

UNDERSTANDING RIVER HEALTH

How rivers work

Rivers are one of the major forces shaping the landscape. Rivers are dynamic systems which have evolved over a very long time in response to Australia's extremely variable climate. They continue to be shaped by events occurring at different spatial and time scales.

There are two major factors influencing rivers and streams:

- **Flow** – the flow pattern will affect the physical form and the ecology of a waterway and is very much driven by climate. Flow variability is a key determinant of river shape and functioning and of the biota which live in rivers.
- **Catchment** – the slope, geology, soil, vegetation and land use will all have some effect on river condition, either through influencing streamflows, water quality, channel features, energy supply or riparian and floodplain vegetation.

A river links with its catchment in three different dimensions:

1. **Longitudinal** – where water, sediments, nutrients, chemicals and biota are moved from the higher areas within the catchment downstream to the sea or a terminal lake. Some upstream movement occurs, for example in the tidal estuarine reaches and by migratory fish, but movement is mostly downstream.
2. **Lateral** – where the river links with the riparian and floodplain land.
3. **Vertical** – where a river links vertically with groundwater systems.

Recognising the importance of these linkages in river functioning is the key to understanding what a river is and how it works.

What is river health

River health is a term used to describe the ecological condition of a river. Health is more than just the flora and fauna that live in a river or the quality of the water. To understand properly how healthy a river is, three aspects of the river system should be considered:

- **the diversity of the habitats and biota.**
- **the effectiveness of linkages.** This is essentially about making sure that a river is part of the total landscape, that it is not just regarded as a channel running through the land. Maintaining each of the linkages outlined above is essential to maintaining the ecological health of the river.
- **the maintenance of ecological processes.** This is particularly important in maintaining biodiversity. These processes include:
 - energy and nutrient dynamics;
 - processes which maintain animal and plant populations; and
 - species interactions, which can affect community structure.

Healthy rivers

In making decisions on river protection, management and restoration, communities need to balance the economic, social and environmental values associated with rivers.

However, it is helpful to have identified what a healthy river is to assist communities with these decisions.

A healthy river is defined as a river which retains the major ecological features and functioning of that river prior to European settlement and which would be able to sustain these characteristics into the future.

A healthy river need **not** be pristine. There may be exotic species present. In some areas along the river, the riparian zone may be significantly reduced. Some areas of the floodplain may be disconnected from the river. It is a river where some aspects of river condition may have been traded off to provide for human use. However, overall, the major natural features, biodiversity or functions of the river are still present and will continue into the future.

Characteristics of an Ecologically Healthy River as used in the VRHS

An ecologically healthy river will have flow regimes, water quality and channel characteristics such that:

- in the river and riparian zone, the majority of plant and animal species are native and the presence of exotic species is not a significant threat to the ecological integrity of the system;
- natural ecosystem processes are maintained;
- major natural habitat features are represented and are maintained over time;
- native riparian vegetation communities exist sustainably for the majority of the river's length;
- native fish and other fauna can move and migrate up and down the river;
- linkages between river and floodplain and associated wetlands are able to maintain ecological processes;
- natural linkages with the sea or terminal lakes are maintained; and
- associated estuaries and terminal lake systems are productive ecosystems.