***AGE - Environmental Health***

*Working Towards Improved Water Quality*

***Introduction***

Alpheius Global Enterprises has developed close working relationships with a number of organisations over the past 10 years, with the aim of assisting in the management of water quality in the South East region. AGE has made a commitment for the next five years to continue this involvement in the following areas of interest:

* Water Contamination
* Grazing Practices
* Groundwater Management
* Invasive Pests
* Wetlands Diversity
* Salinity
* River Health
* Riparian Lands
* Native Vegetation and Biodiversity
* Managing Agricultural Landscapes

***Areas of Interest***

**Water Contamination**

The South East River Contaminants Program builds upon the [National Water Management Program](http://www.rivers.gov.au/research/nemp/index.htm) that addressed issues concerning the cause and management of algal blooms. The program continues the partnership between AGE and the South East Region Commission, and addresses issues of declining water quality in local river systems, with salinity and sediments being identified as the highest priority contaminants for consideration.

A major review concluded that contaminants affect not only the health and ecological value of riverine systems (including wetlands and floodplains) but also threaten consumptive and commercial uses of water resources. River contaminants are also a major threat to receiving waters (estuarine, coastal, wetland and reservoirs) and some ecosystems under serious threat are of enormous national value e.g. the Great Southern Lake and Flinders River.

**Grazing Practices**

It has long been recognised that excessive and long term grazing of pastoral lands influences the condition of local waterways. The level of erosion caused by grazing increases and ultimately becomes difficult to reverse without long periods of non-grazing activity. Increased soil erosion and reduced soil quality influences the contaminants, such as silt, that enters the adjoining waterways.

Grazing regimes in Australia have typically focused on short term returns without looking to long term sustainability. Unless new sustainable systems are recognised by producers to be at least as profitable in the short term as traditional methods, they are unlikely to be adopted and the quality of waterways will not be able to maintain a healthy equilibrium.

The Water Initiatives Programme is developing new land use and management practices in the grazing lands of the South East region to ensure minimal, detrimental influence on the water catchments in the area. The beef industry is the major land user in the South East region and has the most direct influence on the water quality of the streams and rivers of any land user in the area.

Over 80 per cent of sediments and nutrients discharged to the water catchments in the South East originate from the extensive grazing lands of the area. High concentrations of these sediments, and the pollutants they carry, cause damage to the flora and fauna of the local waterways and reservoirs.

The Water Initiatives Programme aims to educate and assist graziers in changing their management practices and decrease the impact of their industry on waterways within and passing through their own properties.

**Groundwater Management**

Water that has accumulated beneath the Earth's surface in soil pores, cracks and spaces in the rock can be pumped to the surface and used for agriculture and other industries. However, the store can be polluted by chemicals seeping down through the soil and the removal of water can affect dependent ecosystems and even cause subsidence.

Traditionally, groundwater has been regarded as an inexhaustible source of water. But this view has changed and it is now recognised that its quantity and quality can be jeopardised. The South East Groundwater R&D Programme provides management and policy information, and tools to assist in the sustainable use of groundwater and the protection of its quality.

**Invasive Pests**

Water quality of reservoirs is put at risk by invasive pests such as Duckweed (*Lemnaceae spirodela*). Even with the assistance of mechanical skimmers, which have the capacity to remove up to 400 cubic metres of duckweed per day, this weed is incredibly difficult to control. It is estimated that currently 65% of the reservoirs in the South East region have been invaded.

Duckweeds, however, reveal a dark and a light side: they have been shown for instance, to be particularly proficient at removing phosphates and nitrates (especially ammonia) from water. This is of particular interest in intensive farming practices when dealing with sewerage and waste water.

Nevertheless, the existence of Duckweed in natural reservoirs is not desirable and the South East Invasive Pest Programme will look at ways to increase the rate of Duckweed removal and management strategies to ensure future control.

**Wetlands**

Wetlands have long been considered unproductive waste lands by traditional farming communities. Public opinion has been to drain these areas, thereby expanding viable areas of agriculture. However, through intensive research it is shown that these areas are in fact performing an invaluable service to the surrounding ecosystems by providing a natural aquatic filter. Additionally, wetlands serve to support a wide diversity of flora and fauna that would not exist otherwise. For these reasons, wetlands in the South East region need to be conserved. A complication in the matter is that many of the wetlands in this region occur on private or leasehold land, so a comprehensive education programme needs to be constructed and delivered to landholders.

**Salinity**

Salinity is a condition where soils contain high levels of salt. There are two forms of salinity: dryland salinity and irrigated land salinity. Dryland salinity, also known as the “white death” among the farming community, currently affects more than 5 million hectares of land; 1.7 million hectares in the South East region alone, and causes damage totalling $270 million each year. Irrigated land salinity, occurs on land subject to irrigation.

Much of the land in the South East region contains high levels of salt, but it is usually held deep in the soil profile where it does not affect plants. Rising water tables, however, cause the salt to rise in the soil profile and this is when salinity issues arise. The high level of salts in the soil restricts or prevents plant growth and arable land usability and value thereby decreases dramatically.

Whereas in the past farmers were surveyed to determine the extent of salination on their properties, it eventuates that the results were not very successful, due to limited knowledge (and therefore ability to determine the extent of salination) and an absence of mapped data. Current methods involve aerial surveys using remote sensing cameras. The data collected is extremely accurate and enables a much clearer insight.

**River Health**

Rivers are a vital link within natural systems. They provide drainage from and supply of water to a catchment. Rivers are also a reflection of the total system and the health of the river can be an indicator of the health of the broader landscape. As river systems increase in size, so too do their potential problems.

The Water Initiatives Plan also seeks to:

* estimate and manage environmental flow to rivers and floodplains
* investigate managing water storages
* investigate the relationship between flow and river biota
* investigate the water requirements of wetlands

**Riparian Lands**

Riparian lands play a vital role in the health of the surrounding landscape and provide important habitats for flora and fauna. Riparian lands influence stream health and river shape and stability. Degradation of these habitats, caused by vegetation removal, has lead to river bank erosion, resulting in flooding and decreased water quality.

Poor management or no management of riparian lands has become an economic burden, with almost $45 million spent annually on improving the water quality of the region.

**Native Vegetation and Biodiversity**

The management of native vegetation and biodiversity of the South East region is of importance due to the critical role that the vegetation plays in the balance of the ecosystem. By improving landscape health, the community can also improve productivity. To be able to ascertain the health of the native landscape and suggest methods for its continued improvement, the Environmental Initiative aims to:

* work with farmers to manage and restore native vegetation
* develop a system for evaluating and documenting biodiversity benefits resulting from the Initiative’s actions
* work with indigenous populations to manage fires
* assess biodiversity benefits from water management in the South East rangelands
* develop software to enable hands-on learning for landholders
* measure biodiversity of regrowth vegetation in modified landscapes

***Affiliations***

The organisations with which Alpheius Global Enterprises is working to improve the quality of the environment include:

Landcare Australia

Environment Victoria

Global Friends Australia

Australian Conservation Foundation

Australian Student Environment Network

The Natural Edge Project

South East Water Conservation Group

South East Ranges Trust