

Gravel Cleaning

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Background

Brown trout and sea trout spawn on sections of silt free gravel, generally between October and February. The female fish select suitable sites, often at the tail end of a pool where clean gravel has accumulated. They excavate shallow depressions in the gravel ('redds') in which they lay their eggs (up to 1,800/kg body weight), which are fertilised by male trout. Freshly dug redds can be easily spotted (see arrow in illustration), as they have a clean appearance, with no algae or silt on them, often in contrast to the surrounding gravel. They can range from less than 30cm in length to the size of a kitchen table.



*Freshly excavated redd
(indicated by arrow on the photograph)*

The presence of large amounts of silt can reduce the hatching success of the deposited eggs. Many rivers have suffered from excessive silt, often as result of bank erosion or run-off from agricultural land. In limestone and chalk streams, concretion of the gravel due to the accumulation of calcium carbonate can further reduce hatch rate.

Cleaning potential redd areas prior to spawning can significantly increase trout spawning and egg incubation success. The benefits of one-off cleaning are relatively short lived (1-3 years typically) but can boost the number of young trout in a river, provided that there is sufficient fry and parr habitat present near to the spawning sites.

Objective

There are two key objectives to gravel cleaning: to break up any compaction of the gravel and to remove as much of the accumulated silt as possible.

Timing

Gravel cleaning should be carried out immediately prior to spawning, ideally in September or early October.

Location

Observation of spawning in past years should inform site selection. In the absence of this information, select areas of suitable sized gravel (10-40mm), with water depth between 100mm-500mm. Clean only small areas of less than 20m² at any one site, as gravel cleaning is temporarily very disruptive to invertebrate populations. Rotate sites each year to avoid long term impacts on one site.

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Method

Always work downstream to avoid siltation of cleaned areas.

Breaking up compacted gravel is best done using hand tools such as a mattock, metal fencing spike or rake. Always break up compacted gravel before trying to clean away silt.



Gravel cleaning using water pumps

Using a spike to break up compacted gravel

Removal of fine silt can be achieved by manual raking of small areas. More efficient and faster cleaning requires the use of either a backpack leaf blower or water pump. A standard 50mm water pump can be mounted in a small boat or on the bank. The outlet from the pump should be connected to a hand-held lance made from metal pipe or tubing which is throttled down to 25mm-38mm to achieve adequate pressure. Your local rivers' agency might be willing to lend you this kit. Concentrate on removing silt from the top 300mm of the bed where most trout eggs are laid. Concentrate on known spawning 'hot spots'. It is probably more effective to treat a large number of small, known spawning sites effectively than to clean a long length of river in one location. Remember, each redd can easily hold 500 or more eggs and perhaps produce 50 swim up fry in good conditions.

Monitoring

Between late October and late February, fish will be cutting redds. Identify and record the location of these sites, ideally with a GPS so that future gravel cleaning can be accurately targeted. Generally, the bigger the redd, the larger the fish that made it. Do not disturb the redds by wading as the eggs are very vulnerable to physical shock.

Consider the availability of habitat for fry which will emerge from the gravel some 60-100 days after spawning. Fry will generally disperse in a downstream direction, searching out areas of low velocity and bankside cover. Tree roots, overhanging brambles and grass, and pieces of fine brushwood in the channel all offer excellent potential as fry refuges. Do not be too tidy. Leaving these sections of cover can significantly increase fry survival and hence the number of adult trout in the fishery.