

Mallee Dryland Agricultural Soil Health Monitoring Program 2010-11



Above: Soil sampling undertaken in late summer 2011. Photo: Mallee CMA.

This fact sheet presents the results of the 2010 and 2011 Mallee Dryland Soil Health Monitoring Program.

The Mallee dryland soil resource supports 1.8 million hectares of crop each year, generating 80% of dryland farm income and producing up to 50% of Victoria's cereals to supply both domestic and export markets.

Declining soil health can cause significant detrimental environmental impacts and can have severe economic and social repercussions for the region and has been recognised as a significant issue in the Mallee region for a number of years.

Mallee Dryland Soil Health Monitoring program began in 2010 with monitoring continuing in 2011. Data that is generated through monitoring activities will be used to develop and report against soil health benchmarks and targets, and to inform the region of the proposed development of the Mallee Soil Health Strategy.

Method

Soil health monitoring is conducted at two types of sites; Focus Sites (a large number of sites where a small number of key soil parameters can be monitored through time) and Benchmark Sites (a small number of intensively monitored paddocks strategically positioned across

land systems and climate zones). Soil health monitoring is undertaken in late February – early March and began in 2010 with monitoring at 77 focus sites in the Central Mallee land system. In 2011 a further 38 focus sites were monitored in the Millewa, Tempy and Boigbeat land systems (Figure 1). Monitoring was also conducted at benchmark sites located at Cowangie and Chinkapook (2010 and 2011 and Karawinna (2011 only).

During monitoring, land management practices are recorded, soil erosion is assessed and soil samples are collected.



At a glance

- The Mallee Dryland Agricultural Soil Health Monitoring Program monitored:
 - 38 focus sites in the Millewa, Tempy and Boigbeat land systems in 2011;
 - 77 focus sites in the Central Mallee land system in 2010;
 - Three benchmark sites at Cowangie and Chinkapook for soil health parameters, with a new site located at Karawinna.

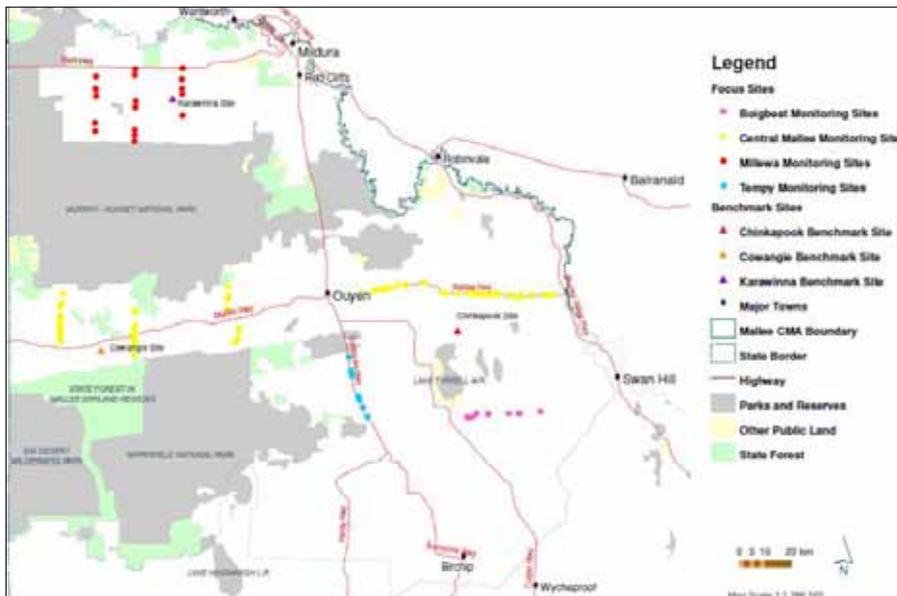


Figure 1: Location of Central Mallee Soil Health Monitoring Focus Sites and Chinkapook and Cowangie Benchmark Sites for the 2010 project delivery (Phase 1), and the location of the Milawa, Boigbeat and Tempy Focus Sites and Karawinna Benchmark Site for the 2011 project delivery (Phase 1). Map: Mallee CMA.

Soil samples are used to determine bulk density, Organic Carbon (OC), Total nitrogen (Total N) and Available Phosphorus (Colwell P). Soil pH and electrical conductivity (EC) have also been determined at focus sites and broad range soil properties have been established at benchmark sites.

Results

A summary of key soil health parameters measured at focus sites during 2010 and 2011 are provided below.

Bulk Density

Bulk density is a measure of the soils physical health. Generally low bulk density indicates better soil structure and an abundance of soil pores, while high bulk density can be an indicator of soil compaction. However in the Mallee, high bulk densities can often occur naturally due to the sandy texture of Mallee soils. Average bulk density results from the four land systems monitored ranged from 1.34gcm⁻³ to 1.49gcm⁻³

Organic Carbon

Organic carbon is very important to soil

health as it is essential for maintaining biological activity in soil, supplying nutrients to plants and building soil structure. Mallee soils are generally low in soil carbon due to factors such as the inherent sandy texture of our soils, the low rainfall climate and regular disturbance of the soil. Average organic carbon levels at sites within the four land systems monitored ranged from 0.55% to 0.97%

Nitrogen

Soils need an adequate level of nitrogen to function as a healthy soil. Nitrogen needs to be in balance with organic carbon for optimum soil biological activity (referred to as the C:N ratio). Plants require large quantities of nitrogen from the soil to grow and nitrogen is predominantly returned through legume plants such a medic pastures, lucerne and pulse crops. Average total nitrogen for the four land systems ranged from 0.06% to 0.10%.

Phosphorus

Phosphorus is an important component of a healthy soil for the purpose of agricultural production. Most naturally occurring Australian soils, including the

Mallee soils, have very low phosphorus levels. Therefore fertiliser has been applied to Mallee dryland agricultural soils over many years to raise soil phosphorus levels. The average available phosphorus (Colwell) for the four land systems to date ranged from 24 to 30mg kg⁻¹.

Conclusion

Two years of data have now been collected at focus sites and benchmark sites. Completion of the initial monitoring of all sites will be undertaken in 2012 with the incorporation of the remaining focus sites from the Culgoa and Hopetoun land systems. Once initial monitoring of all sites is completed, benchmark levels for soil health indicators can be established and will form the basis for monitoring changes and trends in soil health indicators on a three year cycle. Furthermore, once benchmark levels for soil health indicators are established, interpretation of the historic land management and soil health indicator data can also be undertaken.

Acknowledgments

Mallee Sustainable Farming (MSF) and the Victorian Department of Primary Industries (DPI) were engaged by the Mallee CMA to undertake this project with funding from the Victorian government.

Field work was completed by MSF, DPI Victoria, Moodie Agronomy and the Mallee CMA. Laboratory analysis was completed by DPI Victoria.

Further Information

Information for this bulletin and for further results of focus and benchmark sites please refer to the '2010 and the 2011 Mallee Soil Health Monitoring' reports.

The latest reports can be downloaded from the Mallee CMA website:

www.malleecma.vic.gov.au

Project Partners



Published September 2011

This publication may be of assistance to you but the Mallee Catchment Management Authority refers readers to our Terms and Conditions, available from our website.

Printed on 100% recycled Australian paper, made from pre- and post-consumer waste.