Chapter 12 — Human activities

Human land use and records

Changes in land use over the period since development, when associated with the rainfall pattern over time (see ***Moving average rainfall pattern*** page 56), can indicate possible risk areas. Areas may have been abandoned for cropping for a number of reasons. To assess whether salinity was a factor, the suspect area should be analysed for landform and geological contributing features (see ***Landform feature identification*** page 39 and Geology page 42).

Sources of information

There are a number of excellent sources of information on historical land use:

- Current and past landholders may be able to provide information about the history of the area, the timing and effects of clearing such as the development of local springs, and changes in water level and water quality in bores or wells.
- Sequential aerial photography—available from the 1940s in some areas and the 1920s in other areas—is available from DERM and, in some cases, the RAAF.
- Historical land use information relevant to the area under investigation may be listed with the Queensland Spatial Information Council, a computerised directory of land-related information.
- Landsat imagery (for large-scale investigations) is available through Sunmap and other sources.
- Local historical societies and published histories of the local area often provide valuable information.

When seeking information on land use over time and its effects, look for the following features in particular:

- information about the property itself, as well as other properties in the same catchment, especially those upslope from the property in question
- types and time periods of land use and why a particular land use (such as cultivation) was discontinued
- patterns of clearing—which parts of the landscape were cleared, and when
- patterns that indicate patchy growth or wet areas, and relationships with the rainfall pattern
- areas where dams or weirs may have been built, even if these barriers no longer exist.

Interpretation

When analysing information on land use, consider whether the following effects, commonly associated with different land uses, have been in evidence in the area under investigation.

Cropping (irrigated and dryland)

Clearing land for crops can contribute to watertable and seepage salting when vegetation is removed which previously maintained the watertable at a depth below the soil surface where capillary rise was not significant. Fallow periods and some minimum tillage treatments can enhance recharge to the watertable. However, because of soil and aquifer characteristics, salting may not appear in the landscape until 20 to 50 years after initial clearing.

Under irrigation, the greater volume of water being introduced to the system can raise the watertable and lead to watertable and seepage salting. Under these conditions, salting may appear much sooner.

Salts in irrigation water can contribute additional salts to soils being irrigated, causing irrigation water salting. This process can occur over periods of two to ten years. Increasing soil sodicity (which can result from using moderately to highly sodic water) also degrades soil properties.

When cropping practices leave the soil surface bare during periods of high rainfall or when the active growth period of the crop is too short to use the available water, the soil is vulnerable to erosion, contributing to erosion scalding on susceptible soils during major rainfall events.

Grazing (irrigated and dryland)

As for cropping, when land is cleared for pasture, vegetation is removed which previously maintained the watertable at depth below the soil surface. Salting may appear 20 to 50 years after initial clearing.

Grazing lands in susceptible areas can be at risk of erosion scalding. When over-grazing in dry periods removes vegetation from the soil surface in areas with sodic subsoils, the soil is vulnerable to erosion scalding. Erosion scalding can also be seen around watering points, depending on how many there are and where they are positioned.

Residential subdivision

Subdividing rural land into rural residential blocks can contribute to salinity in much the same way as land clearing and irrigation. When the development is occupied, increased amounts of water and nutrients are introduced into the system via wastewater and septic systems. Reticulated water supplies to developments, particularly those not serviced by sewerage, enhance recharge to groundwater and the likelihood of watertable salting in susceptible landscapes. However, compensatory managements, such as managed tree planting, enhanced use of groundwater (instead of reticulated water) and spray irrigation of properly treated waste effluent on an appropriately sized area, will assist in limiting watertable rise.

Roads and dams can become barriers to water movement or sources of additional water. Salting can occur upslope of roads and upstream or downstream of dams.

Practical example

Data derived from aerial photographs (see Figure 51) depict the expansion of a salt-affected area in a small catchment in the Lockyer Valley. The salt-affected area on Darbalara Farm has reached an equilibrium size (following clearing) which fluctuates according to long-term rainfall patterns.

Figure 51. Development of salt scald in response to land clearing and rainfall pattern in a small catchment in south-east Queensland.