Murray Irrigation

Land Sustainability Information

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Contents

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1 Murray Irrigation Strategy – Our journey to 2020

Our vision:

- Enrich the prosperity of a region that is highly valued for its contribution to Australian agriculture

Driving principles and performance goals

- Care – Develop a Zero Harm culture that cares for our people and the environment
- Lead – Drive the region's economic development and become the authoritative voice on water policy

2 Land Sustainability Statements

Murray Irrigation is committed to achieve a balance between environmental responsibility and agricultural production.

Murray Irrigation is committed to ensuring efficient and sustainable use of water consistent with the Water Management Principles of the *WMA 2000*.

Murray Irrigation supports its customers to implement water use best management practices for sustainable irrigated agriculture that promote the Water Management Principles of the *WMA 2000*.

3 Background

Murray Irrigation recognises that controlling the amount of water leaking below the plant rootzone and recharging groundwater in the watertable is essential to ensuring the long-term productivity of the agricultural businesses operated by its customers and, and in turn benefitting the community.

Appropriate irrigation and drainage management, in conjunction with, correct crop and soil selection in irrigation areas can help alleviate the movement of water into the watertable reducing the salinity risk. These practices also provide the opportunity for increased productivity and profitability through more efficient use of water.

Customers can access relevant information regarding modern irrigation management practices on the NSW Department of Primary Industries Irrigation Management webpage.

Murray Irrigation recognises the large amount of investment by customers over a long period of time to upgrade irrigation infrastructure and install drainage and reuse system, including on-farm storage systems. This infrastructure assists in reducing the recharge of the watertable, reducing water logging and ensuring efficient application of water on crops.

3.1 Water Management Act 2000 (NSW)

The *Water Management Act 2000* (NSW) (*WMA 2000*) objectives include encouraging best management practice for sustainable and efficient use of water.

The Water Management Principles of the *WMA 2000* in relation to water use include:

- water use should be consistent with the maintanence of productivity of land in the the long term and should maximise the social and economic benefits to the community

- water use should avoid or minimise land degradation, including contamination, waterlogging and salinity
- the impacts of water use on other water users should be avoided or minimised.

Murray Irrigation's Operating Licence issued under the *WMA 2000* requires Murray Irrigation to have regard for the Water Management Principles of the *WMA 2000* when supplying water delivery services and drainage services.

Under the *WMA 2000* Murray Irrigation is issued with a Combined Water Supply Approval and Water Use Approval (Combined Approval).

3.2 Monitoring Requirements

3.2.1 Watertable monitoring

Murray Irrigation monitors the watertable levels every year via a network of piezometers. The data is used to generate watertable maps for the area. Monitoring of the watertable is a reporting requirement of the Combined Approval.

3.2.2 Irrigation intensity monitoring

Irrigation intensity (total farm water use) is a measure of the volume of water (ML) applied to the landholding area (ha).

Murray Irrigation will monitor the irrigation intensity (total farm water use) on individual landholdings. The monitoring of the irrigation intensity (total farm water use) on landholdings is a reporting requirement of the Combined Approval.

3.2.3 Drainage system monitoring

The monitoring of the water quality discharged from the Murray Irrigation area through the drainage system is a requirement of Combined Approval and the Environment Protection Licence issued by the EPA.

Murray Irrigation is required to monitor the water quality, both salinity and chemicals, discharged from the drainage system to the surrounding waterways. This monitoring ensures minimal impacts of discharges from the drainage system on other water users.

3.2.4 Crop water use monitoring

Murray Irrigation may monitor the crop use of individual crops grown on a landholding and compare the crop water use to the crop irrigation requirement. In determining the crop irrigation requirement of a crop Murray Irrigation will utilise climatic data (rainfall and evapotranspiration), established Kc crop factors and allow for drainage. Many customers will be familiar with the monitoring of the rice crop water use on landholdings.

4 Land Sustainability Recommendations for Customers

Murray Irrigation recognises that the economics of operating an irrigation farm will drive the decisions made by customers regarding implementing practices to achieve efficient and sustainable water use.

4.1 Discharging water from landholdings

The majority of customers have access the drainage system. Only customers with no access to the drainage system are permitted to discharge water into the supply system.

The discharge of drainage water by customers from landholdings into the drainage system presents a risk to Murray Irrigation. Murray Irrigation is required to ensure that drainage discharges do not have a negative impact on waterways into which the drainage system discharges. To enable Murray Irrigation to manage this risk it is essential customers consider the impact of the water quality discharging from their landholding.

The drainage system was built to enable the drainage of water from landholdings following rainfall events, not for the discharge of excess irrigation water. It is expected that customers will implement best management practices while irrigating, utilising on-farm drainage and reuse systems. The drainage system was designed to remove stormwater from landholdings within four days following a 57mm rainfall event occurring in 24 hours.

The discharge of small volumes of water into the drainage system that are not related to a rainfall event pose a high risk for Murray Irrigation. Small volumes of water lying in the bed of the drain result in poor water quality, weed growth and potentially blue green algae blooms.

The discharge of water by customers into the drainage system is considered to be a high risk activity by Murray Irrigation. To mitigate the risk Murray Irrigation assesses the potential risk of each rainfall event on the water quality discharging into the drainage system from landholdings. The risk assessment process includes an analysis of the time of the year and the extent of the rainfall event. For example, a large rainfall event in winter is low risk event, customers wanting to drain stormwater from their landholdings will be required to call Customer Support to record their intention to discharge into the drainage system, with no forms to complete and no water samples required.

4.1.1 Previous Stormwater Disposal Policy and Environment Policy

Customer were required to complete an application form seeking approval prior to discharging water into the drainage system or the supply system, a water sample was required.

4.1.2 Discharge Procedures for customers

Customers must contact Murray Irrigation Customer Support prior to discharging water into the drainage system in all circumstances. This information allows Murray Irrigation to monitor the drainage system and deploy staff to the most appropriate location to ensure the efficient operation of the drainage system.

Customers must contact Murray Irrigation Customer Support prior to discharging water into the supply system in all circumstances. The discharge of water into the supply system requires significant coordination by Murray Irrigation staff to monitor location of pumps or opening of outlets and water levels within the supply system channels.

4.2 Irrigation intensity

4.2.1 Previous Total Farm Water Balance Policy and Environment Policy

The previous Total Farm Water Balance Policy was introduced to address the concerns of the impact of rising watertable on the long term agricultural and economic viability of the region. The Total Farm Water Balance Policy limited the irrigation intensity applied to landholdings. A climatic adjustment factor was applied to the irrigation intensity calculated for landholdings in years with higher than average evapotranspiration and/or lower than average rainfall.

The Total Farm Water Balance Policy limited the irrigation intensity to 4ML/ha. Landholders could apply for higher levels of irrigation intensity, up to 6ML/ha or 8ML/ha (depending the type of crop grown), based on irrigation upgrades and the installation of drainage and re-use systems. Many landholders took advantage of funds available under the Land and Water Management Plans to install these types of works.

The revised Total Farm Water Use Rules in the Environment Policy allowed the following:

- the total farm water use on multiple landholdings operated by a single business were combined based on either a merged water account (S account) or a consolidate account for billing purposes.
- the total farm water use on individual landholdings could be averaged over three years.

Murray Irrigation considers that the implementation of these measures for the total farm water use allowed customers the flexibility to operate a sustainable and profitable business, while recognising the importance of the potential impact of irrigation practices on the watertable.

The Total Farm Water Balance Rules in the Environment Policy did not have clear provisions for horticultural crops.

4.2.2 Irrigation Intensity Recommendations

Murray Irrigation encourages it customers to consider the total farm water use when planning the irrigation cropping program each year.

Murray Irrigation may use the data from the annual watertable monitoring to discuss total farm water use with customers.

Murray Irrigation expects that landholdings with intensive horticultural production (i.e. orchards) will utilise modern irrigation technology such as moisture sensing equipment and automated irrigation infrastructure to ensure optimal irrigation rates matching the crop water requirements.

4.3 Rice Growing

In a ‘normal’ year approximately 50% of the water delivered by Murray Irrigation is used for rice growing. Historically, rice growing has been subject to high level of regulation based on soil suitability and water use criteria.

Murray Irrigation supports the rice industry in the implementation the Rice Growing Recommendations developed by the Rice Growers Association under the Rice Extension Program. The Rice Extension Program Recommendations support Murray Irrigations’ Rice Growing Recommendations and visa versus.

Murray Irrigation will continue to calculate the maximum rice water use and determine the rice water use on landholdings. Murray Irrigation will maintain the records of the historic rice water use on landholdings.

Murray Irrigation will maintain the Approved Rice Soil Suitability Maps and the information used to generate these maps. The maps will continue to be available to customers via the Customer Portal. Murray Irrigation will continue to receive rice soil testing reports and update the Approved Rice Soil Suitability Maps as required when customers choose to send the rice soil assessment report to Murray Irrigation.

4.3.1 Previous Rice Growing Policy and Environment Policy

The Rice Growing Policy and Environment Policy consisted of two criteria, the rice soil classification criteria and maximum rice water criteria, including rice soil assessment requirements. These policies were driven by rules and the consequences for not complying with the policy.

4.3.1.1 Maximum rice water use

The maximum rice water usage is calculated each year based on the rainfall and evapotranspiration for the rice growing season (Oct – Feb) with an allowance of 4 ML/ha added for drainage and soil profile wetting. Customers with a rice crop water usage greater the maximum rice water use would be contacted to discuss the high rice water use. The actions taken following the discussion would be considered on case by case basis. Customers may have been required to undertake rice soil suitability testing prior to growing another rice crop on the area.

4.3.1.2 Rice soil classifications

Murray Irrigation audited the area on landholdings growing rice to confirm the rice being grown on the appropriate rice soil classification. Rice growers were contacted when rice is grown on unsuitable, unclassified or marginal out of rotation classified soils.

Table 1:Rice Soil Classification

Classification	Explanation
Suitable	Rice can be grown on the area with no restrictions
Suitable – subject to water use (new classification in the revised Rice Growing Rules of the Environment Policy)	Rice can be grown on the area for one year, • If the rice water use is equal to or less than the maximum rice water determined for that year, the land will be classified as Suitable • If the rice water use is greater than the maximum rice water use for that year, the land will be classified as Unsuitable
Marginal	Rice can be grown on the area 1 in every 4 years. Rice soil suitability testing may be undertaken to determine if the area could be reclassified as Suitable.
Unsuitable	Rice must not be grown on the area
Unclassified	Rice must not be grown on the area. Rice soil suitability analysis may be undertaken to determine if the area is suitable for rice growing.

4.3.1.3 Rice soil suitability assessment

Soil assessments for rice growing were undertaken by accredited soil surveying contractors. Rice growers pay for the rice soil assessment to be undertaken. The process consists of two stages, an EM31 survey and if required, followed by soil sodicity testing

The adoption of EM31 and soil sodicity criteria has made the identification of soils suitable for rice growing a more accurate process. It has resulted in more efficient and appropriate use of water resources and assisted in the reduction of groundwater recharge.

4.3.2 Rice Growing Recommendations

Murray Irrigation strongly recommends rice growers access the Approved Rice Soil Suitability Map prior to sowing a rice crop and only grow rice on the appropriate areas based on the rice soil classifications.

Murray Irrigation strongly encourages customers to undertake rice soil suitability testing on land that not been previously classified for rice growing, land that was previously classified as marginal or land that has recorded a high rice water use. The benefits of the testing are that the customer can be confident the rice crop is being grown on soil suitable for rice growing and ensure efficient use of water. The testing may reveal a small area within the paddock that is unsuitable for rice growing that can be removed from rice growing allowing the remainder of the paddock to be suitable for rice growing.

For a detailed explanation of the process request the '*Rice Soil Assessment Process'* from Murray Irrigation.

Murray Irrigation may contact rice growers when it has been identified that rice is being grown on land that has been classified as unsuitable for rice growing, unclassified for rice growing or out of rotation for land classified as marginal for rice growing.

Murray Irrigation may discuss with rice growers any exceptionally high rice water use or exceptionally low rice water use to ensure accurate reporting on the rice water use within the area.

All discussions will rice growers regarding rice water use or rice soil classification will be advisory and based on Murray Irrigation and the rice grower working cooperatively to discuss the situation. Murray Irrigation may recommend the rice grower consult either Rice Extension staff, an agronomist or soil surveyor to discuss potential options.

5 Appendix A: Watertable, groundwater and salinity

The watertable level is the surface below which all the spaces in soil and rock are filled with water. Water in the saturated zone is called groundwater. Water moving downwards past the root zone is called leakage. Leakage that reaches the saturated zone is called groundwater recharge. Irrigation salinity occurs due to increased rates of leakage and groundwater recharge causing the watertable to rise. Recharge rates are higher in irrigation areas due to leakage from both rainfall and irrigation.

Watertable within two metres of the soil surface indicate the potential for waterlogging and salt accumulation on the surface.

Watertable levels are managed at both a regional level and individual farm level. Watertable levels rise and fall over time, they are influenced by climate and hydrological loading to the land over extended periods of time. Hydrological loading to the land can be in the form of either rainfall or supplied irrigation water.

Causes of irrigation salinity. Source: Slinger & Tenison (2007).