



# Water Quality on the Farm

Good water quality is essential for everyday life on a farm – for drinking water, for watering livestock, for irrigating crops and for healthy streams and lakes.

The health of our rivers is rapidly declining and farmers can play a pivotal role in protecting water and restoring it to good health.

## Factors That Affect Water Quality

### Sedimentation

Particles of soil or sand can build up in a river over time or get washed into the river after a heavy rainfall. Activities such as spreading near rivers, farm road run off, forestry felling and peat extraction release sediment into the river. Sediment can clog up gravels in a river killing aquatic animals and carries nutrients like fertiliser and pesticides. These chemicals cause water quality to deteriorate and can get into our drinking water. In Inishowen the majority of our drinking water is from surface sources.

### Hydromorphological Modification

Physical changes made to a river channel or bank disrupts normal river processes. The transport of gravel and nutrients downstream is disrupted, the energy of the river changes leading to more erosion and flooding; and habitats for fish and other aquatic animals and plants are damaged.

### Wastewater

Sewage and domestic wastewater brings bacteria and viruses into the river as well as chemicals such as household bleach (ammonia) and microplastics. This excess of nutrients in the water is known as 'eutrophication' and causes bacteria and fungi ('sewage fungus') to bloom in the water, smothering the channel bed. Temperature levels also increase and oxygen decreases, killing aquatic life.

- Avoid**
- straightening
  - widening
  - culverting
  - installing weirs
  - changing channel direction
  - modifying banks



## How do we monitor our rivers?

**Riverfly Monitoring** is one way to assess the health of a river. By observing the insects in the stream, you can get an idea of how your river is doing.

You can use the Citizen Science Stream Index (CSSI) to assess the flies in your river. Learn to recognise the 'good guys' and the 'bad guys'.

# Calculating the Citizen Science Stream Index







Recorder name:	Stream name:
Date:	GPS/location:

The Citizen Science Stream Index (CSSI) is based on the presence or absence of six key aquatic invertebrates. Three pollution-sensitive invertebrates ('good guys') are commonly found in clean streams and three pollution-tolerant invertebrates ('bad guys') are commonly found in polluted streams.

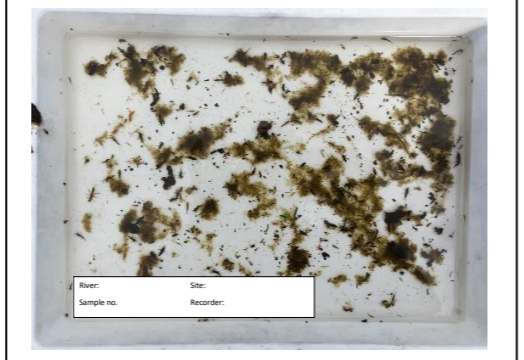
Citizens use a pond net to take three 30-second kick-samples (the three samples should be a few metres apart) from a shallow (<20cm), gravelly, fast-flowing part of the stream. The invertebrates captured in each sample are examined in a white tray on the bankside. The six key invertebrates are easily spotted amongst the many other species in the tray, by their characteristic shape, colour or movement.

The citizen will score each sample depending on which, if any, of the six key invertebrates occur in the tray. The three 'good guys' have a score of +1 each and the three 'bad guys' have a score of -1 each.

The score for each kick-sample can range from +3 (all three good guys and no bad guys) to -3 (all three bad guys and no good guys). When the scores from all three samples are added together, the CSSI ranges from +9 to -9.

	Sample 1	Sample 2	Sample 3
<b>Stonefly (+1)</b> 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Flattened mayfly (+1)</b> 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Green caddisfly (+1)</b> 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Snail (-1)</b> 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Leech (-1)</b> 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Waterlouse (-1)</b> 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Sum of scores 1	Sum of scores 2	Sum of scores 3
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Citizens should also take a good, clear photo of one of the 3 samples, including a label in the tray, with information on the date, stream name, location and recorder.



CSSI Scores can be a 'traffic light' for water quality

CSSI score -9 to -5  
**Poor**

CSSI Score -4 to +4  
**Moderate**

CSSI Score +5 to +9  
**Good**

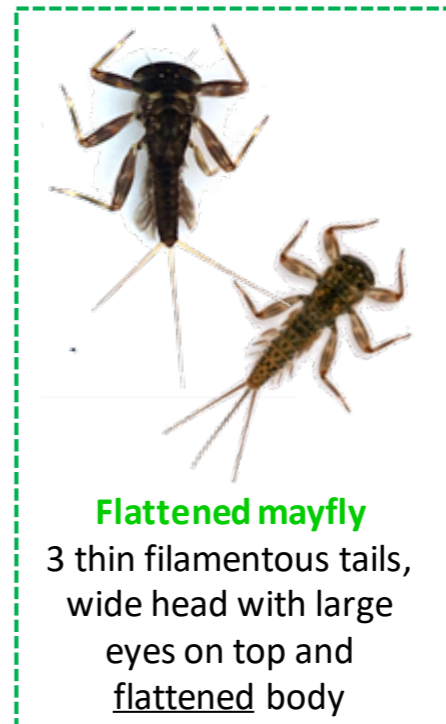
**Total score for the 3 samples = CSSI Score**

**Any observations** (eg. excessive algae or fine sediment, cattle access nearby, surface foam, presence of trout/salmon etc):

## The 'good guys'



**Stonefly**  
2 thin filamentous tails at end of abdomen



**Flattened mayfly**  
3 thin filamentous tails, wide head with large eyes on top and flattened body



**Green caddisfly**  
Green caterpillar-like larva. Gills along abdomen give it a 'spiky' appearance

## The 'bad guys'



**Leech**  
Suckers at both ends & moves by stretching out body

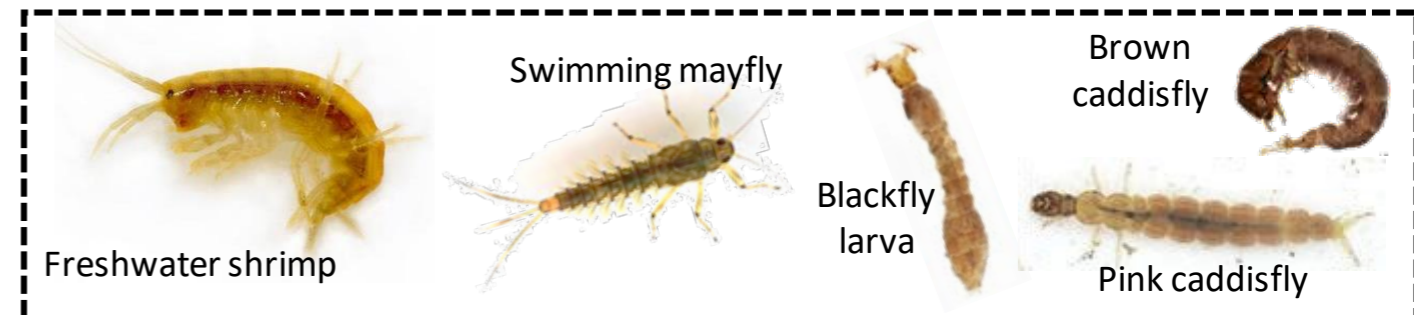


**Snail**  
Hard pointed or coiled shell covering body



**Waterlouse**  
Looks like a woodlouse, crawls slowly along bottom

These invertebrates are found in most streams and are **NOT** scored for the CSSI



# What can you do to help?

## Create Buffer Zones

- Plant trees and shrubs along the riverbanks. Vegetation will help prevent runoff from the surrounding land and can absorb more water during heavy rainfall and prevent flooding. Vegetation can also absorb pesticides and chemicals helping with water quality and will also increase the strength of the riverbank and make it less prone to erosion.
- Stop livestock from entering watercourses. Poached banks are a major source of sediment into streams.

## Follow the Guidelines

The Department of Agriculture, Food & the Marine provide guidelines for watercourses.

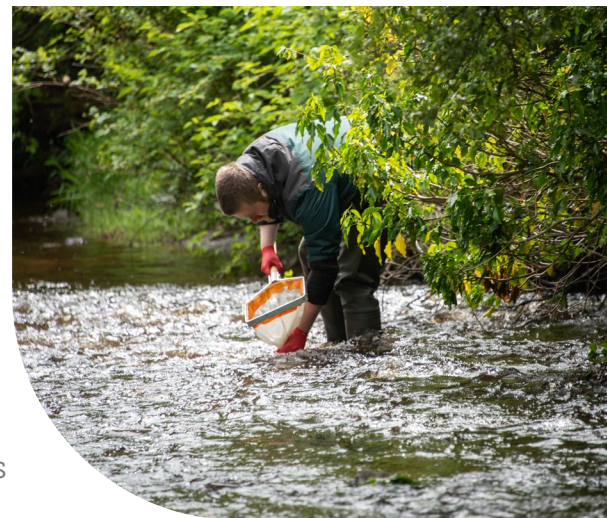
- No roadway runoff to enter watercourses or waters
- Water troughs kept >20m from watercourses
- Fence watercourses at least 1.5m from top of bank
- Fence watercourse crossings
- Keep well back from water supply sources > 25m

## Use less pesticides and fertiliser

- Keep these to a minimum. It will save money and help protect water.
- When spreading, stay back from the edge of the river, and stop fertiliser or slurry from running off into the stream.
- Keeping your machinery in good order with no leaks and paying general attention to where slurry or fertilisers end up means that you can prevent pollution from occurring. These preventative measures are vital because they allow us to manage and take care of the rivers before anything happens, rather than reacting to a problem after the damage has been done.

## Manage drains

- Let nature do the work. Nature based methods of managing drains help filter water before it reaches a river. Nature based solutions on Farms Drains <https://youtu.be/a3U7uouNZ4g>



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