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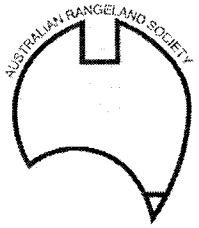

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STATE OF THE COMMONWEALTH: FACTORS AFFECTING CONDITION WITHIN THE COMMONWEALTH LAND SYSTEM OF THE KINGOONYA SCD IN FAR NORTH SA

A. Ben Kahn[1], A. Friedel[2], S. Lawson[2,4] and C. Osborn[3]

[1] 9 Waite Street, Ethelton, SA 5015
[2]Rural Solutions SA, Department of Primary Industries and Resources,
PO Box 356, Port Augusta, SA 5700
[3]Pastoral Management Branch, Department of Water, Land and Biodiversity Conservation,
Port Augusta, SA 5700
[4]Corresponding author.Email: lawson.simone@saugov.sa.gov.au

ABSTRACT
The Commonwealth land system in the former Kingoonya Soil Conservation District of South Australia is highly susceptible to disturbance and its ability to recover is variable, depending on physical influences present. Pastoral Lease Assessments, required under the *Pastoral Land Management and Conservation Act (1989) (SA),* revisits permanent monitoring points enabling long-term comparisons to be made. Factors affecting condition can include fire, rainfall, grazing and pastoral management practices. Combined, these may result in destabilisation, including erosion of surface soil layers and a permanent change in plant community structure and diversity. Photo comparisons are a useful tool, improving our knowledge of how a land system responds to a variety of factors.

INTRODUCTION
The pastoral leases of the former Kingoonya Soil Conservation District's (referred to as the Kingoonya District in this paper) in the Far North pastoral zone of South Australia are currently being assessed for land condition. This process provides an opportunity to examine changes in the condition of land systems over time. The Commonwealth land system is vulnerable due to its sandy nature and is constantly undergoing change in its structure and diversity. Factors affecting the condition of this land system include erosion, regeneration, grazing and the encroachment of unpalatable species. With repeated collection of information at permanent monitoring sites we can begin to identify possible trends within the Commonwealth land system.

THE COMMONWEALTH LAND SYSTEM
The Kingoonya District has 17 land systems. Each land system is defined by specific geology, topography, soils and vegetation. The Commonwealth land system is characterised by sandy topsoil with mulga (*Acacia aneura*) low open woodland with a mixture of shrubs and ground cover species including pearl bluebush (*Maireana sedifolia*), crimson turkey-bush (*Eremophila latrobei*), satiny bluebush (*Maireana georgei*) and woollybutt (*Eragrostis eriopoda*) (McDonald, 1992). Figure 1 identifies the distribution of the Commonwealth land system within the Kingoonya District.

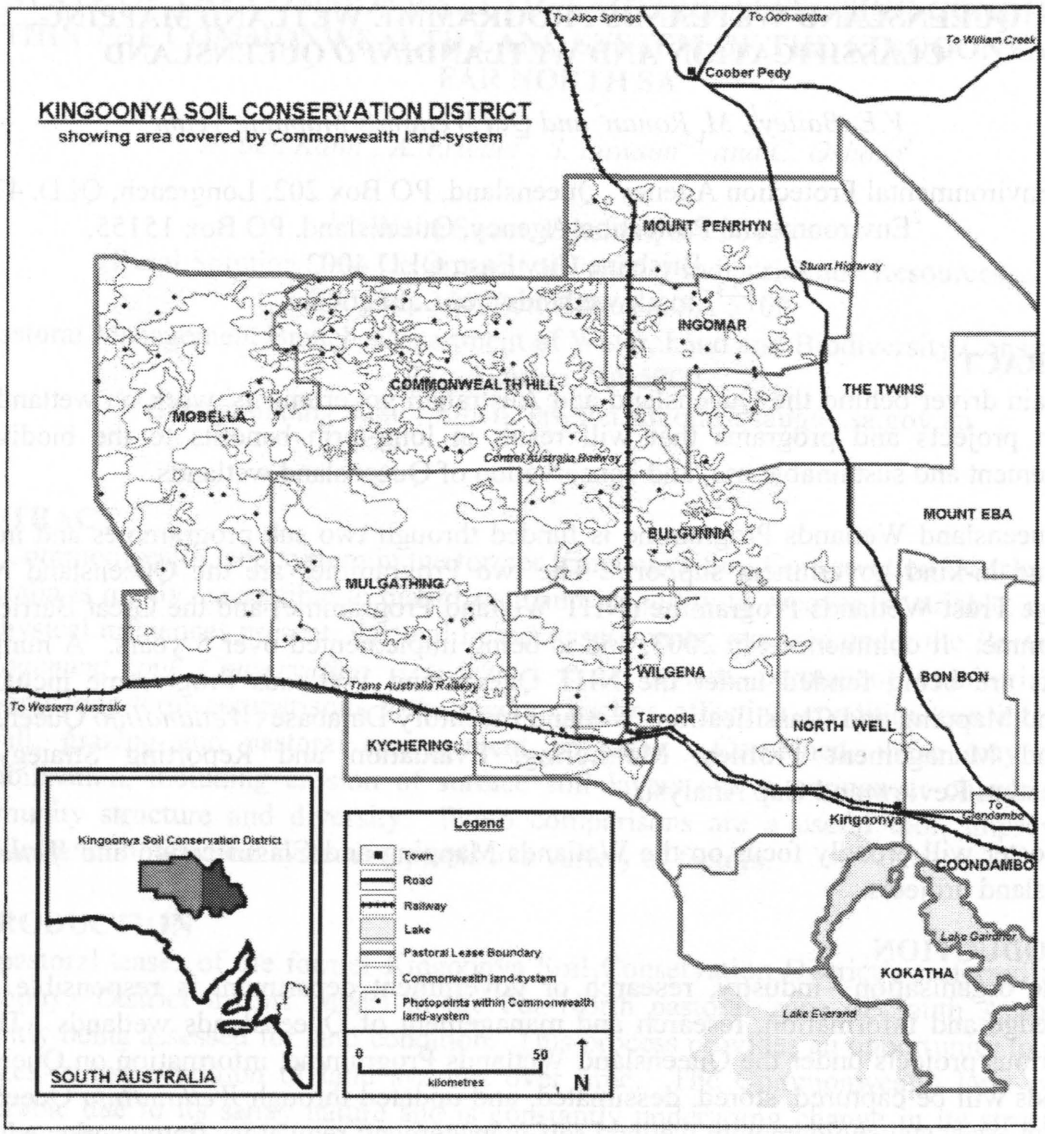

Figure 1: Distribution of the Commonwealth Land System within the Kingoonya District (produced using data provided by Information Management Group, DWLBC)

THE MONITORING PROCESS

The *Pastoral Land Management and Conservation Act (1989)* determines that the assessment of Pastoral Leases within South Australia must take place every fourteen years. The second round of Pastoral Lease Assessments began in June 2005 and revisits permanent vegetation monitoring points established in most paddocks on South Australian pastoral leases. Most are placed out from permanent waters so grazing impacts can be monitored and, therefore, few ungrazed control sites exist. Information gathered at each monitoring point includes photos, a species list, plant densities, erosion and grazing activity, which are all considered in the assignment of a condition rating for each site. At selected sites quantitative data is collected using the Jessup Transect Method (Gould et. al., 2001). This allows for the comparison of species data over subsequent visits to the site. There are approximately 100 monitoring points established in the Commonwealth land system in the Kingoonya District. Many of these have been revisited at least once via the Pastoral Lease Assessment and Pastoral Inspection processes.

FACTORS AFFECTING LAND CONDITION

Factors affecting condition in the Commonwealth land system include fire, erosion, encroachment of woody increaser shrubs, total grazing pressure and the location of fence lines and waters. These factors often interact with one another.

Mulga woodlands are extremely susceptible to fire and several areas of the Commonwealth land system have been affected. High intensity fires in 1974-75 spread through the west of the Kingoonya district and were the most recent broad scale fires in the area. The intensity of fires is largely dependent on the degree of grass cover following a significant rainfall event.

Drift is most common in land systems such as Commonwealth, which inherently has a less stable sandier surface structure. After a fire event, the reduction in vegetative cover can lead to degradation of soil stability, increasing erosion potential and impairing its ability to recover quickly. Dry periods in the arid lands can also influence the natural regeneration of species that define the Commonwealth land system.

Encroachment of woody shrubs can occur following the reduction or removal of palatable plant species, particularly if grazing pressure prevents the regeneration of mulga and perennial grasses. Woody increaser species include cassia (*Senna sp.*), hopbush (*Dodonea sp.*) and emubush (*Eremophila sp.*). These species occur naturally but if the process of succession is interrupted, and in the absence of competition, they can proliferate, forming dense, eventually mixed-age stands (Kingoonya Soil Conservation Board, 2002). The two places where woody increaser encroachment is most often seen are in fire-affected areas and surrounding permanent waters. Largely unpalatable to stock, extra pressure is then transferred onto unaffected areas, which in turn leads to the potential for further encroachment.

Rabbit populations have been suppressed in part by biological controls over the past sixty years. Introduction of the myxomatosis virus in the 1950s and the Rabbit Calici Virus Disease (RCD) in 1996 have helped reduce total numbers. Despite the reduction, even low rabbit populations can remove all mulga seedlings (Pitt 2006). Rabbit populations have begun to increase again following resistance to these controls (Kingoonya Soil Conservation Board, 2002).

The floods of 1989 prompted the regeneration of many species, illustrated by same-age cohorts of some tall shrub and tree species including mulga. Other age-cohorts dating back to the 1973-1974 rains are also well represented. Species such as mulga and pearl bluebush require specific conditions for successful regeneration (Maconochie and Lay, 1996). Although mulga seedlings are present in parts of the Kingoonya District, their long-term survival is largely dependent on follow-up rains and the close monitoring of stock impact, particularly when dry conditions lead to a reduction in alternative feed.

Stocking rate, fence orientation, water placement and historic influences are factors relating to pastoral management that can affect condition in the Commonwealth land system. Many of the monitoring points installed within the Commonwealth land system are situated along fencelines, which allows the direct comparison of two paddocks which may be subject to different stocking conditions. Sheep generally graze into the prevailing south-westerly wind. For this reason, southern fencelines are often more impacted than the northern fencelines of adjacent paddocks. This can be further compounded by the relative location of the nearest water. Impact around waters can be proportional to the length of time they have been operating and how many stock they support. Waters installed in paddock corners often have intensified grazing impact because this narrows the approach of stock, whereas a centrally located water provides 360 degree access, encouraging more uniform grazing across the paddock.

CONCLUSION

The condition of the Commonwealth land system may be linked to historic, environmental and man-made influences and not necessarily relate to current management strategies. Generally, pastoralists have a good knowledge of how their land will react under stocking, and are particularly mindful of the varying ability of land systems to recover.

As monitoring points in the Commonwealth land system continue to be revisited, a clearer picture of land condition trends will emerge. Environmental processes occur on a variety of scales in the rangelands of South Australia, and long-term monitoring will assist our understanding of the dynamics of these changes.

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