

Why trees and shrubs?

Salinity in Tasmania most commonly occurs in the drainage lines of undulating land in the drier areas of the State. Removal of native trees and shrubs from the higher areas has meant that more rainfall now infiltrates past the root zone of annual pasture plants; this is referred to a “leakage”. The water moves through the subsoils or over a clay subsoil towards the drainage lines in the valleys. Generally the valleys contain more clay and this restricts the subsurface movement of this groundwater, forcing it to the surface.

Groundwater generally contains some salt, originating from wind and rainfall, and from the weathering of minerals in the soil. Water movement transports the salt to the valleys and streams. Plants take up water and leave most of the salt in the soil. If there are shallow watertables then salts are brought into the root zone and to the surface of the soil. This sometimes leads to salt scalds.

The higher areas where rainfall infiltrates to the groundwater are called **recharge** areas. The lower areas where groundwater comes to the surface are called **discharge** areas.

Trees and shrubs use more water than crops and annual pastures, so they help to reduce the amount of leakage in recharge areas. They use water that might otherwise move through the subsoil into streams or discharge to the soil surface as springs and soaks.

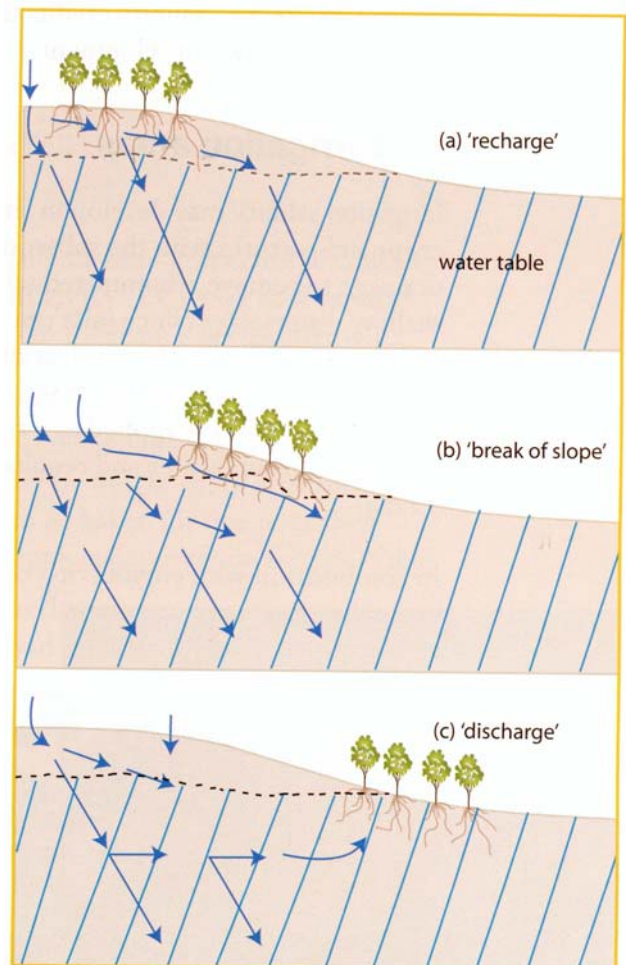
Where to locate plantings

The logical sites for plantings are:

- Recharge areas; on ridges and higher land where water from rainfall leaks to the groundwater. Here the aim is to use water where it falls before it can move to lower parts of the catchment.
- Mid-slope (or break of slope) areas, where water moves laterally from recharge to discharge areas. Plantings in these areas will only be effective if the water is within the root zone of the trees and shrubs. However, these interception plants can be very effective in capturing the lateral movement of water before it can accumulate in the valleys.

- Discharge areas. Trials to date have shown that establishing trees and shrubs in these areas has rarely been successful in Tasmania.

These planting sites are indicated in Figure 1 (from Marcar and Crawford, 2004).



Plantings in discharge areas need to tolerate both salinity and waterlogging. In Tasmania the lower areas are also more subject to frost. Trees and shrubs in these locations need to be extremely hardy.

Where plantings are to be established in discharge areas, it is best to extend the planted area outside the zone of highest salinity. Successful establishment in the lower salinity areas will provide shelter and improve the environment for trees and shrubs to establish in the higher salinity areas.

How large should the plantings be?

The hydrologic processes in Tasmania are complex, so it is difficult at this stage to be sure how large plantings need to be to influence salinity. Logically, plantings in recharge areas should affect the amount of water moving to discharge sites in proportion to the recharge area. It is generally considered that the larger the planting, the greater the effect on water movement and salinity.

Larger plantings will reduce the area of land available for normal farming enterprises, but they will provide economic benefits either directly through the sale of timber, or indirectly through environmental benefits (e.g., shelter, biodiversity and reduced waterlogging and salinity).

Mid-slope plantings intercept water moving to lower parts of the landscape. Although the size of these plantations cannot be precisely determined, it is generally recommended that plantings be a minimum width of 5–10 rows of trees across the slope. Mainland research has shown that small blocks or strips use more water (per unit area) than larger blocks, due to competition between the trees.

Site assessments

Private Forests Tasmania has developed procedures for the assessment of sites for plantations. Landowners are encouraged to seek their advice when planning plantations (in saline and non-saline environments).

Site assessments consider the purpose of the intended planting, landscape position, soil conditions and rainfall, and other environmental and climatic conditions. The most important issue is to be clear about the outcomes expected from the plantation. This will have a major bearing on the species to be planted.

Species selection

There are many trees and shrubs to choose from, depending in particular on whether timber production is a requirement. Advice on suitable trees and shrubs is available from Private Forests Tasmania, Greening Australia, nurseries and consultants.

There have been a number of trials in Tasmania to assess the performance of trees and shrubs in soils with moderate to high salinity, combined with seasonal waterlogging. A number of *Eucalyptus*, *Allocasuarina* and *Acacia* species have performed well. In addition, a range of hybrid eucalypts is being evaluated.

A very detailed list of trees and shrubs with their salinity, drought and frost tolerance is available in Finnigan and Poulton (2005).

Mediterranean Saltbush (*Atriplex halimus*) has performed well in harsh climatic conditions in some areas of Tasmania, and in NSW. This species is showing great potential for salinity management, but further trials are required in a wider range of environments. It does not appear to be particularly tolerant of waterlogging.

Site preparation and tree establishment

It is important to note that if a plantation will be harvested for timber, or is greater than 10 hectares, or the plantation is to be within Vulnerable Land (under the Forest Practices Act 1985), then Council approval may be required along with the creation of a Private Timber Reserve. A certified Forest Practices Plan may be needed. It is best to check these requirements with Private Forests Tasmania or a consultant early in the planning stage.

Site preparation usually includes spraying for weed control, ripping and mounding, possibly surface drains and fencing. There have been many failures because these requirements have not been properly addressed. Professional advice is recommended.

Plantations are usually established with seedlings, as there are usually plans for commercial harvesting where superior selections of tree species are planted. Mixed plantings where timber will not be harvested are amenable to direct seeding. This is a much cheaper option, although results are more variable.

Plantation management

Weed competition is often a major problem while trees are establishing; with spraying and slashing generally needed for the first 2–3 years. It is important to seek advice regarding the most suitable herbicides.

Plants that are stressed, for example by high soil salt levels or waterlogging, are more susceptible to insect pests and disease. Insect pests, diseases and browsing native animals can decimate seedlings very quickly. Regular inspections are needed, with application of control measures where necessary. It is therefore essential to carefully manage trees planted in these situations.

Further reading: Finnigan, J. and Poulton, R. 2005. Trees and Shrubs for Salinity Management in Tasmania. Australian Forest Growers and Private Forests Tasmania.

Marcar, N.E. and Crawford, D.F. 2004. Trees for Saline Landscapes. RIRDC. # 03/108