



**Get Water Wise**

**Progress High SCHOOL 2016**

**get Wise**

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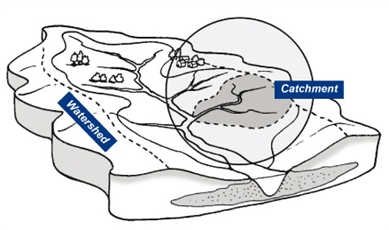
Introduction

For millions for years life on earth has been dependant on water for survival. Consider this: 70% of the earth’s surface is covered with water but of this, approximately 97% is salt water, with the remaining 3% being fresh water. Of this 3%, less than 1% is available for life on earth. About 98% of the earth’s liquid fresh water is underground. <<citation>>

The water we have on earth is very old. The water that we are using now was used by the dinosaurs millions of years ago. This is because the earth recycles its water. This recycling of water is called the water cycle.

Water in Nature

Let’s first brush up on our physical geography and clarify a few terms.

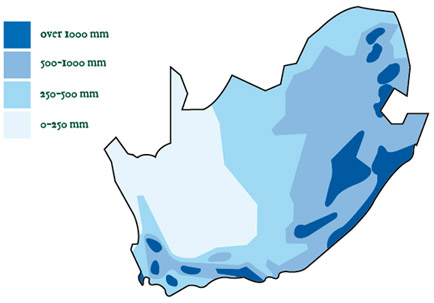


Catchment: the area of land drained by a single river or body of water.

Watershed: the lineseparating two different and adjacent river systems, which is normally the crest of a hill or mountain.

Map 1: Catchments and Watersheds

Compare this with the following rainfall map of SA:



Origin of Rivers

Rivers are complex self-regulating systems supporting arrays of fascinating and important communities. No two parts of the same river is the same. Various ecosystems will be present in one single river. Rivers are also a reflection of the “health” of their catchment area.

When it rains, water starts to flow over the Earth’s surface as sheet wash. That means it is not yet canalised into streams. Once the water starts flowing it will soon start to collect into rivulets which grow into small streams. The small streams flow into each other to form the tributaries. Ultimately the tributaries join into the main stream or river. By these processes rivers eventually become very large, with large amounts of water that discharge into the oceans.

**The five longest rivers in the world (approximate lengths in miles):**

Nile Africa 4180

Amazon South America 3912

Mississippi North America 3710

Yangtse China 2900

Ob Russia 3459

The longest river in SA is the Orange River, with a length of 1400 miles. It has a drainage basin of 375,677 square miles, and an average discharge of 365 m/second. The mountains in the east form a watershed, and the river has a very large catchment area – about 77% of the area of SA.  
See Map 1: <<>> above for a review of terms.

Estuaries

This is where the river meets the sea. Estuaries tend to have wide sand or mudflats that are alternately covered and uncovered by the tides. Their waters are chemical mixtures between sea water and fresh water.

**An interesting fact:**

Sea water is denser than fresh water because of the high salt content. Due to this, one will often find that water entering estuaries from rivers usually forms a layer of fresh water covering the more dense sea water. Thus, the deeper waters of estuaries will be saline, while the upper layers are fresh, or nearly so.

Wetlands and Wet Areas

Wetlands are permanently waterlogged areas that acts as natural filters. They are therefore nature’s way of cleaning water by acting as a filter, trapping sediments, nutrients and bacteria. Wetlands store water in summer and release it in winter, when the vegetation dies off.



Types of Wetlands

There are different types of wetlands: The smaller wetlands, pools and ponds, are very often found in mountains. Sponges are high-altitude wetlands and occur at the sources of rivers high up in the mountains. Bogs are permanently-wet marshes dominated by peat moss causing the water to be dark and acid. Swamps are wetlands with trees, their water being either still or slow-flowing. Marshes are tracts of spongy land that support low-growing reeds (see the picture alongside – a common sight in areas where drainage is problematic).

Why are wetlands important?

However big or small, wetlands act as massive hydrological controls of stream flow. They reduce the force of floods and also store water, releasing it slowly. Destruction of wetlands in a river’s catchment can lead to wild and uncontrollable flooding in its lower reaches.

Mangroves

These are areas on tidal flats, inundated with sea water during high tides, where the vegetation is adapted to salt water conditions in warm to hot climates. Typical places to find mangroves will be in estuaries.

Alien Vegetation

This is vegetation that has been imported into a country from other countries, eg. Wattle, Bluegum etc. In SA this vegetation is a threat to the indigenous vegetation, because it usually uses more water and tends to compete with the indigenous vegetation.

Water Storage

Large dams have to be built in order to store water. In earlier times, many little dams were built to irrigate farms. These dams were the forerunners of the great barrages and dams which today control the water resources on which industrial complexes and the agricultural sector are so heavily dependent.

Hard Facts

SA is a water stressed country. Water resources are under tremendous pressure. The amount of water available for use remains the same, and despite plans to increase storage capacity through the building of new dams or water transfer schemes, predictions are that the demand for water will outstrip supply by 2025. The table and chart below summarise the situation (Surface Water, 2016):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Province** | **Dam Capacity 106 cubic meters** | **This Year**  **This Week (%)**  **Last Week (%)** | | **Last Year (%)** |
| Eastern Cape | 1833 | 69 | 70 | 79 |
| Free State | 15971 | 54 | 54 | 80 |
| Gauteng | 115 | 86 | 86 | 93 |
| Kwazulu-Natal | 4669 | 48 | 49 | 68 |
| Lesotho\* | 2376 | 47 | 48 | 71 |
| Limpopo | 1508 | 58 | 59 | 84 |
| Mpumalanga | 2539 | 60 | 61 | 85 |
| North West | 887 | 66 | 66 | 65 |
| Northern Cape | 146 | 64 | 57 | 87 |
| Western Cape | 1870 | 30 | 30 | 44 |
| **Averages** |  | **58** | **58** | **69** |

A glance at the figures and chart above reaffirms the critical reality: SA is approaching a full-blown drought situation and we need to take drastic action – and sooner rather than later. The best solution to this dilemma lies in changing people's attitude and thus their behaviour to use water more wisely.

A Case in Point – the Vaal Dam

The Vaal Dam was built in the early thirties and completed in 1938. It was built as a joint project between Rand Water and the then Department of Irrigation. At present Gauteng Province gets most of its water from the Vaal Dam, which is now managed by the Department of Water and Environmental Affairs. The dam has a catchment area covering 38 505 square kilometres, a surface area of 321 square kilometers and an average depth of 22,5 metres. Even though the Vaal Dam is only the fourth largest dam in SA in terms of storage capacity, it is without a doubt the most important dam in view of its role as the primary supplier of water to the economic heartland of SA.



Wastewater

Wastewater (or sewage) is dirty, used water that goes down the drains and toilets of homes, schools, businesses and factories. It is collected in a network of sewers that transport it to wastewater treatment plants. At these plants, the dangerous wastes are removed from the water and disposed of safely. Interestingly enough, wastewater is made up 99.9% water and only 0.1% wastes! The large amount of water is only used for transporting the wastes. Thus, the precious resource – the water itself – is returned to the water cycle.

Water-Related Diseases

1. These are classified into four types relating to the path of transmission:
2. Waterborne diseases (e.g. cholera and typhoid) are diseases that are transmitted through drinking water. Proper treatment of drinking water is the best counter-measure.
3. Water-washed diseases (e.g. polio) are diseases where the interruption of the transmission is achieved through effective sanitation and personal hygiene.
4. Water-based diseases are diseases transmitted by contact with water, e.g. recreational swimming.
5. Water vector diseases, such as malaria, are diseases that are transmitted by a vector, such as the mosquito, which needs water or moisture in order to breed. Prevention of transmission is through a vector control.

Saving Water

A family of four can use anything between 300 and 800 litres of water in the home per day. This is a very large amount considering that many people in the world use as little as 25 litres of water per person per day, or six kilolitres of water per household per month. The challenge for every person in SA is to use as little water a day as possible.

We have provided some water-saving tips on the next page, that should go a long way to ensuring that we all have enough water for today AND tomorrow. It’s all up to US!

The Future

The future of South Africa lies in our hands. We just need to understand the water environment and how we humans fit into it. We all need to become “Water Wise”! But what does it mean to be “Water Wise”?

**To be “Water Wise” means that a person will:**

* have the utmost RESPECT for water and all life;
* use water carefully and not WASTE it;
* not POLLUTE rivers with liquid and solid waste;
* PAY for water services;
* take ACTION to solve any water problems;
* CONSERVE water, and thereby CONSERVE the natural environment.

Water is a vital resource and it is up to ALL South Africans to act responsibly in their daily lives and look after the available water resources to ensure that this limited supply is usable by all life on earth. It is very important that everyone becomes “Water Wise”.

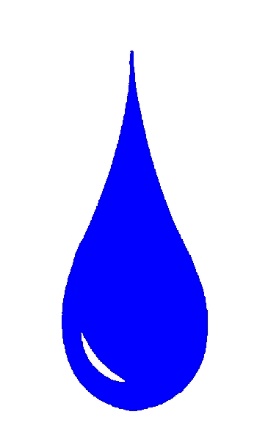
**BE WISE – BE WATER WISE**

Some Water-Saving Tips

**Throughout your home**

* Ensure all taps are properly closed – a dripping tap at 1 drip per second wastes a large amount – up to 30 litres a day.
* Fit tap aerators to restrict and spread the flow. This saves water while giving the impression that you are using the same amount of water.
* Check your plumbing system regularly for leaks and engage a plumber if necessary.

**In your garden**

* Avoid watering your garden during windy periods and only water your garden when necessary. Avoid watering in the heat of the day.
* Place a bucket beneath an overflow pipe that drips into the garden: use the saved water to water pot plants.
* Mulch flowerbeds to check weeds and keep moisture in the ground for longer.
* Use a lawn mower that cuts the clippings finely and blows them back into the lawn.
* Use a trigger nozzle with automatic shut-off on your hose when you water your garden or wash your car.
* Water the garden less frequently, but deeper (i.e. for longer). This encourages a deeper root system, which results in stronger plants.

**In your kitchen**

* Ensure washing machines or dishwashers have a full load before running them.
* Rinse glasses, cutlery, vegetables etc. in a basin of water, rather than under a running tap, then reuse the water for pot-plants or in the garden.
* When washing dishes, re-use the rinse water for the next cycle of washing up.
* Keep some drinking water in the fridge, so that you don’t run lukewarm water down the drain while waiting for it to cool down.
* Run tap water into a bottle while waiting for it to heat up.
* Allow frozen foods to thaw in the fridge, sunlight or microwave rather than placing them under running water.

**In your bathroom**

* Close the tap when brushing your teeth. Use a mug of water to rinse your toothbrush.
* Plug the washing basin when shaving rather than rinsing the razor under running water.
* A half-filled bath uses about 110 litres, whereas a 5-minute shower uses about 50 litres. If you have to bath, make it a shallow one or share it.
* Install a new water-saving toilet or put a sealed plastic container filled with sand (or just a brick) in the toilet cistern.
* Be water-wise in the shower: install a water-saving shower head, take shorter showers, don't open the tap all the way, and turn off the shower when soaping.

**Industries, businesses and schools**

* Automatic flushing urinals are the ultimate water wasters. If they cannot be replaced immediately, turn off the water after hours and over weekends – schools doing this can save a huge amount on their water bill.
* Flush valves should flush for just two to four seconds and urinals for six to eight seconds.
* Regular maintenance of toilet fittings will save unnecessarily flushed water.
* Ensure your plumbing systems are regularly checked for leaks.
* Use a broom (not a hose) to sweep forecourts and other paved areas.
* Do not use drinkable water to dampen building sand or other building material to prevent it from being blown away.

**Bibliography**