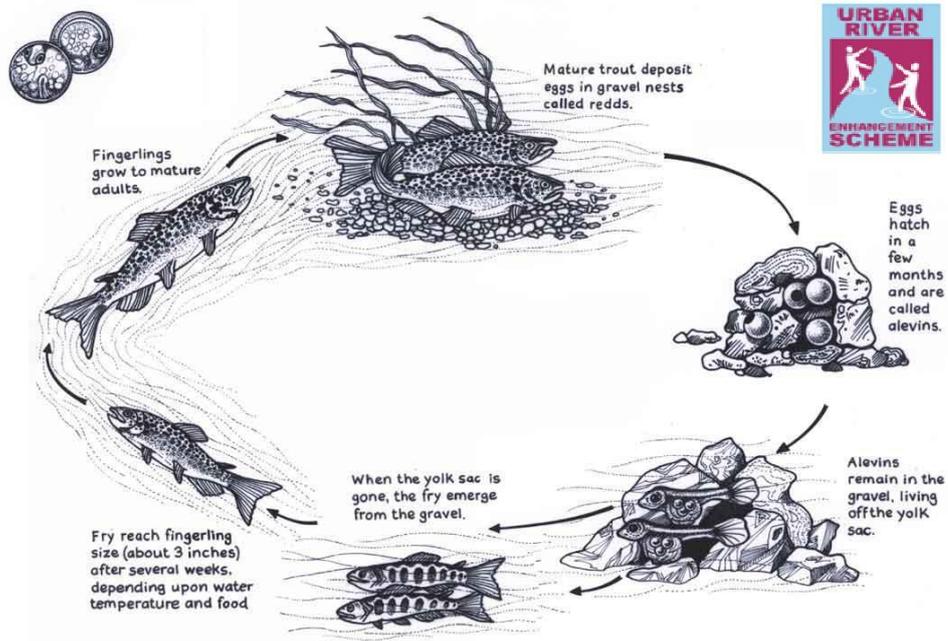
From this point on follow the steps listed in 'Swim up' and the trout should continue to develop and grow. However, some trout never learn to feed, and will die. Non-feeding fish are called 'Pinheads' - big heads, little bodies. These trout should be removed, as they will not develop. Every hatchery sees this mortality spike with the pinheads - it is VERY normal. It is common that overfeeding may lead to ammonia spikes, to prevent this remove any uneaten food 10 mins after feeding.



# Quick Guide to Trout Care and Trouble shooting



## TROUT LIFE CYCLE





## Trout Care

**Basics** (At all times when undertaking any activity in or around the tank)

- Wash hands without soap to remove chemicals from soaps and creams
- Wash hand with soap after activity
- Do not place your hands in the tank if they have open cuts or wounds
- Always dry your hands before dealing with any electrical appliance
- Remember, water is heavy so always act sensibly to avoid injury

### Each Day

- Check the temperature
- Ensure the filter and chiller are functioning correctly
- Check on the welfare of the fish, remove any dead (white) eggs or dead fish immediately
- Feed the fish **ONLY** as much as they can consume within 5 minutes, up to 2 - 3 times per day

### Every Two Weeks

- Replenish the water in the tank if needed (remember to add aquasafe)
- Dose the tank with Easy Balance (from 'swim Up' stage)
- Remove algae from the tank glass using an algal scraper

### Two to Four Months

- Clean the filter (mechanical media) in tank water
- Replace the carbon pads if in use (Eheim systems)
- Clean the gravel and undertake a 50% water change; do not forget to condition the tap water with Aquasafe

Note: Trout are very sensitive to temperature and should be exposed to the most stable temperature possible, as close as possible to the ideal. Fish can handle small fluctuations of one or two degrees, but sudden changes of almost any scale will be stressful. **Changes of 5 degrees or more are a serious threat to trout survival particularly if they are sudden.**



## Trouble Shooting

### Fish

The key to effective troubleshooting of your fish is observation. Do they swim around, look for food, or hold a constant place in the tank? When you put food in the tank, do they respond enthusiastically? Some trout are adventurers and others less so, but as long as you have some of each, and they are spread throughout the water column, that is good.

If they appear lethargic, start behaving strangely or start dying in large numbers the likely culprit is **poor water quality**. Solution: **Large water change**; Up to 50% of the tank water can be replaced in one go as long as the fresh water has been treated with Easy Balance and the tank temperature does not deviate more than a few degrees from the set optimal (introduce the water in stages to minimise this).

### Why are some eggs or fish dying?

Death is a natural part of fish development. Everyone should expect to lose eggs and fish. Some fish will be deformed, and very often will die as a result. The exact survival rate is highly variable and based on many factors. A sudden spike in mortality can indicate a tank problem. It is also worth noting that there are two naturally high - mortality periods, first during the egg stage and then again when the trout first learn to feed. Some fish never learn to feed and simply starve.

As the fish hatch, and age further, survival rates should improve. By the time fish are free swimming and have learned to feed, death should be an uncommon event. Losing many free swimming fish, above all else, is a sign that the tank environment is not healthy. As they grow, fish produce more waste, so cleaning may be needed more often.

Other causes of fish death might be temperature fluctuations, lack of aeration, and chemical exposure. **OVER FEEDING** is the most common cause of fish death as the excess food pollutes the water and clogs up the filter leading to high ammonia concentrations that result in sudden fish death.





## Dealing with dead fish or dead eggs

It is very important that dead eggs, dead fish, and decaying waste matter (discarded food for example) are removed as soon as possible. This will help to reduce stress and spreading infection to the living fish. Please check each day, or even more frequently during critical periods or as needed. This process alone is very important in keeping the remaining fish alive. Poor cleaning is very often the root cause of excessive fish death.

## Tank Equipment

### Leaks

Once a setup is installed and running it is unlikely that the chiller/filter/tank should leak unless they undergo physical damage. If a substantial leak is found turn off and unplug the unit and get in contact with the Trust. Note: Condensation will form on any piece of equipment that carries or holds cold water within the setup.

### Dealing with a power failure

It is important that the fish see as stable water as possible. Short downtimes, of an hour or two at a time, probably will not harm the fish or change the tank temperature by any significant amount. However, lost power during the night or over the weekend (or worse still over a holiday period) will likely to be fatal to the fish.

In extreme situations a 10 L bucket, 3/4 water full and kept covered would be a good choice for holding fish in an emergency, if there is a problem with the tank.

The priority in an emergency is getting the tank environment back to normal, or removing the fish from the tank into a temporary container if possible.

If you find yourself in this position contact the trust immediately (details below).

**The River Ribble Trust Tel: 01200 444452**



[www.ures-burnley.org.uk](http://www.ures-burnley.org.uk)



[www.ribbontrust.com](http://www.ribbontrust.com)