

# TAKE THE GUESSWORK OUT OF LAND USE DECISION MAKING



## SOIL SURVEY FOR WISE LAND MANAGEMENT

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SOILFACTS NO. 2

### Evaluating our land

It is critical that the properties of the land and its soils be appraised before we choose the purpose for which the land is to be used, or the types of management practices to be followed. This will avoid mistakes that can be both costly to the user and permanently damage the land itself.

Land evaluation is a key process for sound land use planning by landowners, local and State government agencies, statutory authorities, rural community groups, or by society as a whole. Land evaluation can help optimise land use where our demands and objectives are multiple and often conflicting. Land evaluation is essential in identifying best land management practice.

As an example, the community may need to decide whether a proposed feedlot development on a parcel of land is indeed within the capability of the land as well as whether it is the most appropriate use of the land. To answer these questions, there must firstly be an understanding of the natural resources of the land. Only then can the direct impact of the proposed land use and its subsequent off-site effects be effectively considered.

### Soil survey and mapping

Soil surveys are essential to most land use decision making. The purpose is to study, classify, describe and map soil properties (such as chemical and physical composition, erodibility, fertility, etc.) so that predictions can be made about soil capability for various uses as well as their response and sustainability under particular management. In other words, how will this land use affect the soils, and how will these soils affect the land use?

The Soil Conservation Service of NSW launched the current series of soil survey maps in 1989. Soil landscape maps and accompanying reports involve the collection and interpretation of data, which is

essential for the broad planning of land use, land management, and the prevention and remediation of land degradation.

The Department of Land and Water Conservation is committed to completing the task of mapping the soil landscapes of eastern and central NSW. This will provide a clear and consistent picture of the soils across NSW in a landscape context for:

- resource allocation to address land and water quality degradation issues;
- identifying areas where sustainable development opportunities exist; and
- providing a reliable base for land use and land management decisions.

Preparing each soil landscape map and report requires several years of work. This involves:

- the use of satellite imagery and air photo interpretation;
- thousands of soil and landscape observations;
- hundreds of detailed soil descriptions;
- laboratory analysis for selected profiles;
- a range of interpretations and classification of data; and
- the production of a comprehensive report, an accompanying map and a series of derivative maps.

SOILFACTS

The information can be combined and recombined in a number of ways to produce a surprisingly large number of solutions to regional landscape management problems.

Soil landscape mapping is the preferred method of collecting resource information applicable to the management of the State's soil resources. It is a style of mapping suited to the broad scale necessary to cover an area as large as NSW. The NSW soil landscape method allows soil information to be incorporated in greater detail than for other styles of mapping at the same scale.

The "soil landscapes" concept recognises that soils are naturally occurring entities. The landscape (land surface shape, soil parent material and vegetation) can be used to distinguish mappable areas of soils because the formation of landscapes and soils is interrelated. Both have been subject to the same processes and influences over time.

Soil landscapes provide a means to merge soil and landscape qualities into a single mapping unit, recognising that land management constraints relate to both land and soil limitations. Soil landscapes are also the key to understanding catchment processes and can help predict how ecosystems and hydrology will react if an aspect of the catchment is altered.

## WHAT IS A SOIL LANDSCAPE?

A soil landscape is an area of land with identifiable features and characteristic soil types.

Each soil landscape map shows the distribution of soil landscapes with a brief summary of the soil and landscape features. Soil landscape maps cover the same area as standard contour maps of the same scale.



Soil landscape reports include information for each soil landscape on:

- geology/rock types
- regolith
- landforms and slopes
- native vegetation distribution
- current and historical land use
- severity and types of land degradation
- detailed soil descriptions and locations where typical soils can be seen
- diagrams of soil occurrence patterns
- soil and landscape properties that affect development
- soil fertility assessments and tables of soil test results and interpretations
- soil erodibility and erosion hazards
- urban capability
- rural capability

Most natural resource management and land use decisions need to include a consideration of soil conditions. Our agriculture, pastures, forests and native plants depend on the soil. Soil properties are also important for designing our roads, buildings and infrastructure foundations.

## Specific purpose maps for land use decision-making

Each soil landscape map and report can be interpreted in a number of standard ways to produce derivative maps. Derivative maps combine and filter soil landscape information to show how soil and land varies in its behaviour or suitability for specific purposes. This means that maps can be presented to help resolve specific issues, without people having to build complex combinations of information from scientific results buried in reports. Derivative maps may include but are not limited to:

- urban land capability
- limitations to urban development
- physical capability for paved local roads and streets
- foundation stability
- limitations for building foundations
- rural land capability
- degree of physical limitations to rural development
- limitations to cultivation on quality agricultural land
- propensity to soil structure decline on cropping and grazing lands
- soil fertility
- capability for construction of small farm dams
- capability for agro-forestry

- capability for farm forestry
- capability for on-site effluent absorption
  - trench system
  - sub-surface irrigation system
  - irrigation system
  - mound bed system
- ease of installation of underground services
- soil capacity to assimilate pollutants
- water erosion risk
- off-site phosphorus export hazard
- dryland salinity hazard
- sodic soils, saline materials and salinity hazard
- soil acidification risk
- surface soil pH
- high watertables
- seasonally waterlogged, inundated or flooded areas
- soil profile permeability or highly permeable soils
- mass movement— occurrence or potential
- native vegetation distribution as determined by soil landscapes
- regional soils and associated forest types

This is not an exhaustive list, but indicates specific interpretations that have been made of soil landscape information to date.



*Information about the land and its soils will assist wise land use decision-making.*

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Soil landscapes and derivative products are designed for regional decision making, providing only an indication of what can be expected at any particular site. They are not designed for critical or expensive land use decisions for specific sites. In such cases, there is no substitute for site and soil inspection.



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