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Saving the catchments of Albany’s harbours

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Fertiliser, particularly phosphorus, running off farm land is a major source of nutrient entering Albany’s harbours. Oyster Harbour, which has a large rural catchment, is especially at risk.

The build-up in nutrients in the harbours has caused nuisance algal growth since the early 1970s and subsequent death of more than half the seagrass beds, which are vital to the area’s marine life.

The Department of Agriculture, at the request of the Environmental Protection Authority, has developed and promoted catchment management plans that enable rural land holders to reduce the amount of fertiliser run-off into the harbours without necessarily sacrificing farm productivity.

Industry and urban sources of pollution were also targeted. Harbour-side industries and both the Town and Shire of Albany have to reduce the amount of nutrients reaching the harbours. Industries such as CSBP, and Southern Processors, are working hard to reduce the impact their effluent has on Princess Royal Harbour.

The nutrient load must be reduced within a certain time. For Oyster Harbour, phosphorus inputs from rural sources must be reduced to between 7 and 14 tonnes by 1994, and for Princess Royal Harbour to 7 tonnes immediately if the remaining seagrasses are to be saved.
**Soil studies**

Studies have shown that clearing sandy surfaced soils with low nutrient holding capacities and traditional farming practices are partly responsible for the decline in the harbours’ water quality.

Annual applications of phosphorus fertiliser allow productive pastures to be grown in the catchment. However, some of this fertiliser finds its way to the waterways and estuaries, and this has allowed algae to build up to the detriment of the once abundant seagrasses.

There are 312,000 ha in the catchments of both harbours, including 59,000 ha of reserves and 212,000 ha of cleared private land. More than 90 per cent of the privately-owned land is cleared in the catchments draining into Princess Royal and Oyster Harbours.

In 1988 and 1989, the Department of Agriculture took 2650 soil samples from 300 farms in the catchment and analysed them for nutrient status. Farmers were also asked about their agricultural practices that may have influenced nutrient losses from farm land.

**Major findings of the survey**

- Soil tests showed that more than half the soils in the Albany harbours catchment did not need a phosphorus fertiliser for at least 12 months. However, a phosphorus fertiliser was applied to nearly all soils each year. Only a small number of farmers used soil test results or technical advice to decide whether fertiliser was needed.

This unnecessary fertiliser cost farmers more than $2 million, money that could have been better spent correcting other nutrient deficiencies, such as potassium and sulphur, and soil acidity and salinity.

- More than 80 per cent of phosphorus fertilisers were applied before the end of May, before pastures germinated and before soils became wettable.
• The better quality soils were cleared first, and the lighter textured soils developed last.

• Forty-four per cent of samples collected came from paddocks cleared more than 30 years ago. These soils have more than 800 ppm reactive iron and do not leach phosphorus. Sandy soils developed relatively recently contained only 25 per cent of high reactive iron soil types.

• Thirty-four per cent of all soils were acidic and needed liming to gain most benefit from fertilisers.

• Phosphorus fertilisers were applied to 90 per cent of paddocks that would not respond, while about 30 per cent of paddocks that would benefit from added phosphorus did not get any.

• Throughout the community there were misconceptions about the environmental problems of the Albany harbours and how they were caused.

The survey also showed that the phosphorus level in sandy soils did not increase after years of phosphorus application, but the level of phosphorus in heavier soils was still increasing. In many cases where superphosphate was used, any plant responses would have been due to the sulphur content and not the phosphorus.

Based on the findings of the survey, the Department of Agriculture developed a strategy to reduce the nutrient input to the harbours from rural sources. The strategy considers management of existing land and management of future land uses.

Reducing nutrient run-off
Management of existing land uses means changing some land management practices to reduce both the concentration of nutrient in run-off and reducing the amount of water leaving the farm. Practices that would be helpful related closely to the findings of the survey.

Soil tests
Regular soil tests to determine the need for fertiliser applications should avoid excessive applications and reduce the risk of high nutrient concentrations in run-off.

The Department of Agriculture has developed a computer model, PHOSUL-K, to help in this process. This model makes a fertiliser recommendation to maximise profit in the
Fringing vegetation is sparse on this section of a southern river. Photo: Luke Pen.

Healthy vegetation fringes the banks of this southern river. Photo: Luke Pen.

This article incorporates substantial contributions from David Weaver, Research Officer, Albany.

next 12 months. It does this by relating soil nutrient status, the price of various fertilisers, and the profitability of the farming enterprise to a recommended fertiliser type and time of application. The model is continually being updated and demonstrated to farmers in high rainfall areas in the south-west of Western Australia.

Framing vegetation

Erosion control
Run-off can be reduced and erosion controlled by protecting the remaining vegetation on the farm and planting perennial pastures in suitable areas. Paddock plant cover should be left high enough to prevent erosion, and drainage of swamps and wetlands avoided. Fencing creek lines to protect them from grazing by stock allows the vegetation to act as a filter to sift out the phosphorus-carrying clay and silt from entering the creek lines. Perennial pastures do the same job.

Soil amendments
The use of soil amendments, such as lime, should be considered where soils are acidic and pH is less than 4.3.

Farm plans
Alternative land uses should be investigated for some of the problem soil types. Farm plans can be drawn up to identify land management units that need different management practices.

Trees and perennial pastures
The use of deep-rooted and perennial pasture species will increase water use, help to dry out the soil profile and encourage greater infiltration of rainfall. This increased water use on the farm should reduce the volume of run-off and, as a result, the amount of nutrient entering the harbours should decrease.

Future land use
A major role for land managers when planning future land use is to ensure that mistakes made in the past are not repeated. The land must not be used for purposes for which it is not suitable.

The Department of Planning and Urban Development has set some objectives to help decision makers when considering future land use. The main objectives are to:

• provide a framework for planning in rural areas;

• enable rural land to be managed to maximise opportunities and to provide for the needs of the community;

• maintain environmental quality;

• provide a framework for resolving conflict; and

• plan for desirable land use change.

Planning should guarantee that key natural resources such as water, soils, minerals, timber and areas of ecological significance are conserved and protected from land use and management practices that cause their destruction or degradation.

Various agencies such as the Department of Planning and Urban Development are producing regional plans that address these issues and suggest how problems should be tackled. Shire councils are producing local rural strategies that address sensitive environmental issues. Land conservation districts are preparing farm and catchment plans, all of which are designed to overcome land degradation problems. In the case of the Albany harbours, the problem is off-site and an integrated approach is needed to solve it.

This integrated approach is represented by several agencies working within the South Coast Estuaries Project Group, based at the Department of Agriculture’s Albany office. The success of the project depends on total community involvement at all levels of decision making, a necessity for integrated catchment management to work and achieve results.

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