

# **Managing Water Catchments**



**Understanding the interactions between the land and the water is crucial to the successful management of our essential water resources.**

## What is a catchment?

Think of it as a funnel, collecting the water that drains into an area and channelling it into streams, rivers, lochs or oceans. We all live in a catchment – all the land on our planet is part of a catchment related to a particular body of water. Catchments include rural areas such as agricultural land, forests and grasslands, and urban areas, such as city centres and housing. Catchments vary in shape and size, depending on the shape of the land. The boundary of a catchment is identified by drawing a line along the highest elevations between two areas on a map.

## Why are catchments important?

Catchments are important because we all rely on water - and other natural resources - to exist. How we treat the land within a catchment affects both the quality and quantity of water available to ourselves and wildlife. Our catchments provide us with water for drinking, washing, agriculture, industry and recreation, and wildlife with food and shelter.

Below right: A catchment in Glenfiddich, Scotland showing the boundaries defined by the highest points of the region



## How does a catchment work?

Beginning at the 'top' of a catchment in the higher parts of a region, water normally drains into small streams. It flows into larger and larger streams, which eventually join a river. The volume of the water in the river increases as more of these tributary streams join. The amount of water that reaches a river from its catchment area is affected by:

- the size of the catchment area,
- the amount of rainfall and snow (precipitation),
- the amount of water lost through evaporation,
- the gradient of the land,
- surface run-off (water flowing over the surface of the land),
- the soil type
- the vegetation
- how the land is used, such as for farming, forestry, or towns and cities.

## Why do some areas flood?

Sandy soils allow the ground to soak up water faster, which reduces the surface runoff, so the rivers fill up more slowly. Clay soils, on the other hand, allow less water through, increasing the surface runoff and allowing the river to fill up more quickly. By holding water in (and on) their roots and leaves plants can reduce the surface run-off to rivers, slowing the process of filling rivers.

In cities, water reaches rivers more quickly, because of the many highly impermeable surfaces such as pavements and roads, which force the water to travel down urban drainage systems, and onwards into the rivers.

## What is Catchment Management?

To manage a catchment we need to look at the close relationship between river systems and their surrounding land areas. As water moves through a catchment (either over the surface or through the ground) it picks up soil particles, nutrients, and other contaminants, such as oil from roads, and moves them into the river system. The quality of the water in the rivers is therefore affected by the activities occurring in the surrounding catchment.

### Did you know?

**The Amazon Basin is the largest catchment in the world, at approximately 5.6 million square km, about ten times the size of Spain! It also has the largest number of tributaries and discharges the greatest volume of water to the sea - an average of about 200 million litres per second. That's the equivalent of emptying 400 swimming pools every second! The Amazon catchment includes parts of Peru, Bolivia, Venezuela, Columbia, Ecuador and Brazil.**



Human activities such as agriculture, transportation and construction all affect river systems and how they function. Understanding the interactions between the land and the water is crucial to the successful management of our essential water resources.

## Why do we need to look at this scale?

What happens in one part of a catchment can have 'knock-on effects' in other parts of the same catchment – usually downstream. For example, fertilisers spread on the land in one area of a catchment can be washed off the land into the river system. As the water flows along in the rivers it may carry the fertilisers with it, affecting the water quality down stream of where the fertilisers entered the river system. There's more information about this in "Nutrient Enrichment of Freshwater"

The same thing happens in urban areas where substances (e.g. oil, dust) can be washed off surfaces (e.g. roads, pavements, roofs) and enter rivers via the urban drainage system. Again these substances can be transported downstream by the water in the rivers. The quality of the water affects both what the water can be used for and the wildlife it can sustain.

Flooding can be a problem if we don't consider the impacts of building on flood plains or trying to straighten the course of rivers and streams. What solves a problem in one part of a catchment might actually create a problem in another.

This is why it is important to consider the 'big picture' and adopt a catchment-wide approach to management rather than focusing only on local issues.



Above: Fertilisers spread in one part of a catchment can be washed off the land into the river system