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Land capability and land use in the Leeuwin-Naturaliste region

By Peter Tille and Neil Lantzke, Advisers, Division of Resource Management

The Leeuwin-Naturaliste region is one of Western Australia’s most beautiful areas. Located in the far south-west corner of the State, it is a popular scenic and tourist spot, as well as supporting grazing, horticultural and viticultural enterprises.

Outside of Perth the region is the most popular tourist destination in the State. It is also responsible for about a quarter of the State’s milk production, 15 per cent of the State’s potato production and a quarter of the State’s wine grapes.

Many new agricultural enterprises have opened up in the past 15 years, and the population has increased by almost 40 per cent in that time.

These new developments have led to increased pressure on land use. The Department of Agriculture conducted a land capability study in the region in 1986 and 1987, and the results of this study are being used to improve land use planning.

The Leeuwin-Naturaliste region plan

The Leeuwin-Naturaliste region incorporates the Shires of Busselton and Augusta-Margaret River (Figure 1).

Traditionally most of the land was used for grazing. While this is still the case, there is now an increasing number of competing demands for land for horticulture, rural retreats, hobby farms, urban expansion, mining, tourist developments and conservation.

In 1985, the State Government decided to prepare a regional plan “to minimize disagreements about how the area is to be used and to ensure that the area achieves a development potential that recognized both its many attractions and its sensitivity to misuse” (State Planning Commission, 1987).

The regional plan is co-ordinated by the State Planning Commission, and the Busselton-Margaret River-Augusta land capability study was prepared by the Department of Agriculture. The study provides information about the land resource and its capabilities which are essential to any planning exercise.
The land capability study

The Busselton-Margaret River land capability study, funded by the National Soil Conservation Program, covers an area of 2,710 sq. km. This includes all the freehold land in the Shires of Busselton and Augusta-Margaret River. The area's land uses were surveyed in 1986-87 and a map of the land resources prepared. This map shows the distribution of 'land units' which were defined according to soil type, topography, drainage and wind exposure. The study also included information on the climate and the availability of surface and ground water.

The second stage of the study was to assess land capability, or the ability of the land to sustain a specific use without undesirable on-site or off-site effects. Physical attributes (or land qualities), such as soil fertility and water erosion hazard, of each of the land units were compared with the requirements of several land uses. A capability rating was derived for each land unit for the following land uses: grazing, market gardens, vineyards, orchards and forestry.

Land units and productivity

By combining the information collected during the study with that from the land unit maps, the study team created several interpretive maps which present the information in a simple form.

About 70 per cent of the study area is suited to grazing. This is not surprising as the region contains some of the State's best grazing land and much of this country is still used for grazing. Among the areas with a lower capability for grazing are large tracts of deep sandy soils which do not support good pasture growth because of poor nutrient levels and poor moisture retention. In coastal areas these soils are also highly susceptible to wind erosion.

Other areas with poor capability for grazing are those with shallow stony soils or those subject to severe waterlogging. In some cases where these less capable soils have been cleared of natural vegetation and used for grazing, some areas have suffered wind and water erosion or become saline.

Despite the recent growth in the horticultural industries, grazing remains the most important agricultural activity in the region.
Land with a high capability for horticulture is much less than that for grazing (Figure 2). Much of the good grazing country is not suitable for horticulture because of the limited availability of water, poor drainage and the risk of water erosion or exposure to wind. However, the yellow-brown Spearwood Sands on the Swan coastal plain near Busselton which are not highly suitable for grazing can grow horticultural crops. These sands have good drainage, are underlain by high quality groundwater supplies and cover an area of 75 sq. km.

Although horticultural activities only occupy about 1 per cent of the agricultural land at present, they contribute almost a third of the total gross value of agricultural production (Table 1).

The deep bleached Bassendean Sands on the Swan coastal plain also show promise for horticultural production. These sands cover an area of 47 sq. km. They are not used for horticulture in the south-west and are generally considered to have little agricultural potential. However, with suitable management they are producing profitable market garden crops near Perth.

Intensive horticulture on either the Spearwood or Bassendean Sands requires high inputs of fertilizers to produce good crops. Nutrients leach rapidly from these sands, and there is a risk of groundwater pollution and eutrophication problems developing in the Vasse and Womerup estuaries, similar to those experienced in the Peel-Harvey Estuary south of Mandurah.

The other main area on the Swan coastal plain with a high capability for horticultural use is a patch of alluvial soils covering 50 sq. km and stretching from Marybrook, through Carbanup to Jindong. Much of this area is used for market gardening, as are the alluvial soils along the Margaret River.

In the hills and valleys of the uplands the risk of water erosion is often too great for market gardening, but there are many areas suitable for vineyards and orchards. Most of the vineyards are situated on the gravelly soils of the valley slopes located between Bussell Highway and Caves Road, however, there are many similar areas east of the highway which may also be suitable for vineyards or orchards. More reliable water supplies can often be found east of the highway, but the risk of frost damage is greater than on land further west.

About 15 per cent of the study area has a high capability for horticultural production, with only about a third of this being suited to market gardening. Some of this land has already been set aside for forestry, the Ludlow National Park, sand mining, urban development and special rural zones, leaving the horticultural industries, and market gardening in particular, little room for expansion.

Using the information

Information collected during the study was used in the preparation of the Leeuwin-Naturaliste Region Plan. In this plan certain areas have been designated intensive agricultural zones in recognition of the role of horticulture in the region’s economy and the potential for future expansion. Restrictions will apply in these zones, limiting the extent of subdivision.
As a general guideline areas with a good capability for market gardening and sufficient water supplies will not be subdivided into lots smaller than 20 ha, while areas with a good capability for vineyards and orchards will not be subdivided into lots smaller than 30 ha. This strategy will help maintain viable lot sizes for these enterprises, and ensure that land prices and rates do not rise to levels which are likely to force horticulture out of these areas.

To minimize potential conflicts between agricultural activities and other uses the plan states that "residential, tourist or commercial uses should not be supported in areas with high agricultural potential unless such use is incidental or complementary to the predominant use."

Other areas have been identified in the plan where controls over land use will need to be enforced. These include much of the western slope of the ridge between Cape Naturaliste and Cape Leeuwin, where there is a high risk of wind erosion, and the wetlands along the coast behind Busselton.

Once the areas with high horticultural potential or high degradation risk are delineated, other areas suitable for subdivision into rural living areas can be identified. One example is the Biddle Road rural living area identified in the Leeuwin-Naturaliste Region Plan.

The present rural land rating practices appear to be reducing the viability of farms in some areas and the planning authorities are considering altering the rates structure. Unless an area is earmarked for subdivision, rates should be in line with the land's agricultural capability rather than its potential value for housing. A rational rating policy would decrease financial pressures on landholders and help promote sensible land use.

The information provided by the Busselton-Margaret River-Augusta Land Capability Study is also being used by local government authorities. On a broad scale the maps are being used to develop rural strategy plans. At a more detailed level the maps are of assistance when assessing specific development or subdivision proposals. However these maps are not intended to provide a 'final say' with regards to land use decisions, rather they help provide a framework for making these decisions. Maps indicate what will be found on the ground, and what to look for, but they can never replace on-site investigations.

The results of the study are widely used by consultants planning developments or subdivisions. The maps assist them to select the best use of the land and help them identify areas of

<table>
<thead>
<tr>
<th>Item</th>
<th>Area (ha)</th>
<th>Gross value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Livestock slaughtered and other disposals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Cattle and calves</td>
<td>96,011</td>
<td>37,480,000</td>
</tr>
<tr>
<td>- Other</td>
<td>18</td>
<td>157,000</td>
</tr>
<tr>
<td>Livestock products</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Whole milk</td>
<td>6,841</td>
<td>2,172,000</td>
</tr>
<tr>
<td>- Wool</td>
<td>18</td>
<td>157,000</td>
</tr>
<tr>
<td>- Other</td>
<td>72</td>
<td>409,000</td>
</tr>
<tr>
<td>Total</td>
<td>137,738</td>
<td>53,133,000</td>
</tr>
<tr>
<td>Pastures and grasses</td>
<td>96,011</td>
<td>37,480,000</td>
</tr>
<tr>
<td>Potatoes</td>
<td>354</td>
<td>6,841,000</td>
</tr>
<tr>
<td>Other vegetables</td>
<td>177</td>
<td></td>
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<td>Total vegetables</td>
<td>531</td>
<td>6,841,000</td>
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<tr>
<td>Total fruit</td>
<td>18</td>
<td>157,000</td>
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<tr>
<td>Total grapevines (bearing and not yet bearing)</td>
<td>509</td>
<td>9,579,000</td>
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<tr>
<td>Production of grapes for winemaking or distillation</td>
<td>1,773 tonnes</td>
<td>2,172,000</td>
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<tr>
<td>Wine made (b) - unfortified</td>
<td>770</td>
<td></td>
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<tr>
<td>- fortified (c)</td>
<td>20</td>
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</tr>
<tr>
<td>Nurseries</td>
<td>72</td>
<td>409,000</td>
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<tr>
<td>Total horticulture</td>
<td>1,130</td>
<td>9,579,000</td>
</tr>
<tr>
<td>Total all crops</td>
<td>15,649</td>
<td></td>
</tr>
<tr>
<td>Total all agricultural commodities</td>
<td>137,738</td>
<td>*53,133,000</td>
</tr>
</tbody>
</table>

(a) Excludes establishments with an estimated value of agricultural operations less than $20,000.
(b) Represents wine made in the area regardless of the area in which the grapes were grown.
(c) Includes spirit for fortification.
Horticulture occupies about 1 per cent of agricultural land but it contributes almost a third of the total gross value of agricultural production in the region.

Waterlogging is a major constraint to plant growth over much of the study area.

The alluvial soils in the Marybrook and Findon districts are the main focus of market gardening activities.
possible concern to the planning authorities. The consultants can then develop an initial plan which is more likely to be approved, thus speeding up the planning process.

Studies on the future expansion of the horticultural industry, which incorporated data from the Busselton-Margaret River-Augusta Land Capability Study, have been undertaken (AACMC and AGC 1987, Moore, unpub.). These studies extend well beyond the bounds of the Leeuwin-Naturaliste region. One of the aims is to plan for future allocation of water resources in the south of the State.

The results of the study have been put to a wide range of other uses, many of which were not anticipated by the authors. These include the preparation of a management plan for the Leeuwin-Naturaliste National Park. The study has also identified areas with the potential for growing certain crops, such as seed potatoes and table grapes, as well as areas where an arum lily outbreak is likely to occur.

The Department of Conservation and Land Management uses the maps to locate areas of different soil types in the fight against the spread of jarrah dieback disease. The Environmental Protection Authority has used the information to produce maps showing soils in the catchments of the Vasse and Wonerup estuaries which could leach high loads of nutrients.

People who are interested in buying land in the region have also found the study useful, as have students and researchers.

Bibliography


The deep bleached sands are traditionally considered to have little value agriculturally. However, good vegetable crops are now being produced from similar sands near Perth.

The subdivision of rural land in the Leeuwin-Naturaliste region is one of the major issues facing planners.