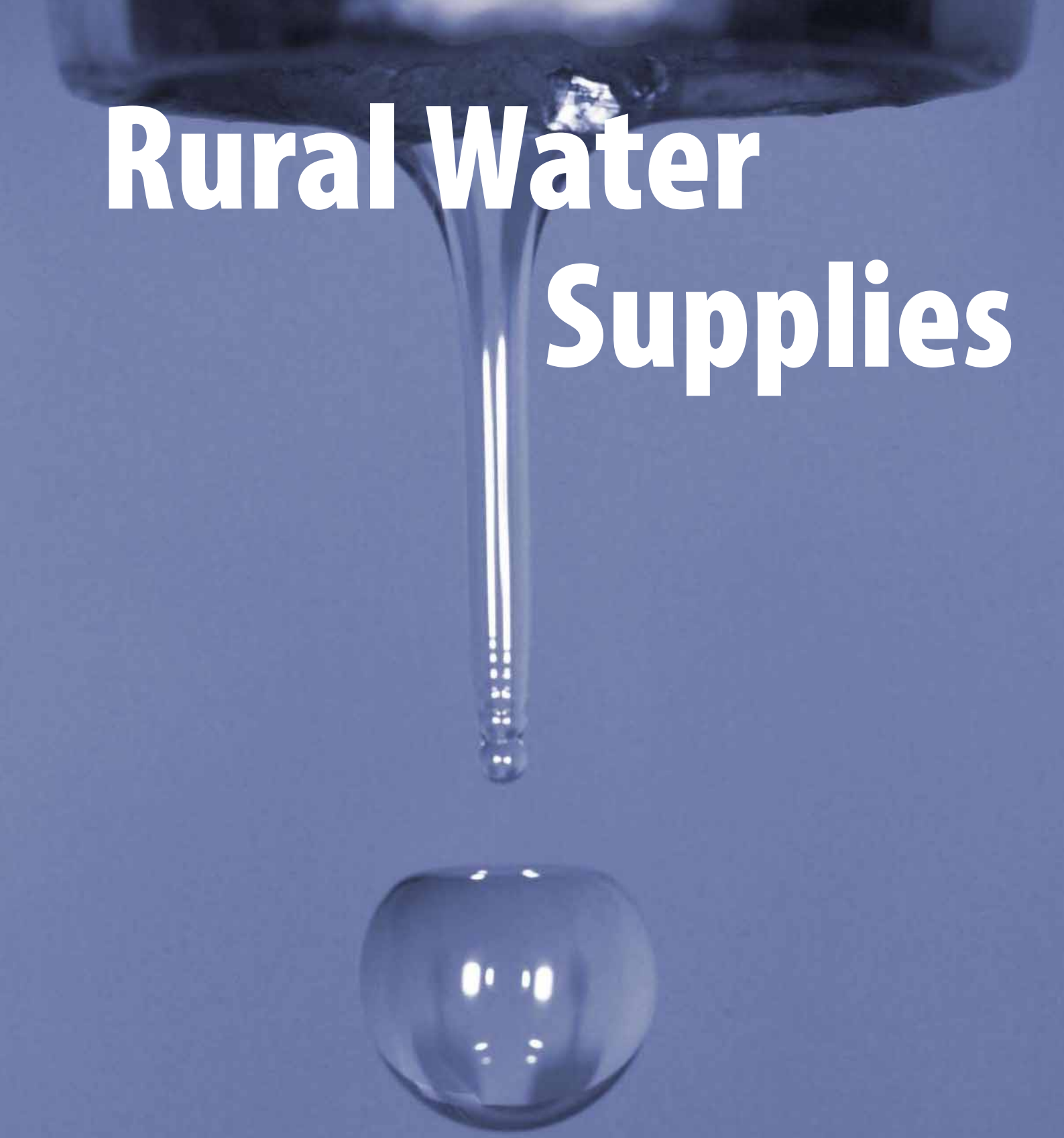
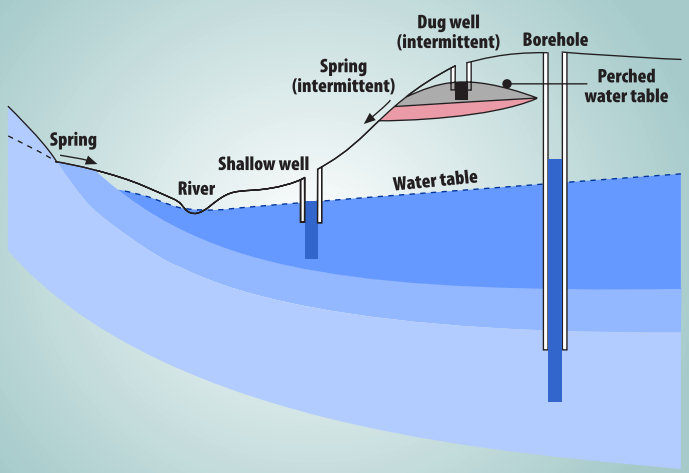
Rural Water Supplies



Studies have shown that all rural water supplies, including those serving campsites and hotels, as well as households, can be at risk of contamination from bacteria such as E. coli.

What do rural water supplies look like?

Rural water supplies can be wells, springs or boreholes. At the surface they can all look quite similar. Modern collection chambers are typically made up of a series of concrete rings set on top of one another. They often look like ordinary water wells, and are set within the water table, to depths of two-eight metres. While wells tap the underlying shallow groundwater (up to depths of eight metres), springs are points in the surface where water naturally flows out of the ground. Water normally has to be pumped from boreholes, which go much deeper into the ground and underlying groundwater.



How are rural water supplies contaminated?

Studies have shown that all rural water supplies, including those serving campsites and hotels, as well as households, can be at risk of contamination from bacteria such as E. coli. The key problems are:

- Adjacent land uses that introduce bacteria to the soil, such as grazing by animals
- Inadequate fencing to exclude stock and wild animals such as deer
- Poor construction and maintenance

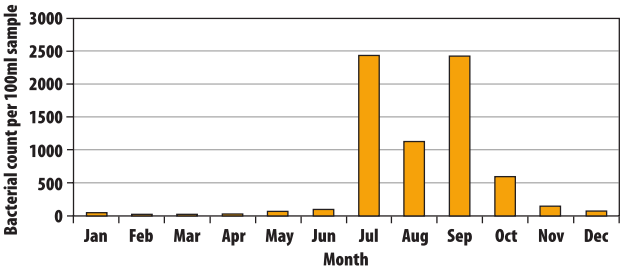
Above right:A typical rural water supply
Left: Sources of drinking water

- Lack of sealing between two concrete rings, allowing contaminated water to seep through
- Water supplies being set too low in the ground, so that surface water can enter the collection chambers
- Insufficient protection to prevent water running down the edge of the concrete ring and seeping into the supply lower down
- Cracks or holes in the concrete and in the lids which provide prime routes for contamination by bacteria

Left: Holes in rural water supplies provide easy routes for bacterial contamination

Can regular monitoring help?

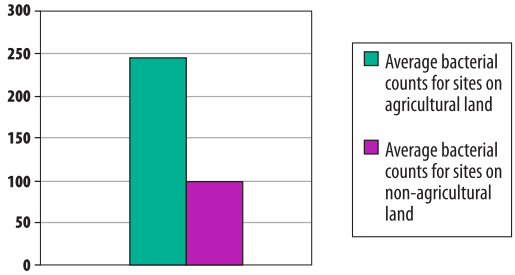
Not always! One of the key problems with the contamination of rural water supplies is that regular monitoring of a supply makes little difference to our knowledge of the water quality, because contamination can occur over short periods of time. Sites may become contaminated after periods of heavy rainfall for example, when there is more water rushing through the soil, carrying bacteria with it. As the graph shows, a water supply may be clean one month and contaminated the next. The only obvious pattern is that contamination is greater during wetter, and possibly warmer, periods, as reflected in the greater contamination rates for the wet summer of 2002.



Graph showing bacterial contamination levels through the year

Which water supplies are most at risk?

The graph clearly shows that sites on agricultural land have greater contamination levels than those on non-agricultural land. This may be simply because agricultural land is more biologically productive. Sites near septic tanks or those used for grazing by wild animals such as deer however, can also be at risk.



Graph showing bacterial contamination levels for agricultural and non-agricultural sites

How does risk assessment help?

It is clear that simply measuring the quality of water supplies, even on a regular basis, is insufficient to ensure clean, safe drinking water at all times. Risk assessment allows us to understand both the likelihood and consequences of a private water supply being contaminated. It is possible to minimise the chances of contamination by following certain procedures, known as best management practices.

Did You Know?

Most of the Scottish population has ready access to clean and reliable sources of water. However, it is estimated that 60 000 people obtain water from a private source rather than an official water supplier. There are about 30,000 of these private water supplies in rural Scotland, the majority of which cater for only one household.

Best Management Practices

Guidelines have been established for both the general site area and the water supplies themselves. Site requirements include ensuring that septic tanks and sites of sewage spreading, for example, are not located within 50 metres of a water supply. Guidelines for the supplies themselves, whether they are wells, springs or boreholes, include the following:

- Set the concrete chamber in the ground so that the top is high enough to prevent the direct flow of surface water into the chamber
- Construct a cement apron sloping away from the water supply
- Dig and line cut-off ditches, to divert nearby surface or ground water
- Fence off the supply to protect it from animals
- Chlorinate the supply regularly (e.g. once a year)
- Install a UV filter near to the point of use to kill bacteria

Water supplies ser too low in the ground allow contaminated surface water to enter the collection chamber