

RIVER HEALTH – what are the symptoms?

When you get very sick you usually go to a doctor, who will determine your illness by looking at the symptoms you have. But how do we determine the health of our rivers?

Rivers are extremely important sources of water, especially in South Africa, where they provide about 70% of water used. For rivers to keep on providing their goods and services they need to be kept as healthy as possible.

But how do we monitor this health? It is not just the water that needs to be of good quality: a multitude of factors determine the health of a river ecosystem. Freshwater experts, therefore, look at a multitude of things to determine what the state of health of a river system is.

RIVER HABITATS

Loss of habitat is regarded as the single most important factor that has contributed towards the extinction of species in the last century. When destruction of a particular type of habitat takes place it can result in the disappearance of certain species of plants and animals.

Examples of river habitat types are pools, rapids, sandbanks, stones on the river-bed, and vegetation fringing the water's edges. For this reason, knowledge of the state of habitats along a river system forms an important part of assessing the overall health of that river system. Experts look at the things that can impact these habitats such as water abstraction, flow regulation, removal of indigenous riparian vegetation and encroachment by exotic (invasive alien) vegetation.

RIPARIAN VEGETATION

Healthy riparian vegetation (those plants that grow on the banks of rivers) maintains channel form and serves as filter for light, nutrients and sediment. It can reduce the amount of sediment and pollutants entering a river and provides a valuable habitat for birds and animals. Riparian vegetation can be influenced by things such as farming or people collecting firewood as well as invasive alien plants.

In South Africa, experts use what is called a Riparian Vegetation Index to determine the status of riparian vegetation within river segments. They look at things like vegetation removal, cultivation, construction, erosion/sedimentation and the presence of exotic (alien invasive) species of plants to determine how healthy the riparian zone is.

FISH

Fish are good indicators of long-term influences on a river as they generally live long and move around in a system. The number of species of fish that occur in a specific reach, as well as factors such as



Healthy rivers provide us with a lot of services, such as recreational fishing.



Lani van Vuuren

At a glance rivers might seem healthy, but closer inspection may uncover pollution problems.



Seeing how many types of invertebrates there are in a river are a good indicator of its health.

different size classes and the presence of parasites on the fish can be used as indicators of river health.

Different non-lethal ways are used to collect fish for river health purposes. One of the most interesting methods is that of electrofishing. A field of electricity is passed through the water that causes a muscle response reaction from the fish forcing them towards the netsman. The fish is caught in the net and once assessed is let go again.

AQUATIC INVERTEBRATES

A variety of invertebrate organisms (e.g. snails, crabs, worms, insect larvae, mussels, beetles) live in rivers. These animals (called invertebrates as they have no backbone) require the river to be in a certain state of health of survive. By catching a sample of these invertebrates and checking which species are present (or not present) experts can determine how healthy a river system is.

DIATOMS

Diatoms are one of the most common types of phytoplankton. They are delicate single-celled organisms that one can find in freshwater. Diatoms are increasingly used as a component of river health monitoring.

They are at the bottom of the foodchain (meaning other animals feed off them) and their response at this level (assemblages and type of species present among others) reflects what is happening in the water. So, for example, changes in water quality due to, say, pollution, will allow some types of diatoms to grow and reproduce, outcompeting other species. Thus when experts look at the type of diatoms found in a river section they can see what the water quality is like.

WATER QUALITY

When assessing river health, experts also look at the quality of the river water. This indicates suitability of that water for aquatic ecosystems. Among others, measurements are taken of the temperature, pH, electrical conductivity, total phosphate, total nitrogen, ammonia and dissolved oxygen levels in the water. □

WORDS RELATED TO RIVER HEALTH

- Anthropogenic:** Caused by human activity.
- Biodiversity:** The diversity of life from a taxonomic, ecological or genetic point of view.
- Biomonitoring:** Monitoring of living organisms, usually as indicators of habitat integrity.
- Biota:** The living organisms of a region or system.
- Biotope:** An area of uniform environmental conditions.
- Catchment:** The land area from which a river or reservoir is fed.
- Crustacea:** Crabs, prawns and amphipods.
- Ecology:** The study of the interrelationships between organisms and their environments.
- Ecosystem/ecological health:** A descriptive term for the combination of all factors that make up a particular environment and its organisms.
- Effluent:** That which flows out (usually discharge wastewater).
- Environment:** All the physical, chemical and biological factors and conditions that influence an object.
- Fauna:** Collective term for all the animals living in a particular area or period.
- Habitat:** The combination of biotopes that makes up the living space of an organism.
- Indigenous:** Living or growing naturally in a particular area, but not naturally confined to that area.
- Invertebrate:** Animal without a backbone.
- Riparian:** Pertaining to a river bank.
- Sediment:** Fragmentary material (e.g. sand, silt and mud) weathered from rocks and (recently) deposited.
- Source:** *Environmental water quality in water resources management* by Unilever (WRC Report No: TT 217/04)

SOURCES

WRC Lesson Plans (www.wrc.org.za/Pages/Learning_School_lessonplans.aspx)
River Health Programme (www.csir.co.za/rhp)